FACTORS INFLUENCING MICRO-ENTERPRISES' INFORMATION TECHNOLOGY ADOPTION

By

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A DISSERTATION

Presented to the Faculty of

The Graduate College at the University of Nebraska

In Partial Fulfillment of the Requirements

For the Degree of Doctor of Philosophy

Major: Public Administration

Under the Supervision of Dr. Kenneth Kriz and Dr. Jooho Lee

Omaha, Nebraska

April, 2014

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University of Nebraska, 2014

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Public and non-profit organizations are operating different types of programs to help micro-enterprises appropriately adopt and utilize information technology (IT) for their businesses. Some programs provide mentoring or consultation services; some simply deliver discounted hardware and software; and some offer training services. However, it is uncertain which type would be more effective for micro-enterprises in appropriately adopting and continuously using IT, because it is unknown what factors are relatively significant in terms of micro-enterprises' decisions to adopt and utilize IT for their businesses. The purpose of this research is to examine relevant factors and theories and empirically test their significance and fitness to the context of micro-enterprises' IT adoption. A national mail survey was conducted for data collection, and partial least square structural equation modeling was conducted for data analysis. Findings reveal that factors such as awareness, compatibility, observability, perceived usefulness, perceived ease of use, attitude toward behavior, trialability, anxiety, self-efficacy, business social influence, and technical facilitating condition are significantly associated with micro-enterprises' IT adoption, while resource facilitating condition and perceived behavioral control are not statistically significant. In addition, the Diffusion of Innovation Theory and the Technology Acceptance Model are found to be more significant than the Theory

of Planned Behavior in explaining the context of micro-enterprises' adoption and continuous use of IT. The findings suggest that a more general theory of IT adoption should be developed to explain different contexts of IT adoption. The findings also provide practical implications for better IT support programs for micro-enterprises. For example, an effective IT intervention program would be one that provides micro-enterprises with consultation services that appropriately inform IT solutions, addresses compatibility issues relevant to the individual micro-enterprise business context, and provides opportunities to observe how other micro-enterprises utilize IT solutions rather than simply addressing resource constraints by providing discounted hardware and software. This research contributes to public administration by providing significant implications for policy makers in public and non-profit organizations in designing IT assistance programs that help micro-enterprises effectively carry out a combination of IT solutions, which would foster economic development.

Dedication

To my wife Youngsook Kim whose unwavering support made this project possible, to my two lovely children, Jooeun and Minjae, who cheered me up throughout this project, and to my other family members who kept praying for this project.

Acknowledgements

I would like to express my deepest appreciation to those who contributed to this dissertation research project. I am deeply indebted to my two mentors: Dr. Ken Kriz and Dr. Jooho Lee. Dr. Kriz supported and guided me throughout this project, providing me with excellent academic support and encouragement that instilled confidence in me. Dr. Lee helped me reinforce my academic identity and rigidity for not only this research but also my other research projects. My deepest gratitude also goes to the other committee members: Dr. Robert Blair, Dr. Gary Marshall, and Dr. Sajda Qureshi. This project would never have been in its current form without guidance from them.

Many other professors and friends offered help of many kinds during the writing process or throughout my doctoral study. I would like to express my gratitude to Dr. Jay White, Dr. Christine Reed, Dr. Dale Krane, Dr. Arwiphawee Srithongrung, and Dr. Angela Eikenberry who helped me by looking up the research methods and materials relevant to my dissertation topic. Dr. Meagan Van Gelder and Mrs. Rhonda Sheibal-Carver provided excellent administrative support for my dissertation. Lastly, I would like to thank my fellow doctoral students, Michael Pippin and Jihyung Park, for their input.

This dissertation project was financially supported by the Graduate Research and Creative Activity Grant Program at the University of Nebraska at Omaha

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Chapter 1. Introduction

1.1 Making Sense of Micro-Enterprise

Micro-enterprises are commonly defined as businesses with five or fewer employees including the owner (Association for Enterprise Opportunity, 2011a)[1]. According to the Association for Enterprise Opportunity (2011b), there are over 25 million micro-enterprises in the United States (U.S.), representing about 88 percent of all businesses in the U.S. Because of this they are an integral and important part of national and local economies. Micro-enterprises create jobs (Macke, 2000) and smaller enterprises generate proportionately more jobs than larger enterprises (Hart, 2000). In Nebraska, for example, micro-enterprises accounted for approximately 22 percent of the job growth (Macke, 2000). Micro-enterprises often serve as the seedbed for medium or large enterprises (Grosh & Somolekae, 1996; Macke, 2000). Companies like Cabela's in Sidney, ConAgra in Omaha, and Behlen Manufacturing in Columbus began as micro-enterprises in Nebraska (Macke, 2000). Moreover, micro-enterprises play a role as job trainers. Although many micro-enterprises cease to exist, the experience often provides an effective training ground for job and career development to the people who were

[1] Despite the definition as a business, the micro-enterprise often refers to the owner of the micro-enterprise. Almost 84 percent of all micro-enterprises in the U.S. are those that do not have any employees (the owner is the only worker for the micro-enterprise) (Association of Enterprise Opportunity, 2011b). In most cases, resource constraints of the micro-enterprise owner are directly linked to those of the micro-enterprise. Hence, the term "micro-enterprise" and "micro-enterprise owner" are often used interchangeably, and this applies to this research. For example, "IT intervention for micro-enterprises" may be understood as "IT intervention for micro-enterprise owners."

associated with the micro-enterprise (Macke, 2000), fostering sustainable community development (Vargas, 2000).

Recognizing that micro-enterprises contribute to boosting and stabilizing national and local economies, the U.S. government operates various kinds of business support programs for micro-enterprises, including business training and micro-loans (Schreiner & Woller, 2003; Servon, 2006). Training programs, which are often geared for disadvantaged groups such as the disabled, women and minorities, provide training in developing and financing business plans. Evaluations suggest that these training programs promote business start-ups (Benus, Johnson, Wood, Grover, & Shen, 1995). Business counseling is mostly provided by Small Business Development Centers (SBDCs) supported by the Small Business Administration (SBA) and state and/or local resources. Financial assistance programs increase the availability of capital to new small businesses and micro-enterprises through various methods. Business development financial institutions offer loans to new small businesses or micro-enterprises. They are capitalized with investments from foundations or from government agencies and programs as investors become willing to tolerate lower rates of return (Caskey & Hollister, 2001). The government encourages private financial institutions to expand their financing of micro-enterprises through guarantees and subsidies. While most financial assistance programs provide and expand loans, some programs seek to expand venture capital. For example, public subsidies may be disbursed in order to provide venture capital into rural areas (Barley, Markley, Freshwater, Rubin, & Shaffer, 2000). Micro-enterprise development programs have become a popular local economic development strategy as an increasing number of states have codified micro-enterprise development into their state statutes (Center for Economic Development, 2009-2010; The U.S. Senate Committee on Small Business and Entrepreneurship, 2008). Various micro-enterprise development programs have been established in rural, suburban, and/or inner-city areas, widening work schedule alternatives or generating local economic development policy options (Macke, 2000).

1.2 Why Does Information Technology Matter for Micro-enterprises?

Information technology (IT) has accelerated communications and created a new way of viewing the ways in which various development goals can be achieved through increased productivity. That is, IT can amplify economic growth and income by increasing productivity (Duesterberg, 2003; Stiroh, 2001, 2002; Varian, 2003). The benefits of IT come not just from an increase in connectivity or broader access to IT but also from the facilitation of new forms of development solutions and economic opportunities (Juma & Yee-Cheong, 2005). IT can maximize the utility of limited development resources by enabling or facilitating the development of cost-effective and scalable solutions (Juma & Yee-Cheong, 2005). IT can increase access to information and expertise, competitiveness and access to markets, administrative efficiencies, and learning and labor productivity (Qureshi, 2005, 2010).

As far as access to information and expertise is concerned, Duncombe and Heeks (2003) demonstrate that IT can play a crucial role in enabling and facilitating information and knowledge sharing among rural micro-enterprises, promoting both social and economic development. Puri and Sahay (2003) argue that communicative action helps articulate understanding, knowledge and views. IT facilitates communication by making access to information easier. IT allows micro-enterprises to obtain relevant business information, and thus to increase their business expertise in an efficient and effective manner (Kamal, Song, Kriz, & Qureshi, 2010). Micro-enterprises access the Internet and use email as a means of personal and business communications (Kamal et al., 2010). Diffusion of technology plays a key role in determining competitiveness (Qureshi, 2005, 2010). With regard to competitiveness and access to markets, Preis-Heje, Baskerville, and Hansen (2005) demonstrate a development strategy to attain competitiveness in the software market. Access to markets includes increased access to current and/or new markets or customers, and primarily relates to web marketing or e-commerce sites. Micro-enterprises that develop and host their own websites can expect increased access to their current and potential markets (Kamal et al., 2010).

Administrative efficiency means the maximization of the ratio of net positive results to opportunity costs (Simon, 1950). Increased outcomes for a given amount of costs or reduced costs for a given level of positive outcomes may be considered administrative efficiency. In the context of micro-enterprise development, administrative efficiency means cost savings because micro-enterprises can utilize IT to reduce the cost of their business operations (Kamal et al., 2010). Regarding learning and labor productivity, Cecchini and Scott (2003) demonstrate that the computerization (or digitalization) of operations can lead to faster processing. IT use can increase the productivity of an entire labor force (Braa & Sahay, 2004). Labor productivity relates to output per labor hour or per employee (Chinloy, 1981). It comes from reduced labor input for a given number of products or services, or increased products or services for a given amount of labor time. Micro-enterprises that adopt and use IT experience time savings that can be attributed directly to IT, although the amount of saved time may be different from one micro-enterprise to another (Kamal et al., 2010). The saved time can be used for other core business activities such as communicating with current clients, contacting potential customers or improving product or service quality (Kamal et al., 2010). Labor productivity can be improved by acquiring new IT knowledge and/or skills. Finally, IT can contribute to business quality improvement, either through products or services. In sum, IT can help micro-enterprises grow by creating or enhancing micro-enterprises' (1) access to information, knowledge and expertise, (2) competitiveness and access to markets, (3) administrative efficiencies, (4) learning and labor productivity, and (5) quality improvement.

1.3 Current Practice of IT Intervention for Micro-Enterprises

Despite its potential contribution to business growth, IT adoption by micro-enterprises is limited due to various challenges (Qureshi, Kamal, & Wolcott, 2009; Riemenschneider, Harrison, & Mykytyn, 2003; Wolcott et, Kamal, Qureshi, 2008). Few micro-enterprises possess the information systems needed to support their business operations (Qureshi et al., 2009). A compelling case can be made to make IT assistance an essential part of any micro-enterprise development program. First, it is undeniable that micro-enterprises have contributed and will continue to contribute to both the national economy and to their local economies by creating jobs and expanding the tax base. Second, IT has great potential to increase micro-enterprise business productivity and competitiveness by improving information quality and accelerating communication.

However, IT support programs for micro-enterprises are limited in their number and approach. The current intervention for micro-enterprises is fragmented. Some programs provide mentoring or consultation services (e.g., SCORE[2]); some simply deliver discounted hardware and software (e.g., NFIB[3], TechSoup[4]); and some offer training services (e.g., SBDCs[5]). However, it is uncertain which type would be more effective for micro-enterprises in appropriately adopting and continuously using information technology because it is unknown what factors significantly affect micro-enterprises' decisions to adopt and utilize information technology for their businesses effectively.

Little empirical research has been conducted to inform effective types of IT intervention[6] for micro-enterprises. Any IT intervention that lacks theoretical and empirical foundations with regard to their design and approach may lead to poorly designed programs and haphazard implementation schemes that do not account for various contextual challenges faced by micro-enterprises, resulting in projects that fail to meet their objectives. Therefore, understanding the critical components of an effective IT intervention for micro-enterprises is compelling. This requires understanding the significant factors that influence micro-enterprises' IT adoption. Understanding the relevant factors related to micro-enterprises' IT adoption will provide insights for designing and implementing

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[2] SCORE is a non-profit organization that provides mentoring and education services for small and micro-enterprises (www.score.org).

[3] The National Federation of Independent Business (NFIB) is a non-profit organization that advocates for small and micro-enterprises; it provides its members with discounted IT products and services (www.nfib.com).

[4] TechSoup is a non-profit organization that provides non-profit enterprises with discounted IT products (www.techsoup.org).

[5] Small Business Development Centers (SBDCs) provide a vast array of supporting services to small and micro-enterprises, including technical assistance and training (www.sba.gov).

[6] IT intervention can be defined as the act of interfering with the intent of facilitating IT adoption and utilization.

more effective IT interventions for micro-enterprises, which would motivate or facilitate micro-enterprises' IT adoption. If successful, IT adoption by micro-enterprises may contribute to their development (business growth) through increased business productivity (Kamal et al., 2010; Qureshi, 2005). The growth of micro-enterprises would then contribute to stabilizing or boosting local and national economies through job creation (Grosh & Somolekae, 1996; Hart, 2000; Macke, 2000).

1.4 Purpose of the Research and Organization of the Dissertation

Kamal et al. (2010) demonstrate that IT has a great potential for micro-enterprise development, including productivity growth. However, micro-enterprises face various challenges with regard to their IT adoption, including lack of funding, knowledge, and confidence (Wolcott et al., 2008). Understanding what factors and challenges are related to micro-enterprises' IT adoption is important for designing an effective IT intervention. However, while there has been anecdotal evidence on the effects of IT adoption by micro-enterprises (Kamal, 2009; Kamal et al., 2010; Qureshi et al., 2009), little systematic empirical research has been conducted to investigate the significant factors related to micro-enterprises' IT adoption. This dissertation tries to bridge this knowledge gap. The purpose of this study will be to investigate and model significant factors that are positively or negatively related to micro-enterprises' IT adoption in an attempt to provide practical implications for designing and implementing an effective public and non-profit intervention for the use of IT in micro-enterprises. Through a quantitative analysis of potential factors, the research will address the following research questions: (1) *What are* *the significant factors that influence micro-enterprises' IT adoption?; (2) How can they be modeled to better explain micro-enterprises' IT adoption?; and (3) Which one of the four seminal theories—the Theory of Reasoned Action, the Technology Acceptance Model, the Theory of Planned Behavior, and the Diffusion of Innovation Theory—better fits to the context of micro-enterprises in explaining IT adoption behaviors?* The research questions will be answered by identifying potential factors through a literature review and preliminary field research and then by conducting a cross-sectional national mail survey and analyzing collected data through structural equation modeling.

This dissertation has at least two main contributions to knowledge development and use. First, it is meaningful to determine and empirically test the factors that affect micro-enterprises' IT adoption and use. There have been numerous empirical studies about factors that affect IT acceptance, but most of them have involved more or less organizational contexts that entail large enterprises or student subjects. No single empirical, quantitative research has been conducted about micro-enterprises, which is an important public policy subject. This research enhances our knowledge about the factors that significantly affect micro-enterprises' IT adoption and use, which would inform scholars and practitioners about effective forms of public and non-profit interventions for IT adoption by micro-enterprises. Previous research on micro-enterprises' IT adoption has been mostly qualitative in its nature and limited in terms of generalizability to the entire population of micro-enterprises. For example, resource constraints are one of the commonly cited challenges that micro-enterprises face in previous qualitative case studies (e.g., Wolcott et al., 2008), but there has been no research that provides empirical evidence that is generalizable to the entire population of micro-enterprises. This research attempts to produce a generalizable body of knowledge about the factors influencing micro-enterprises' IT adoption behavior, providing implications for designing and implementing an effective form of IT intervention for micro-enterprises that takes into account the significant factors. Second, this dissertation contributes to the research body of IT for development. Walsham and Sahay (2006) identify four primary areas of IT for development: (1) understanding the link between IT and development, (2) understanding the cross-cultural and multi-cultural implications of IT, (3) understanding the notion of local adaptation and how developing countries appropriate IT, and (4) understanding how IT leads to the development and prominence of marginalized groups. If developing countries can be equated with "underserved communities," and micro-enterprises are considered to be part of underserved communities, then this research can be said to contribute primarily to the third category above: Understanding the notion of local adaptation in terms of applying IT adoption theories to the context of micro-enterprises.

This dissertation is organized as follows. In the next chapter, a literature review is conducted on rationales for public and non-profit intervention to support micro-enterprises' IT adoption, IT for development, and IT acceptance models and theories. The discussion includes the context of IT development for micro-enterprises in which IT interventions for micro-enterprise can be situated (e.g., why public and non-profit organizations need to intervene). Then, the discussion moves to the major technology acceptance models or theories that inform factors relevant to the context of micro-enterprises' IT adoption. The theoretical research model and hypotheses are specified in this chapter, drawing on the literature review. Chapter 3 discusses the methodological framework: Survey methodology for data collection (e.g., sampling and national mail survey) and structural equation modeling for data analyses to test the hypotheses generated in Chapter 2. Chapter 4 discusses the results of data analyses. Descriptive statistics, measurement model, and structural model are examined. Then, the final chapter concludes the dissertation by discussing theoretical and practical implications, limitations, and future research.

Chapter 2. Literature Review

2.1 Overview

In this section, the context and literature of micro-enterprises' IT adoption (IT diffusion among micro-enterprises) and its factors are discussed. Setting the context for the study, the section begins with an overview of the general context from which an IT intervention for micro-enterprises has emerged to facilitate their IT adoption. This is followed by an overview of theories and models of IT adoption, including factors theoretically found and empirically tested.

2.2 Why IT Intervention for Micro-Enterprises

While the contexts in which IT intervention for micro-enterprises can be justified may vary, the major rationale can be provided from the perspective of economic development and social equality. Different economic theorists have provided diverse views on whether or not the government or public sector should play a role in economic development. While there is little consensus on how and/or when the government or public sector should intervene in the private sector (Koven & Lyons, 2010), different development strategies or approaches have been practiced by government.

2.2.1 Role of Government in Economic Development

The economic development policy in the United States can be characterized by "laissez-faire"; the concept originates in Adam Smith's economic theories. According to Smith (1952), each individual pursues his or her own personal gain but is unintentionally directed by an "invisible hand" to promote the goal of wealth maximization; that is, each individual promotes the wealth of the society more effectually than when he or she intentionally seeks to promote it. Smith asserted that the profit motive channels an individual's self-interest into the collective interest of society, and the economic activities of individuals motivated by their self-interests would work for the good of society as far as a market is free (competitive). Therefore, an external actor like the government has no place to intervene to control the market because of this self-adjusting algorithm of the marketplace. Only limited roles of government were advocated by Smith in such areas as defense, the administration of justice, and the maintenance of public works (Smith, 1952). Advocates of lower taxes, less government regulation and small government draw their justification from these basic concepts of Smith (Koven & Lyons, 2010).

Critics of the laissez-faire theory of economic development argue for government or public interventions to address so-called market failure. Market failure happens when the free or unfettered pursuit of private interest brings about an inefficient use of society's resources or an unacceptable distribution of society's goods or services. The areas of market failure include collective goods, externalities, natural monopolies, and information asymmetries that require the government or public interventions (Koven & Lyons, 2010). Collective goods are not produced by the market because nobody can effectively be excluded from their acquisition; therefore, collective goods or services need to be produced and provided through voluntary or coerced contributions such as taxes (Savas, 2000). National defense is an example of a collective good that is non-excludable and benefits all citizens (Koven & Lyons, 2010). Externalities are defined as impacts on someone who did not consent to the impacts; they could be positive or negative, and negative externalities such as air or water pollution provoke various public interventions to remedy them (Stiglitz, 2000). Natural monopolies are regulated in the United States in order to prevent exorbitant prices from being charged by these monopolies (Koven & Lyons, 2010). Finally, information asymmetries, or imperfect information, can illustrate how the market is not always the best answer (Koven & Lyons, 2010). Coupled with a need to respond to these market failures, a shared wish to stimulate economic development and a need to provide worthy goods such as education (job training), food, housing, and medical care allow the government to play a more active role in the private economy instead of leaving the private sector alone (Koven & Lyons, 2010). The government at all levels has undertaken not only economic regulations to remedy market failures but also active economic development to boost economies in their jurisdictions through public works, subsidies, and licensure of programs (Koven & Lyons, 2010).

2.2.2 Local Economic Development Theories, Strategies, and Tools

Various theories have been developed to explain diverse phenomena and contexts in which local economic development takes place: economic base theory, staple theory, sector theory, neoclassical growth theory, interregional trade theory, product cycle theory, theories of flexible production, entrepreneurship theories, theories of concentration and diffusion, location theories, and human capital theory, among others. Each theory delivers its own version of local economic development. For example, economic base theory give emphasis to the export sector that sells products to residents of other locations (Hoyt, 1954; Weinstein, Gross & Rees, 1985); staple theory emphasizes export-led economic growth (North, 1955); sector theory focuses on sectoral diversity (primary, secondary, and tertiary) and productivity (Fisher, 1933); interregional trade theory highlights competitive advantage (Krugman, 1990); product cycle theory underscores creation and diffusion of new products through an innovative process (Vernon, 1966); theories of flexible production accentuate agile production, innovation, and specialization (Piore & Sabel, 1984); entrepreneurship theories call attention to resilience and/or diversity through innovation (Baumol, 1968; Frank, 1998); human capital theory lays emphasis on the development of new products and the creation of an adaptable workforce as viable strategies (Reich, 1991); growth pole theory focuses on diffusion of growth to surrounding regions (Perroux, 1950), and so on. Especially pertinent to this research is Schumpeter's notion of innovation, economic development, and entrepreneurship (Frank, 1998; Schumpeter, 2002). According to Schumpeter, innovation refers to a new combination of existing technologies, and development is defined by the carrying out of new combinations. These concepts cover different types of development: introduction of a new product, introduction of a new method of production, and opening of a new market, among others. Schumpeter emphasizes the role of entrepreneurs, individuals who carry out new combinations of technologies, in realizing development through innovation.

There is no perfect theory that can explain every aspect of local economic development; each theory entails its own strengths and weaknesses (Malizia, 1985). Local actors should take into consideration local economic development strategies based on their solid understanding of local environments to create and/or retain jobs and capital expenditures in their jurisdictions. One of the ways to understand local development strategies is to view them in terms of supply-side and demand-side economics (Eisinger, 1988; Koven & Lyons, 2010). The government or public sector can stimulate local development through supply-side or demand-side strategies (Koven & Lyons, 2010). Supply-side economic development strategies are traditional approaches that focus on reducing the costs of production for businesses and include a variety of incentives and supports from government; it aims to capture mobile capital from businesses looking for places to invest assets. Advocates of supply-side economics believe that benefits to businesses (producers and suppliers) will ultimately benefit all other players in the economy as well (Koven & Lyons, 2010). Tools relevant to supply-side economic development strategies include grants, loans, interest subsidies, equity financing, tax incentives, and nonfinancial assistance (Malpezzi, 2003; Matz & Ledebur, 1986). Tax incentives may include tax abatements, tax exemptions, tax credits, tax cuts, reduced sales taxes, and reduced license fees, and nonfinancial assistance may include customized skills training and relieved regulations (Matz & Ledebur, 1986). These tools are consistent with the philosophy of promoting a favorable business climate for investment (Koven & Lyons, 2010).

Meanwhile, demand-side economic development strategies are relatively new approaches that focus on improving the demand for goods and services and include product development and marketing assistance. In contrast to supply-side, demand-side targets consumers and ultimately aims to boost economic activities by promoting greater consumption of goods or services (Koven & Lyons, 2010). Demand-side strategies may include helping local businesses find (potential) markets, assisting entrepreneurs in creating new businesses, helping existing businesses expand, and nurturing indigenous talent through public-private partnerships, subsidies, and social and human capital development (Coleman, 1988; Flora, 1998; Portes & Sesenbrenner, 1993). According to Eisinger (1988), demand-side approaches accept the perspective that the role of the government or public sector is to help identify the business opportunities that the private sector may overlook or decline to pursue, including opportunities in new markets, new products, and new industries.

Malizia (1985) explains nine local economic development strategies: industrial recruitment/promotion, expansion of existing industries, worker/community ownership, new enterprise development, small business development, transition to new ownership, brokerage/financing services, technical assistance, and management assistance. Koven and Lyons (2010) categorize local economic development strategies in the United States into three waves: (1) business attraction, (2) business retention, expansion and creation, and (3) industrial clusters and other forms of networking, public-private partnerships, human-capital building, and strategic planning. The first wave focused on attracting manufacturing firms to a locality. States and localities provided a variety of tax incentives, loan guarantees, direct loans, and other forms of incentives to attract manufacturing firms into their jurisdictions in order to stimulate local economic development (Blakely & Bradshaw, 2010; Lyons & Hamlin, 2001). The second wave of local economic development, beginning in the 1980s, focused on mixing industrial development (i.e., attracting manufacturing firms) with existing business assistance (i.e., helping local firms grow) and business creation (i.e., helping new firms get started) (Bradshaw & Blakely, 1999). The government practiced various forms of strategies, including more direct incentives, business incubation, micro-enterprise development, venture capital, and technical assistance (Clarke & Gaile, 1997). The third wave of local economic development strategies reflects the global business environment (e.g., global competition) and technological changes (e.g., information and communication technologies) from the 1990s and focuses on creating a conducive environment to growth and development for a specific locality (Fosler, 1992).

2.2.3 Rationales for Government/Public Interventions for Micro-Enterprises' IT Adoption and Use

It is undeniable that micro-enterprises have contributed to national and local economies through creating jobs and expanding the tax base and that IT has a great potential to increase the business productivity and competitiveness of micro-enterprises through improved information quality and accelerated communications. IT interventions for micro-enterprises are compelling. However, any government or public programs to facilitate micro-enterprises' IT adoption and use may raise doubts about whether such programs should be subsidized by the general public or by taxes because these programs' immediate benefits are reaped by the assisted micro-enterprise sector. Hence, the question is—why should the government or public sector take care of IT adoption and use by micro-enterprises? Rationales can be provided in terms of market failure, local economic development theories, and social equity, among others, to justify government or public interventions to facilitate micro-enterprises' IT adoption and use.

First of all, the government or public intervention can be justified in terms of market failure (Koven & Lyons, 2010), information asymmetries to be specific. IT adoption by micro-enterprises is minimal. Information on how to increase business productivity in micro-enterprises through innovation enabled/facilitated by IT may be insufficiently supplied by the private market. For example, micro-enterprises may have difficulty accessing reliable IT consulting services that would inform them of how to integrate IT into their business operations; the available information is often self-serving and untrustworthy, and assessing different claims by different experts is difficult due to micro-enterprises' limited IT knowledge. In this case, IT may not be optimally incorporated into business operations of micro-enterprises although such incorporation of IT would increase micro-enterprises' productivity by more than the input cost. The productivity of micro-enterprises may be increased if the government or public sector facilitates IT adoption by them in a way to provide relevant consultation services (e.g., informing micro-enterprises of IT solutions relevant to their business operations) to micro-enterprises.

Second, micro-enterprise development has been supported by various economic development theories—primarily entrepreneurship theories—and practically implemented since the second-wave economic development policies, drawing on demand-side economics (Bradshaw & Blakely, 1999; Clarke & Gaile, 1997). While local economic growth can be achieved through increasing exports or substituting imports (i.e., economic base theory), the wealth of a locality can also be expanded by increasing the overall productivity of local economy. Studies demonstrate that the growth of micro-enterprises can be facilitated through IT-enabled productivity and innovation (Qureshi, 2005, 2010) and contribute to regional (local) economic growth through creating job opportunities (Hart, 2000; Macke, 2000). Local economic theories, including product cycle theory, theory of flexible production, human capital theory, and entrepreneurship theories, have accentuated productivity and innovation that can be enabled or facilitated by technology, including IT. Providing micro-enterprises with information and training on IT knowledge and skills will increase the productivity of business operations resulting in business growth, which in turn results in increased wealth of localities. The government can strategically assist micro-enterprises with IT knowledge and training in order to enable and/or facilitate innovative processes in them that may boost local economic development.

Finally, social equity has served as one of the criteria by which supporting micro-enterprise development can be justified. Bartik (2004) argues that governmental support for businesses can be justified not only if they affect businesses enough to significantly increase local competition and enhance the productivity of assisted businesses by more than they cost but also if they help businesses or groups whose business success is socially beneficial. Because many micro-enterprises represent underserved communities involving women or minorities, supporting micro-enterprise development can be socially beneficial and thereby justified. Micro-enterprise development programs have typically assisted individuals from groups regarded disadvantaged in their access to capital and mainstream business services (Microenterprise Fund for Innovation, Effectiveness, Learning and Dissemination, 2008). As far as IT is concerned, so-called "digital divide[7]" would be pertinent here to justifying governmental IT interventions for micro-enterprises because digital divide can be discussed in terms of "a general theory of social inequality" (Sharma, 2011, p. 296). Digital divide is one manifestation of social inequality, and it becomes more critical as the new economy develops (Quark, 2008). That is, while IT has become one of the core elements that characterize the new economy, many small enterprises have lagged behind due to limited resources, knowledge, and skills in IT (Sharma, 2011). As an effort to reduce or eliminate digital divide at an enterprise level, governmental or public interventions for micro-enterprises' IT adoption and use can contribute to enhancing social equity.

2.3 Information Technology for Development

Development has been defined in many ways to highlight its different dimensions (Staudt, 1991); there are various notions of development as social, political, and economic processes converge (Qureshi, 2005). The purpose of development is to elevate the sustainable level of living of the poor as rapidly as is feasible and to provide all human beings with the opportunity to develop their fullest potential (Streeten & Burki, 1978). Various development programs have been designed in order to (1) achieve a nation's development goals; (2) make changes in a society or community in a way to increase its productive capacity; and (3) increase the quality of peoples' lives, including improvements in the well-being of the poor (White, 1987, p. 13). Development is

[7] Digital divide refers to inequalities between groups (e.g., individuals, businesses, geographic areas) in terms of access to and use of IT.

typically equated with economic development (Smith, 2009), but it also involves human and social development dimensions. Warschauer (2003) suggests that change management of human and social systems should be taken into account in order for an IT project for development to be successful. Investigating and understanding various aspects of development and how they take place and complement or synergize each other would inform how to improve development in a more efficient or effective way. Knowledge of how and why development helps people change and grow can inform a variety of policy applications to incorporate into empowering people to live up to their full potential (Streeten & Burki, 1978) and to reach as high a freedom as is feasible (Sen, 1999).

Technology is closely linked to development, and vice versa. Neither technology nor development exists alone; they drive each other (Smith, 2009). Technology has had numerous impacts on development; the role of technology as "an engine of development" has been a constant (Smith, 2009, p. 12). Technology has contributed to human welfare, energy, health, and so on (Juma & Yee-Cheong, 2005). However, any examples of successful development do not represent miracles or technological panaceas; rather they represent the massive complexities of the relationships between technology and development (Smith, 2009). Observations of the impacts of technology on development have led to the call for technology for development (Juma & Yee-Cheong, 2005; World Bank, 1998/99). If the impact of technology on development is to become significant, it should be accompanied by adequate human capability. Lee (2001) argues that two different development policies should be implemented to promote technology diffusion: "one that increases access to advanced technologies and another that nourishes human resources to utilize the new technologies" (p. 131). In this sense, development policies in relation to technology may be divided into two different kinds: (1) technology adoption for development and (2) development for technology adoption, comprising the subject area of the research community of information technology for development.

IT for development relates to the implementation, use and management of IT infrastructures for the purpose of stimulating social and economic development (Qureshi, 2005). The wide use of information and communication technologies (ICTs) in different segments over the world has informed the way in which the field of IT for development is progressing (Qureshi, 2010). A variety of IT for development research has been conducted, investigating various effects brought about by IT for development efforts and local contexts of IT for development implementations; various theories have been built and tested for IT for development, informing future research to be followed for better knowledge development and use about IT for development. Brown and Grant (2010) suggest a duality in the research agenda of IT for development: (1) those studies that focus on understanding IT "for development," in which development is set as a dependent variable, and the adoption or appropriation of IT is treated as a set of independent variables and (2) those studies that focus on understanding IT "in developing" countries, in which IT adoption, appropriation or use is treated as a dependent variable. The former informs research primarily about what technologies are related with what types of development and focuses on understanding the link between IT and development (Walsham & Sahay, 2006) and how and why IT facilitates development (Brown & Grant, 2010). Meanwhile, the latter informs research mainly about how technologies can be adopted effectively and/or efficiently and focuses on understanding the notion of local adaptation to IT, including the cultural implications (Walsham &

Sahay, 2006). For example, building human skills may be a key agenda for developing countries to catch up with current technologies; that is, improving human capability of utilizing technology may cause a positive cycle of human development for adopting advanced technologies, facilitating technology adaptation (Lee, 2001). The field of IT for development is not limited to developing countries; in actuality, it can be applied to every segment of communities and regions in which people have limited access to funds, social services and education needed to sustain them (Kamal, 2009). Micro-enterprise is a global phenomenon mostly related to people who run a business with limited resources for development; hence it becomes a relevant subject of IT for development research although the context would be more or less different between developed and developing countries.

Previous research on micro-enterprises' IT adoption has shown that IT helps micro-enterprises operate in a more efficient and effective fashion (Kamal, 2009; Kamal et al., 2010; Qureshi et al., 2009). Kamal et al. (2010) suggest a conceptual logic model to show how IT adoption by micro-enterprises may lead to long-term economic development and poverty reduction and empirically investigated short-term effects of IT adoption on micro-enterprises that are suggested by Qureshi (2005). The IT effects that lead to development in Qureshi (2005) and Qureshi et al. (2009) are access to new markets, increased access to information and skills, competitiveness, productivity improvements and administrative efficiencies. Qureshi et al. (2009) empirically investigated how IT adoption by micro-enterprises can enable them to achieve and increase competitiveness, drawing on the resource based view of the micro-enterprise to develop a model of micro-enterprise growth through IT.

While Qureshi, Kamal and Wolcott (2008) provide insights about how IT can bring about sustainable business improvement in micro-enterprises, IT adoption by micro-enterprises is limited due to various challenges they uniquely face (Qureshi et al., 2009; Riemenschneider et al., 2003; Wolcott et al., 2008), including lack of funding, knowledge and skills (Duncombe & Heeks, 2003). Few micro-enterprises have information systems needed to support their business operations (Qureshi et al., 2009). While micro-enterprises can serve as the seedbed for overall economic development (Grosh & Somolekae, 1996), they have to overcome many challenges that inhibit their IT adoption (Qureshi et al, 2009). Wolcott et al. (2008) empirically investigated a host of challenges that micro-enterprises face in adopting and using IT and grouped those challenges into six categories: capabilities, resources, access, attitude, context, and operations. Clifton Jr., Edens, Johnson and Springfield (1989) demonstrate a need to set up an appropriate information delivery mechanism for an effective technology assistance to take into account various limitations and challenges faced by small enterprises in their technology adoption. In order to investigate the factors that would influence the process of IT adoption by micro-enterprises, the research draws upon various IT acceptance models or theories.

2.4 IT Adoption Theories

Numerous models have been introduced in order to explain individual IT adoption and use. The major seminal theories that have contributed to developing a body of knowledge in this field include the Theory of Reasoned Action, the Theory of Planned

Behavior, the Technology Acceptance Model, and the Diffusion of Innovation Theory, among others.

2.4.1 Theory of Reasoned Action

Theory of Reasoned Action (TRA) is a theory in which individual behavior is determined by "behavioral intention," and behavioral intention is driven by "attitude toward behavior" and "subjective norm" (Fishbein & Ajzen, 1975). In TRA, attitude toward behavior is defined as a positive or negative feeling about performing a behavior, and subjective norm is defined as an individual perception of what people important to the individual think about the behavior in terms of whether the behavior should be performed or not; in other words, beliefs about consequences of behavior influence attitude toward behavior, and normative beliefs about behavior influence subjective norm concerning behavior in TRA (Fishbein & Ajzen, 1975). TRA can be visually modeled as shown in Figure 2.4.1.1.

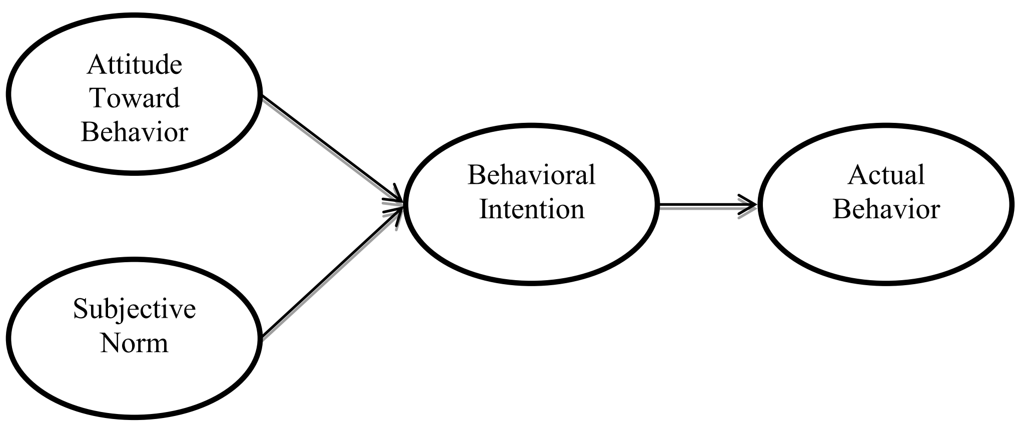

Figure 2.4.1.1 Theory of Reasoned Action

TRA was adapted into the Technology Acceptance Model (Davis, 1989) and used in various following models to explain individual IT acceptance and use (e.g., Herbert & Benbasat, 1994; Karahanna, Straub, & Chervany, 1999; Leonard, Cronan, & Kreie, 2004; Venkatesh, Morris, Davis, & Davis, 2003).

2.4.2 Technology Acceptance Model

As discussed earlier, Davis (1989) adapted TRA suggested by Fishbein and Ajzen (1975) into the field of information technology and developed the Technology Acceptance Model (TAM). TAM is a model that explains how individual end users accept and use information systems. Instead of using the concept of subject norm, Davis (1989) added “perceived usefulness” and “perceived ease of use” as determinants of attitude toward using information systems; therefore, the main constructs in TAM is perceived usefulness, perceived ease of use, attitude toward using IT, behavioral intention to use, and actual use of information systems; perceived usefulness is theorized to be influenced by perceived ease of use; both perceived usefulness and perceived ease of use is seen to influence attitude toward using IT; and perceived usefulness is posed to influence behavioral intention to use, which, in turn, is theorized to determine actual use of IT (i.e., actual IT usage behavior).

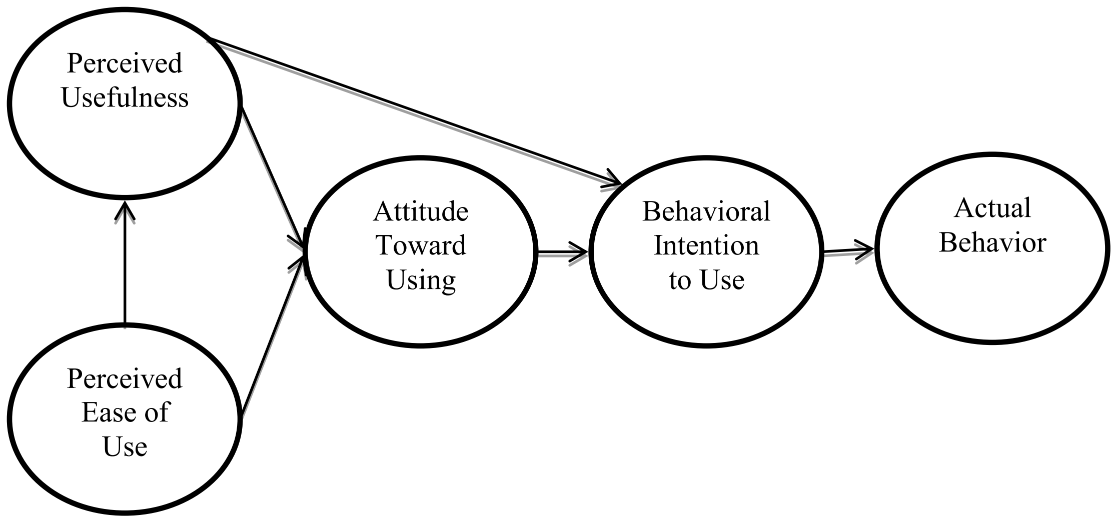

Figure 2.4.2.1 Technology Acceptance Model

Davis, Bagozzi, and Warshaw (1989) empirically showed that TAM is more powerful in explaining behavioral intention to use technology. According to Davis et al. (1989), perceived usefulness strongly influences intentions to use IT; perceived ease of use has a small but significant effect on intentions to use IT, yet subsides over time; attitude only partially mediates the effects of the beliefs on intentions; and subjective norm, which is one of the main constructs of TRA (Fishbein & Ajzen, 1975), have no effect on intentions. TAM is one of the most influential models in this research body of IT acceptance; many researchers have empirically tested the relationships between constructs employed in TAM (e.g., Adams, Nelson, & Todd, 1992; Hendrickson, Massey, & Cronan, 1993), and extended TAM to different settings (e.g., Agarwal & Prasad, 1999; Amoko-Gyampah & Salam, 2004; Gefen, Karahanna, & Straub, 2003; Koufaris, 2002; Venkatesh & Bala, 2008; Wixom & Todd, 2005). While TAM is acknowledged to have significantly contributed to developing technology adoption research, it has been criticized for some limitations including limited predictive power and lack of practical value (Bagozzi, 2007).

2.4.3 Theory of Planned Behavior

TRA was revised and extended by Ajzen (1991) into the Theory of Planned Behavior (TPB). TPB includes perceived behavioral control as a critical construct that influences behavioral intention and actual usage behavior because the actual usage behavior is considered to be limited due to the lack of control over behavior (Ajzen, 1991). In the model, the performance of behavioral intention is a joint function of attitude toward behavior, subjective norm, and "perceived behavioral control," and that of actual usage behavior is explained as a function of behavioral intention and perceived behavioral control. The model is diagrammed as follows.

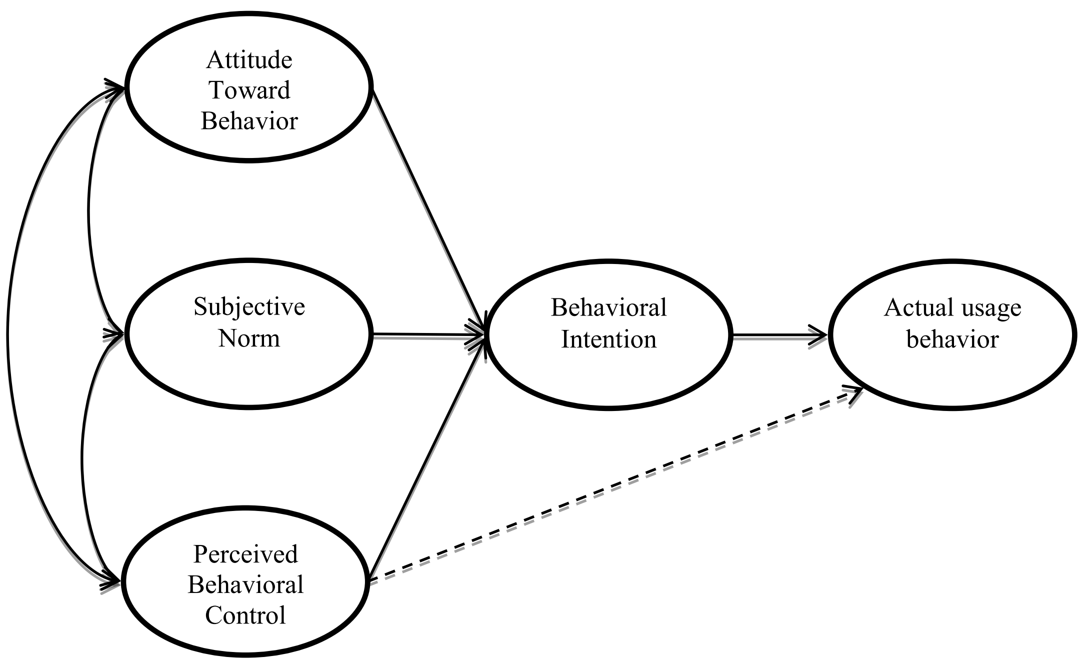

Figure 2.4.3.1 Theory of Planned Behavior

Attitude toward behavior is determined through an assessment of one's beliefs about the consequences resulted from actual usage behavior and an evaluation of the desirability of these consequences. For subjective norm, the contribution of the opinion of any given referent is weighted by the motivation that an individual has to comply with the wishes of that referent. Finally, behavioral control is defined as one's perception of the difficulty of performing a behavior. TPB has been used in various following models of IT acceptance in different settings (e.g., Brown & Venkatesh, 2005; Chau & Hu, 2001; George, 2004; Hansen, Jensen, & Solgaard, 2004; Leonard, Cronan, & Kreie, 2004; Mathieson, 1991; Taylor & Todd, 1995; Workman, 2005). Taylor and Todd (1995) compared TAM with TPB in an attempt to examine which model better explain the construct of behavioral intention to use IT or actual IT usage. The results show that the predictive power of TPB model is roughly comparable to TAM, and therefore the construct of perceived behavioral control does not add much value beyond TAM in terms of the predictive power. According to Taylor and Todd (1995), both intention and perceived behavioral control are significant determinants of actual usage behavior.

2.4.4 Diffusion of Innovations Theory

The Diffusion of Innovations Theory (DIT) posits that the innovation adoption is shaped by the characteristics of an innovation being considered, the involved decision-making process when considering the adoption, the characteristics of individuals who consider the adoption, the potential or expected consequences for individuals and society by adopting an innovation, and the communication channels involved in an innovation adoption (Rogers, 2003). DIT has been incorporated into the field of IT for the purpose of understanding what individual factors influence the innovation (information system) adoption (i.e., IT adoption); the main focus has been on individuals' perceptions of the IT innovation as informed by DIT (e.g., Baskerville & Pries-Heje, 2001; Brancheau & Wetherbe, 1990; Moore & Benbasat, 1991; Rajagopal, 2002; Shao, 1999; Straub, 1994; Wu & Wang, 2005; Zhu & Kraemer, 2005). For example, Moore & Benbasat (1991) incorporate the idea of Roger's five factors (i.e., "relative advantage," "compatibility," "complexity," "observability," and "trialability") and generate eight characteristics of the innovation as perceived by individual users; they include relative advantage, complexity, image, visibility, compatibility, results demonstrability, and voluntariness of use.

2.4.5 Other major models of IT adoption and issues

In the meantime, such models as the Model of PC Utilization[8] (Thompson, Higgins, & Howell, 1991), the Motivational Model[9] (Davis, Bagozzi, & Warshaw, 1992), the Social Cognitive Theory[10] (Compeau & Higgins, 1995), the Combined TAM and TPB[11] (Taylor & Todd, 1995), and the Unified Theory of Acceptance and Use of

[8] The Model of PC Utilization incorporates Triandis' theory of human behaviour and suggests a competing perspective to that proposed by TRA and TPB. Main constructs include job-fit, complexity, long-term consequences, affect toward use, social factors, and facilitating conditions (Thompson et al., 1991).

[9] The Motivational Model applies motivational theory in an attempt to understand new IT adoption and sets extrinsic and intrinsic motivation as primary constructs to explain IT adoption (Davis et al., 1992).

[10] The Social Cognitive Theory applies the theory of human behaviour and has outcome expectations–performance, outcome expectations–personal, self-efficacy, affect, and anxiety as its main constructs (Compeau & Higgins, 1995).

[11] This combines predictors from TPB with perceived usefulness from TAM; main constructs include attitude toward behavior, subjective norm, perceived behavioral control, and perceived usefulness (Taylor & Todd, 1995).

Technology[12] (Venkatesh et al., 2003) have been introduced in an attempt to advance or extend TAM and TPB, and many other studies have been conducted on differently adjusted models. These studies can be categorized into three purposes: 1) to introduce factors from related models or theories, 2) to investigate additional or alternative belief factors, and 3) to examine antecedents and moderators of perceived usefulness and perceived ease of use (Wixom & Todd, 2005). TAM was compared several times to either TRA or TPB; subjective norm was added to TAM model several times; the original TAM model had five constructs and 10 relations between constructs, but none of the following studies incorporated all these relations; there was a high proportion of positive relations between constructs in each study, but with a number of inconsistencies between studies (Legris, Ingham, & Collerette, 2003). In addition, each model uses different construct names with similar concepts. While most studies have been successful in exploring new constructs by borrowing some meaningful concepts from other research disciplines and incorporating them into their own IT acceptance models and in showing some significant relationships among constructs, their findings have been more or less inconsistent in terms of significance of external variables.

For example, the research results of Thompson et al. (1991) show that there is no significant relationship between facilitating condition of IT use and behavioral intention to use IT, while Wang (2003) shows a significance of the construct "self-efficacy[13]." In

[12] This Unified Theory reviews previous introduced eight models and sets performance expectancy, effort expectancy, social influence, and facilitating conditions as its main constructs that affect behavioural intention or use behaviour (Venkatesh et al., 2003).

[13] As noted earlier, each research uses different construct names for similar or same concepts, so readers should be careful in understanding what constructs mean from their names. Here, the construct of facilitating condition in Thompson et al. (1991) includes similar items that the construct of self-efficacy in Wang (2003) has. In addition, Compeau and Higgins (1995) separate the items in the construct of facilitating condition in Thompson et al. (1991) into two

addition, Compeau and Higgins (1995) reveal a conclusion that there is a negative relationship between support (facilitating condition) and self-efficacy as opposed to expectation. Possibly, the results are different because the subjects are different, involved technologies are different, and the organizational or individual contexts are different. While most studies on IT acceptance models consistently show a significant, positive relationship between perceived usefulness of IT and behavioral intention to use IT (Lee, Kozar, & Larsen, 2003), there has been little consistency among other constructs (i.e., factors except perceived usefulness); this may imply that their applicability would depend on specific situations or contexts in which they are applied. This implies that some factors would better explain a certain phenomenon of IT adoption than others, depending on different contexts of IT adoption. For example, studies conducted on the basis of an organizational context would be more or less limited in explaining an individual context of IT adoption because the environment surrounding IT use (e.g., resources) is different between users with organizational support and those without. Therefore, findings about constructs (or factors) studied under the organizational context by previous research may be somewhat limited in their generalizability to the context of micro-enterprises' IT adoption.

Furthermore, the relationship between facilitating condition of IT use and behavioral intention to use IT may not be significant under some organizational contexts in which organizational support is enough that individual users do not need to pay much attention to it because it is given; however, for individual users who do not have such organizational support, facilitating condition may be a significant factor if they are really

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different constructs, support and self-efficacy; the meaning of self-efficacy is different between Compeau and Higgins (1995) and Wang (2003).

concerned about losing control of IT and needing support. In an organizational context, the availability of resources necessary to adopt new IT may not be a concern to individual users in the organization because it is an issue on the organizational level, but it would really matter to an individual IT adopter who needs to take care of funding for IT adoption. In this sense, the generalizability of findings on IT adoption factors may be limited to the same or similar context from which they have been drawn. Therefore, while many factors have been identified and tested to explain behavioral intention to use IT and/or actual IT use, it would be quite difficult to conclude which factors would be relevant in explaining a different situation or context of IT adoption, if studies have not been conducted taking into account the specific context. As far as micro-enterprises are concerned, there has been no such empirical research; hence, we do not know for sure which factors would really matter in the context of micro-enterprises' IT adoption. This is the context of why we need to investigate which factors would affect micro-enterprises in their IT adoption and use. Lee et al. (2003) point out that research subjects are either students or knowledge workers, implying that it is hard to argue that findings of previous IT adoption models about significant factors are applicable or generalizable to the context of micro-enterprises. In many cases, the owners of micro-enterprises are not knowledge workers. Previous research results regarding IT acceptance factors or models would be useful only to the degree which they can inform potentially relevant factors that would affect micro-enterprises' IT adoption.

2.5 Constructs and Hypotheses

Developing a theoretical model of micro-enterprises' IT adoption involves an effort to identify potential factors that are relevant to the context of micro-enterprises' IT adoption. It entails understanding of the unique contexts or business environments that micro-enterprises face in order to narrow down the most relevant constructs among them and develop new constructs as they are seen to be relevant. Therefore, the first thing to do is to review previous works on IT adoption/acceptance factors in order to inform relevant ones to this study.

2.5.1 Awareness

Awareness is the state or ability to perceive, to feel, or to be conscious of events, objects, or sensory patterns. More broadly, it is the state or quality of being aware of something. Very little work has been done in this research field on the effects of awareness of relevant IT solutions in IT adoption behavior. This may be because most of the studies in this field have involved an organizational context in which subjects are already aware of the IT solutions being investigated. In an organizational context, technologies or systems are given to end-users waiting for their acceptance and use at the stage of implementation. However, the context of micro-enterprises' IT adoption is different in that technologies are not given. If the owners of micro-enterprises do not know what technologies are available for their businesses, there is no opportunity to assess how they would be useful in their business contexts. Lack of awareness about IT is one of the challenges that would inhibit micro-enterprises in their IT adoption (Wolcott et al., 2008). In this sense, it would be reasonable to assume that the more the owners are aware of relevant IT solutions, the more they are likely to perceive the solutions' usefulness, which, in turn, motivates micro-enterprises to move forward to adopt and use the solutions (Song & Qureshi, 2010).

Hypothesis 1: Awareness is positively associated with perceived usefulness.

2.5.2 Perceived Usefulness

Perceived usefulness is defined as the degree to which a person believes that using a particular system would enhance his or her job performance (Davis, 1989). This construct is one of the core constructs of TAM (Davis, 1989, 1992). Perceived usefulness has been differently named depending on the context of studies involved: extrinsic motivation (Davis et al., 1992), job-fit (Thompson et al., 1991), relative advantage[14] (Moore & Benbasat, 1991; Premkumar & Potter, 1995; Rogers, 2003), and outcome expectation (Compeau & Higgins, 1995). Venkatesh et al. (2003) used performance expectancy covering all of these different names with the same or similar concepts. Perceived usefulness is one of the constructs that have been consistently employed in the research models of previous studies and empirically tested against its statistical significance (e.g., Bhattacherjee & Sanford, 2006; Compeau & Higgins, 1995; Hsieh, Rai, & Keil, 2008; Karahanna et al. (1999); Legris, Ingham, & Collerette, 2003; Taylor &

[14] Relative advantage: The degree to which the innovation is perceived to be superior to current practice (Rogers, 2003).

Todd, 1995; Tompson et al., 1991; Venkatesh, 2000; Wixom & Todd, 2005; Wu & Lederer, 2009).

This consistent use of perceived usefulness in previous studies sheds light on a high possibility of becoming relevant to the context of micro-enterprises' IT adoption as well. The construct has been theorized to be determined by self-efficacy (Agarwal & Karahanna, 2000; Compeau & Higgins, 1995; Igbaria, Parasuraman, & Baroudi, 1996; Montazemi, Cameron, & Gupta, 1996), perceived ease of use (Davis et al., 1989; Devaraji, Easley, & Crant, 2008; Karahanna & Straub, 1999; Riemenschneider et al., 2003), compatibility (Chau & Hu, 2002; Karahanna, Agarwal, & Angst, 2006), social influence (Compeau & Higgins, 1995; Karahanna & Straub, 1999), among others. Perceived usefulness has been modeled to positively influence such constructs as attitude toward IT (Bhattacherjee & Sanford, 2006; Chau & Hu, 2002; Davis et al., 1989; Hsieh et al., 2008; Karahanna et al., 1999), behavioral intention to use IT (Agarwal & Karahanna, 2000; Bhattacherjee & Sanford, 2006; Brown & Venkatesh, 2005; Chau & Hu, 2002; Chin, Johnson, & Schwarz, 2008), and usage behavior (Thompson et al., 1991; Premkumar & Potter, 1995; Igbaria et al., 1996; Karahanna & Straub, 1999; Wu & Lederer, 2009), among others.

Hypothesis 2a: perceived usefulness is positively associated with usage behavior.

Hypothesis 2b: perceived usefulness is positively associated with attitude.

Hypothesis 2c: perceived usefulness is positively associated with behavioral intention to use.

2.5.3 Perceived Ease of Use

Frequently employed in the previous IT acceptance models is perceived ease of use. Perceived ease of use is defined as the degree to which a person believes that using a particular system would be free of effort (Davis, 1989); it is another core construct of TAM (Davis, 1989; Davis et al., 1989). Perceived ease of use (Davis, 1989; Davis et al., 1989) also has often been named differently; complexity[15] (Rogers, 2003; Thompson et al., 1991), perceived complexity (Igbaria et al., 1996) and effort expectancy (Venkatesh et al., 2003). In contrast to perceived usefulness, which has consistently turned out to be statistically significant (e.g., Adams et al., 1992; Bhattacherjee & Sanford, 2006; Chau & Hu, 2002; Compeau & Higgins, 1995; Hsieh et al., 2008; Karahanna & Straub, 1999; Plouffe et al., 2001; Taylor & Todd, 1995; Venkatesh et al., 2003; Wixom & Todd, 2005), the statistical significance of perceived ease of use has been mixed; that is, it was significant in some studies (e.g., Pavlou & Fygenson, 2006; Riemenschneider et al., 2003; Taylor & Todd, 1995; Wixom & Todd, 2005) and insignificant in other studies (e.g., Chau & Hu, 2002; Davis et al., 1989; Karahanna et al., 1999).

This construct seems especially relevant to explaining micro-enterprises' IT adoption and use because many of the micro-enterprise owners are known to suffer a lack of IT knowledge and skills (Kamal, 2009; Song & Qureshi, 2010; Wolcott et al., 2008). Perceived ease of use has been hypothesized to affect attitude toward IT (Chau & Hu, 2002; Davis et al., 1989; Karahanna et al., 1999; Moore, 1987; Pavlou & Fygenson, 2006) and perceived behavioral control (Chau & Hu, 2002; Hsieh et al., 2008; Riemenschneider et al., 2003), among others.

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[15] Complexity: The degree to which an innovation is perceived as relatively difficult to understand and use (Rogers, 2003; Thompson et al., 1991).

Hypothesis 3a: perceived ease of use is positively associated with perceived behavioral control.

Hypothesis 3b: perceived ease of use is positively associated with attitude.

Hypothesis 3c: perceived ease of use is positively associated with perceived usefulness.

2.5.4 Compatibility

Compatibility refers to the degree to which the innovation is perceived to be consistent or inconsistent with socio-cultural values or beliefs, previously ideas or experience, and/or needs of potential innovation adopters (Rogers, 2003). This construct is one of the five key factors—relative advantage, complexity, compatibility, observability, and trialability—theorized to influence diffusion of innovation (Rogers, 2003). The consequences of IT implementation depend on compatibility to the context in which it occurs (Avital et al., 2007; Kling, 2000); hence, the construct of compatibility has been considered as having influence on IT acceptance (Chau & Hu, 2002; Karahanna et al., 1999; Moore, 1987; Moore & Benbasat, 1994; Plouffe et al., 2001; Premkumar & Potter, 1995; Taylor & Todd, 1995). Compatibility has been modeled as affecting perceived usefulness and perceived ease of use (Chau & Hu, 2002; Karahanna et al., 2006), attitude toward behavior (Moore, 1987; Taylor & Todd, 1995), behavioral intention to use (Chau & Hu, 2002; Plouffe et al., 2001), and usage behavior (Karahanna et al., 2006; Moore & Benbasat, 1991; Premkumar & Potter, 1995), among others.

Hypothesis 4a: compatibility is positively associated with usage behavior.

Hypothesis 4b: compatibility is positively associated with attitude.

Hypothesis 4c: compatibility is positively associated with behavioral intention to use.

2.5.5 Observability

Observability is another core factor theorized to impact diffusion of innovations (Rogers, 2003). It is defined as the degree to which the results of an innovation are visible to potential adopters (Rogers, 2003). It is not difficult to think that ideas are likely to be adopted earlier when they are easily observed by potential adopters. For example, hardware is known to have a faster rate of adoption than software because the former is more visible than the latter. Xia and Lee (2000) divide observability into two different constructs: results demonstrability and visibility. Observability seems relevant to the context of micro-enterprises' IT adoption as implied by Song and Qureshi (2010) in which it is argued that observing other micro-enterprises' IT use would provide micro-enterprises with opportunities to make sense of what solutions are being used in what contexts and how they would work for their own businesses. Observabilitity has been hypothesized as having influence on perceived usefulness (e.g., Compeau & Higgins, 1995), self-efficacy (Compeau & Higgins, 1995), perceived ease of use (Igbaria et al., 1996), attitude toward behavior (Moore, 1987), behavioral intention to use (Igbaria et al., 1996), and usage behavior.

Hypothesis 5a: observability is positively associated with usage behavior.

Hypothesis 5b: observability is positively associated with awareness.

Hypothesis 5c: observability is positively associated with attitude.

Hypothesis 5d: observability is positively associated with behavioral intention to use.

2.5.6 Technical Facilitating Condition

Facilitating condition refers to provision of support for users that can influence system utilization (Thompson et al., 1991). The business environment of micro-enterprises suggests a potential relevancy of such factors as facilitating conditions (Song & Qureshi, 2010). Test results in the previous empirical studies about facilitating conditions have not been consistent; as discussed earlier, it turned out to be insignificant in some studies (Karahanna & Straub, 1999; Thompson et al., 1991; Tihah & Barki, 2009; Venkatesh et al., 2003), but significant in other studies (Compeau & Higgins, 1995; Igbaria et al., 1996; Wang, 2003). The effect of facilitating condition was even negative in contrast to expectation in the research of Compeau and Higgins (1995). These inconsistent results might have been caused by different organizational contexts in which these studies were conducted. Facilitating condition might have not been considered important to individual members of the organization of which IT support was perceived to be enough for end users. However, as far as micro-enterprises are concerned, technical facilitating condition would be critical in their IT adoption to the degree which they believe they cannot manage or control IT by themselves. Facilitating condition has been theorized to impact perceived behavioral control (Hsieh et al.,2008; Pavlou & Fygenson, 2006; Taylor & Todd, 1995), perceived ease of use (Igbaria et al., 1996; Igbaria, Zinatelli, Cragg, & Cavaye, 1997; Karahanna & Straub, 1999), perceived usefulness (Compeau & Higgins, 1995; Igbaria et al., 1997; Karahanna & Straub, 1999), behavioral intention to use (Tihah & Barki, 2009; Venkatesh et al., 2003), and usage behavior (Thompson et al., 1991; Venkatesh et al., 2003), among others.

Hypothesis 6a: technical facilitating condition is positively associated with usage behavior.

Hypothesis 6b: technical facilitating condition is positively associated with perceived ease of use.

Hypothesis 6c: technical facilitating condition is positively associated with perceived behavioral control.

Hypothesis 6d: technical facilitating condition is positively associated with behavior intention to use.

2.5.7 Perceived Behavioral Condition

The construct of perceived behavioral control was added to TRA, resulting in the introduction of TPB (Ajzen, 1991). It is defined as the perceived ease or difficulty of performing the behavior (Ajzen, 1991). In the context of information systems research, it is interpreted as perceptions of internal and external constraints on behavior (Taylor & Todd, 1995). The construct of perceived behavioral control has been hypothesized to influence behavioral intention to use (Ajzen, 1991; Brown & Venkatesh, 2005; Chau & Hu, 2002; Harrison, Mykytyn Jr., & Riemenschneider, 1997; Hsieh et al., 2008) and usage behavior (Ajzen, 1991; Pavlou & Fygenson, 2006; Taylor & Todd, 1995). Taylor and Todd (1995) have self-efficacy, resource facilitating conditions and technology facilitating conditions as the antecedents of perceived behavioral control.

Hypothesis 7a: perceived behavioral control is positively associated with usage behavior.

Hypothesis 7b: perceived behavioral control is positively associated with behavioral intention to use.

2.5.8 Trialability

Trialability refers to “the degree to which the innovation can be experienced on a limited basis” (Rogers, 2003, p. 258). It is argued that innovations that can be tried on an installment basis are more rapidly adopted than those that are not divisible (Rogers, 2003). In addition to this aspect of trialability, this research argues that easy access to and/or experience with innovations may comprise another aspect of trialability. A good example of this aspect of trialability can be seen in a trial version of software, which is usually not divisible in its adoption. In this sense, trialability would be pertinent to the context of micro-enterprises’ IT adoption because it is often difficult for micro-enterprises to try (new) IT due to their lack of access to solution and limited funding and time (Kamal, 2009; Song & Qureshi, 2010; Wolcott et al., 2008). Hence, trialability is included in the research model of this study as a potentially significant construct. This construct of trialability reflects the importance of past or prior experience (Dishaw & Strong, 1999) and has been modeled as influencing attitude toward behavior (Karahanna et al., 1999; Moore, 1987).

Hypothesis 8: trialability is positively associated with attitude.

2.5.9 Attitude toward Behavior

Attitude toward behavior is defined as an individual's positive or negative feelings (evaluative affect) about performing the target behavior (Fishbein & Ajzen, 1975). The construct of attitude toward behavior has been most repeatedly investigated (Davis, 1989; Davis et al., 1989; Fishbein & Ajzen, 1975; Taylor & Todd, 1995) although it has sometimes been named differently; examples include intrinsic motivation (Davis et al., 1992), affect toward use (Thompson et al., 1991), and affect (Compeau & Higgins, 1995). Micro-enterprises' attitude toward IT would play a critical role in their IT adoption because willingness to experiment with IT that comes from positive attitude toward IT is a prerequisite leading to their IT adoption. Attitude toward behavior has been modeled as affecting behavioral intention to use (Ajzen, 1991; Riemenschneider et al., 2003; Hsieh et al., 2008; Harrison et al., 1997; Wixom & Todd, 2005).

Hypothesis 9a: attitude is positively associated with usage behavior.

Hypothesis 9b: attitude is positively associated with behavioral intention to use.

2.5.10 Anxiety

Anxiety refers to an unpleasant state evoking anxious or emotional reactions when it comes to performing a behavior (e.g., using a computer) (Compeau & Higgins, 1995). Wolcott et al. (2008) and Song and Qureshi (2010) argue that fear factors matter in the context of micro-enterprises' IT adoption. Micro-enterprises that participated in a preliminary case study (Song & Qureshi, 2010) repeatedly raised questions about whether they could manage IT without external support, worrying about potential loss of business control against their will. Lack of confidence is one the challenges that inhibits micro-enterprises' IT adoption (Wolcott et al., 2008). In this sense, computer anxiety would be a relevant construct to the context of micro-enterprises' IT adoption. Computer anxiety has been discussed from various contexts (Gilroy & Desai, 1986; Howard & Smith, 1986; Kernan & Howard, 1990; Morrow, Prell, & McElroy, 1986; Parasuraman & Igbaria, 1990) and modeled to affect perceived ease of use (Montazemi et al., 1996; Venkatesh, 2000), among others.

Hypothesis 10: anxiety is negatively associated with perceived ease of use.

2.5.11 Resource Facilitating Condition

An introductory qualitative work by Wolcott et al. (2008) and a preliminary work of this study (Song & Qureshi, 2010) reveal that micro-enterprises often suffer limited resource availability. Resource availability refers to the degree to which resources necessary to adopt IT are available, and lack of resource availability often results in insufficient technology support. According to Wolcott et al. (2008), lack of time and funding comprise the challenges faced by micro-enterprises in adopting IT. Therefore, unlike in large enterprises where resource availability is not a critical factor to its members in their IT acceptance, in micro-enterprises resource availability has direct influence on IT adoption of the owners in that they are in charge of the costs involved with IT adoption. Resource facilitating condition has been hypothesized to influence the construct of perceived behavioral control (Hsieh et al., 2008; Pavlou & Fygenson, 2006; Taylor & Todd, 1995) and turned out to be statistically significant. In this research, resource facilitating condition is also theorized to influence behavioral intention to use and usage behavior.

Hypothesis 11a: resource facilitating condition is positively associated with usage behavior.
Hypothesis 11b: resource facilitating condition is positively associated with perceived behavioral control.
Hypothesis 11c: resource facilitating condition is positively associated with behavior intention to use.

2.5.12 Self-Efficacy

Self-efficacy has been a frequently employed construct in IT acceptance models. It is defined as judgment of one's ability to use technology (e.g., computer) to accomplish a particular job or task (Compeau & Higgins, 1995). In other words, it is the belief in one's capability of successfully performing a technologically sophisticated task (McDonald & Siegall, 1992). Self-efficacy would be partly related to the construct of anxiety (Bandura, 1977; Fenech, 1998; Gist, Schwoerer, & Rosen, 1989; Hill, Smith, & Mann, 1987). Self-efficacy is known to be determined by prior experience (Bandura, 1977), social influence (Compeau & Higgins, 1995b), observability (Compeau & Higgins, 1995), facilitating condition (Compeau & Higgins, 1995), and skills (Pavlou & Fygenson, 2006). This construct seems especially relevant to the context of micro-enterprises' IT adoption because micro-enterprise owners' fear of losing control over technologies is known to be high due to their lack of IT capabilities (Kamal, 2009; Song & Qureshi, 2010; Wolcott et al., 2008). Wolcott et al. (2008) argue that micro-enterprises suffer from inadequate IT user skills, poor troubleshooting skills, inadequate IT development skills, limited IT planning capabilities, and lack of IT knowledge. Self-efficacy has been hypothesized to influence perceived behavior control (Hsieh et al., 2008; Pavlou & Fygenson, 2006; Taylor & Todd, 1995) and perceived ease of use (Agarwal & Karahanna, 2000; Devaraji et al., 2008; Igbaria et al., 1996; Montazemi et al., 1996; Venkatesh, 2000), among others.

Hypothesis 12a: self-efficacy is positively associated with perceived ease of use.
Hypothesis 12b: self-efficacy is positively associated with perceived behavioral control.

2.5.13 Social Influence

Social influence refers to the individual's internalization of the reference group's subjective culture, and specific interpersonal agreements that the individual has made with others, in specific social situations (Thompson et al., 1991). In this research, the construct of social influence is divided into two different constructs—personal social influence and business social influence—as they seem appropriate. In this research, social influence is theorized to have influence on awareness of relevant IT solutions because people around the micro-enterprise owner would be a good source from which they become aware of some relevant IT solutions that would be relevant to their business contexts. Rogers (2003) makes an argument for the effects of social influence through the communication network in innovation diffusion, suggesting the potential significance of the link of social influence to awareness. Social influence has been hypothesized as affecting social or subjective norm (Hsieh et al., 2008; Karahanna et al., 1999; Taylor & Todd, 1995), among others.

Hypothesis 13a: personal social influence is positively associated with awareness.

Hypothesis 13b: personal social influence is positively associated with subjective norm.

Hypothesis 14a: business social influence is positively associated with awareness.

Hypothesis 14b: business social influence is positively associated with subjective norm.

2.5.14 Subjective Norm

Subjective norm is defined as the person's perception that most people who are important to him or her think he or she should or should not perform the behavior in question (Ajzen, 1991; Fishbein & Ajzen, 1975). That is, this construct draws on the normative beliefs of significant others surrounding an IT adopter with respect to IT adoption (Karahanna et al., 1999). In the same context as in social influence, subjective norm seems relevant because micro-enterprise owners are cautious in adopting IT and tend to want to see the proof that IT would work for their business operations from the words of significant others. Subjective norm has been named differently (e.g., social factors as cited in Thompson et al., 1991), and there have been other similar concepts such as image (Moore & Benbasat, 1991) and social pressure (Igbaria et al., 1996). Subjective norm has been modeled as influencing behavioral intention to use (Ajzen, 1991; Brown & Venkatesh, 2005; Devaraji et al., 2008; Harrison et al., 1997; Hsieh et al., 2008) and usage behavior (Devaraji et al., 2008).

Hypothesis 15a: subjective norm is positively associated with usage behavior.

Hypothesis 15b: subjective norm is positively associated with behavioral intention to use.

There are many other constructs that were investigated in previous studies but are not included in this researh: voluntariness (Moore & Benbasat, 1991), personal innovativeness (Agarwal & Karahanna, 2000), physical and information accessibility (Karahanna & Limayem, 2000), perceived enjoyment (Davis et al, 1992), and system quality (Venkatesh & Davis, 2000), to list some of them. Some constructs may be more controllable than others, and some seem more relevant to the context of micro-enterprises' IT adoption than others. However, these other constructs are not included in the research model employed in this study; their substantial meanings are somewhat limited in the context of designing and implementing programs for IT assistance for micro-enterprises.

Chapter 3: Methodology

3.1 Overview

Research design makes a link from research model (i.e., hypotheses) through data collection and analysis to conclusions that answer the initial research questions; it provides a conceptual framework and an action plan for flowing from a set of research questions to a set of conclusions. Research design for this research involves a quantitative research method; a survey method is employed to collect data from micro-enterprises, and structural equation modeling is conducted to analyze collected data and test hypotheses. In this chapter, the hypotheses developed in the previous chapter are summarized into the research model. Then, question items to measure each construct employed in the research model are briefly discussed. Finally, survey design for data collection and structural equation modeling for data analysis are concisely discussed.

3.2 Research Model

The hypotheses presented in the previous section are depicted by the research model as shown in Figure 3-1. All research hypotheses are summarized in Table 3-1.

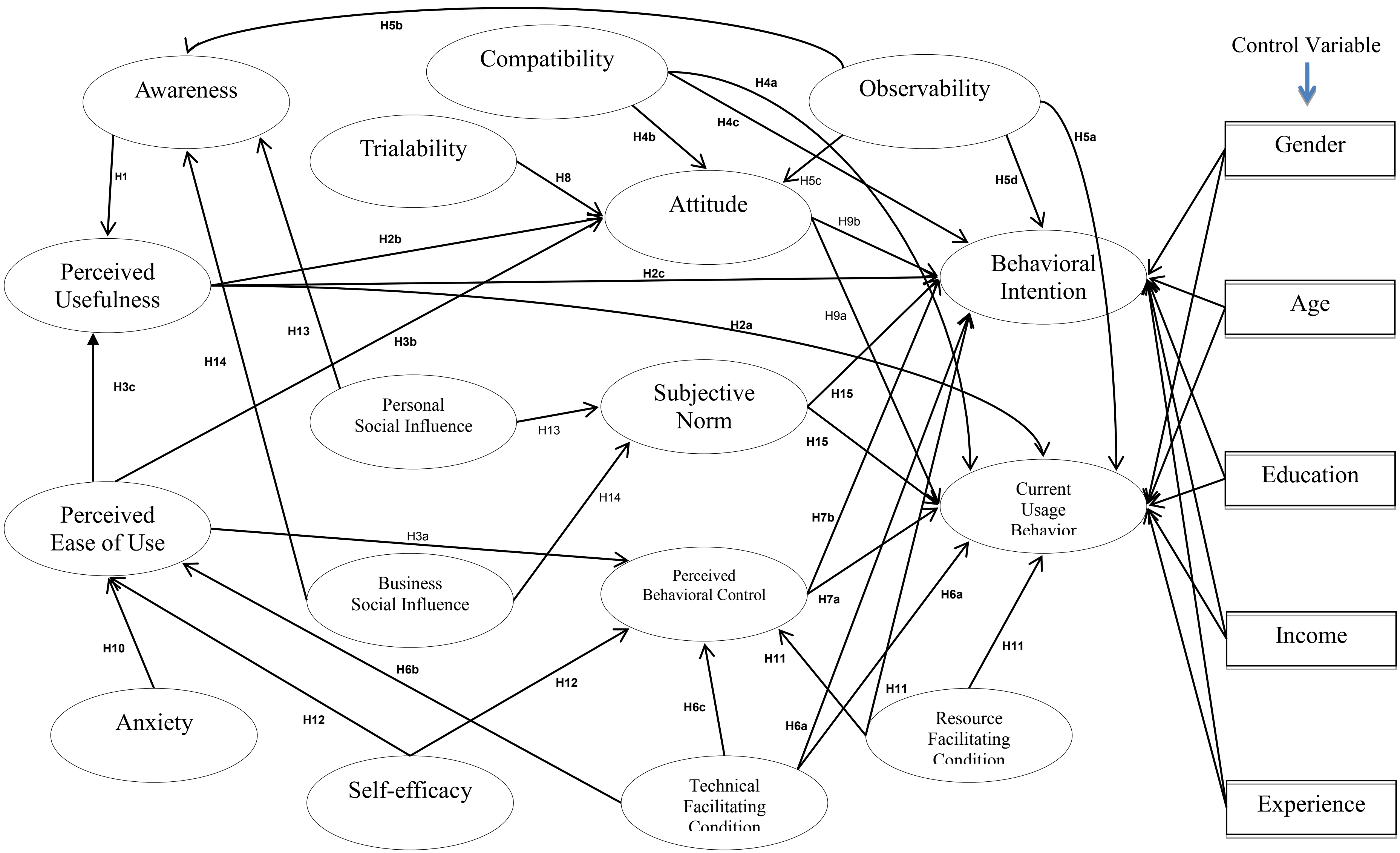

Figure 3.2.1 Theoretical Model (Default PLS Model) of Micro-enterprises' IT Adoption

Table 3.2.1 Summary of Research Hypotheses

H1	Awareness is positively associated with perceived usefulness
H2a	Perceived usefulness is positively associated with usage behavior
H2b	Perceived usefulness is positively associated with attitude
H2c	Perceived usefulness is positively associated with behavioral intention to use
H3a	Perceived ease of use is positively associated with perceived behavioral control
H3b	Perceived ease of use is positively associated with attitude
H3c	Perceived ease of use is positively associated with perceived usefulness
H4a	Compatibility is positively associated with usage behavior
H4b	Compatibility is positively associated with attitude
H4c	Compatibility is positively associated with behavioral intention to use
H5a	Observability is positively associated with usage behavior
H5b	Observability is positively associated with awareness
H5c	Observability is positively associated with attitude
H5d	Observability is positively associated with behavioral intention to use
H6a	Technical facilitating condition is positively associated with usage behavior
H6b	Technical facilitating condition is positively associated with perceived ease of use
H6c	Technical facilitating condition is positively associated with perceived behavioral control
H6d	Technical facilitating condition is positively associated with behavior intention to use

H7a	Perceived behavioral control is positively associated with usage behavior
H7b	Perceived behavioral control is positively associated with behavioral intention to use
H8	Trialability is positively associated with attitude
H9a	Attitude is positively associated with usage behavior
H9b	Attitude is positively associated with behavioral intention to use
H10	Anxiety is negatively associated with perceived ease of use
H11a	Resource facilitating condition is positively associated with usage behavior
H11b	Resource facilitating condition is positively associated with perceived behavioral control
H11c	Resource facilitating condition is positively associated with behavior intention to use
H12a	Self-efficacy is positively associated with perceived ease of use
H12b	Self-efficacy is positively associated with perceived behavioral control
H13a	Personal social influence is positively associated with awareness
H13b	Personal social influence is positively associated with subjective norm
H14a	Business social influence is positively associated with awareness
H14b	Business social influence is positively associated with subjective norm
H15a	Subjective norm is positively associated with usage behavior
H16a	Subjective norm is positively associated with behavioral intention to use

3.3 Measurement

The constructs or latent variables employed in the research model were operationalized in a way to minimize measurement error from perception-based question-statements and to reduce collinearity among latent variables (Gefen, Straub, & Boudreau, 2000; Schumacker & Lomax, 2004).

The scale of actual IT usage has been measured mostly in terms of the intensity and/or frequency of IT use (e.g., Davis et al., 1989; Thompson et al., 1991). This research takes the same approach in order to be consistent with the previous measurement scale. The intensity of business-related IT use was measured in terms of hours of use per week, and the frequency of IT use was measured in terms of hardware, software, and Internet use. The items to measure the frequency of hardware use include personal computer (including tablet PC), smartphone, printer, scanner, digital camera or camcorder, and data backup devices. The items to measure the frequency of software use include Internet connection (information search and email), word processing (MS Word or similar), spreadsheet (MS Excel or similar), database (MS Access or similar), presentation (MS PowerPoint or similar), scheduling (Google calendar or similar), and custom applications. The question items to measure Internet use is shown in Table 3.3.1.

Table 3.3.1. Question Items to Measure Internet Usage Scale

1	Searching for business-related information (e.g., laws and regulation, market and trade information, etc.)
2	Using email to communicate with business stakeholders (e.g., customers, suppliers, etc.)

3	Using Internet for advertising or promoting the business (e.g., building an informational business website, online yellow pages, etc.)
4	Conducting business-related transactions (e.g., sales, procurement, etc.)

The respondents were asked to choose one of the options—1 (Never), 2 (Occasionally), 3 (Often), and 4 (Always)—that most closely describes their usage behavior related to each item. Regarding the intensity of IT use including hardware, software, and Internet, the respondents were asked to choose one of the following options: 1 (Less than 1 hour), 2 (1-5 hours), 3 (5-10 hours), 4 (10-20 hours), 5 (20-30) hours, and 6 (More than 30 hours). The construct of actual IT usage was modeled to be formative because the causality direction is from the measurement items to the construct, and the measurement items do not necessarily have to be correlated (Diamantopoulos & Siguaw 2006). All the other constructs employed in the research model were modeled to be reflective (Chin, 1998; Diamantopoulos & Siguaw 2006).

The scale of behavioral intention to use IT was adapted from Taylor and Todd (1995) and Venkatesh et al. (2003). For example, one of the measurement items in Taylor and Todd (1995) stated "I intend to use the CRC this term"; in Venkatesh et al. (2003) the statement was "I intend to use the system in the next <n> months." In the instrument for this research, the statement was revised in a way to reflect the context of micro-enterprises' IT adoption; that is, the item was stated as "I intend to use computers more intensively for my business" and "I intend to use computers more frequently for my business." Initially, the statement used "IT" instead of "computer," but it was revised to help the respondents better understand what is being asked. The construct of actual IT usage has five measurement items, and the 7-point Likert scale was used to measure each item; that is, the respondents were asked to rate each item or statement from 1 (Strongly disagree) to 7 (Strongly agree). This construct has a Cronbach's alpha of 0.94. The construct or scale is modeled to be reflective.

Table 3.3.2 Question Items to Measure Behavioral Intention to Use Scale

BI1	I intend to use computer more intensively for my business.
BI2	I intend to use computer more frequently for my business.
BI3	I intend to explore more computer solutions for my business.
BI4	I intend to use computer to do my business whenever it has a feature to help me perform it.
BI5	I intend to use computer in as many cases/occasions as possible

The awareness scale was developed to measure how aware micro-enterprise owners are of computer hardware or software relevant to their business operations and if they have a clear idea of how using computer hardware and software would benefit their businesses. Four question items comprise the awareness scale as presented in Table 3.3.3, and the scale has a Cronbach's alpha of 0.959. The construct or scale is modeled to be reflective. The research employed the 7-point Likert scale to measure the measurement items by asking the respondent to rate each item from 1 (Strongly disagree) to 7 (Strongly agree).

Table 3.3.3 Question Items to Measure Awareness

AW1	I am well aware of computer hardware relevant to my business operations.
AW2	I have a clear idea about how using computer hardware benefits my business.
AW3	I am well aware of computer software relevant to my business operations.
AW4	I have a clear idea about how using computer software benefits my business.

The scale of perceived usefulness includes six items, and it was adapted from Adams, Nelson, and Todd (1992), Davis (1989), Davis et al. (1989), and Moore and Benbasat (1991). The question items (statements) were differently worded to reflect the context of micro-enterprises by adding the term "business." For example, Moore and Benbasat (1991) have a question item stated as "using a PWS increases my productivity," but in this research it was revised as "using computers in my business increases my productivity." The research employed the 7-point Likert scale to measure the measurement items of perceived usefulness by asking the respondent to rate each item from 1 (Strongly disagree) to 7 (Strongly agree). This scale has a Cronbach's alpha of 0.972, and is modeled to be reflective.

Table 3.3.4 Question Items to Measure Perceived Usefulness

PU1	Using computer in my business enables me to accomplish tasks more quickly.
PU2	Using computer improves my business performance.

PU3	Using computer in my business increases my productivity.
PU4	Using computer enhances my effectiveness in the business.
PU5	Using computer makes it easier to do my business.
PU6	I find computer useful in my business.

The scale of perceived ease of use also includes six items. The measurement items are from such studies as Adams et al. (1992), Davis et al. (1989), Moore and Benbasat (1991), etc. The scale has a Cronbach's alpha of 0.975, which is the highest among the constructs employed in this research. The scale is modeled to be reflective. The research employed the 7-point Likert scale to measure the measurement items of perceived ease of use by asking the respondent to rate each item from 1 (Strongly disagree) to 7 (Strongly agree).

Table 3.3.5 Question Items to Measure Perceived Ease of Use

PE1	Learning to use computer is easy for me.
PE2	I find it easy to get computer to do what I want it to do.
PE3	I find computer to be flexible to interact with.
PE4	It is easy for me to become skillful at using computer.

PE5	My interaction with computer is clear and understandable.
PE6	I find computer easy to use.

The compatibility scale is adapted from the previous studies (e.g., Chau & Hu, 2002; Karahanna et al., 1999; Moore & Benbasat, 1991; Taylor & Todd, 1995, etc.). Measurement items include compatibility with most aspects of the work and work style. Five measurement items comprise the scale in this research as presented in Table 3.3.6. The scale has a Cronbach's alpha of 0.950, and is modeled to be reflective. The research employed the 7-point Likert scale to measure the measurement items of compatibility by asking the respondent to rate each item from 1 (Strongly disagree) to 7 (Strongly agree).

Table 3.3.6 Question Items to Measure Compatibility

COM1	Using computer is compatible with all aspects of my business
COM2	Using computer is compatible with my current business situation.
COM3	Using computer fits well with the way I prefer to do my business.
COM4	Using computer fits into my business style.
COM5	The setup of computer is compatible with the way I do business.

The construct of observability is composed of result demonstrability and visibility (Karahanna et al., 1999; Moore & Benbasat, 1991). The observability scale in this research is measured in terms of visibility and adapted from the visibility scale in both Karahanna et al. (1999) and Moore and Benbasat (1991). For example, the statements "In my organization, I have seen many people with Windows in their computers" in Karahanna et al. (1999) and "I have seen what others do using their PWS" in Moore and Benbasat (1991) were differently worded as "I have seen what other micro-enterprises do using information technology." Rewording this way clarifies what "many people" or "others" means. Four adapted measurement items are presented in Table 3.3.7. The research employed the 7-point Likert scale to measure the measurement items of observability by asking the respondent to rate each item from 1 (Strongly disagree) to 7 (Strongly agree). The scale has a Cronbach's alpha of 0.872, and is modeled to be reflective.

Table 3.3.7 Question Items to Measure Observability

OB1	I have seen what other micro-enterprises do using computer
OB2	It is easy for me to observe other micro-enterprises using computer.
OB3	I have had plenty of opportunity to see computer being used for other micro-enterprises.
OB4	Computer is very visible in my business community.

Although the conceptual boundary between facilitating condition and perceived behavioral control was sometimes unclear (e.g., Venkatesh et al., 2003), the scale of facilitating condition has been distinguishable from that of perceived behavioral control (e.g., Taylor & Todd, 1995). Facilitating condition has been also divided into technical facilitating condition and resource facilitating condition (Taylor & Todd, 1995). The scale of technical facilitating condition in this research was adapted from Thompson et al. (1991) and Taylor and Todd (1995) in a way to add the business context of micro-enterprises. The research employed the 7-point Likert scale to measure the measurement items of technical facilitating condition by asking the respondent to rate each item from 1 (Strongly disagree) to 7 (Strongly agree). The scale has a Cronbach's alpha of 0.928 and is modeled to be reflective in this research.

Table 3.3.8 Question Items to Measure Technical Facilitating Condition

TF1	Guidance is available to me in the selection of computer hardware and software for my business.
TF2	A specific person (or group) is available for assistance with computer software difficulties.
TF3	Specialized instruction concerning the popular computer software for my business is available to me.
TF4	A specific person (or group) is available for assistance with computer hardware difficulties.

The construct of perceived behavioral control was included in TPB (Ajzen, 1991), and TPB has been included in various models of technology acceptance (Brown & Venkatesh, 2005; Chau & Hu, 2002; Hsieh et al., 2008; Pavlou & Fygenson, 2006; Taylor & Todd, 1995; Riemenschneider et al., 2003)). The scale of perceived behavioral control in this research was adapted from Taylor and Todd (1995), in which three measurement items comprise the scale. The adapted three measurement items are presented in Table 3.3.9. The scale has a Cronbach's alpha of 0.823 and is modeled to be reflective in this research. The research employed the 7-point Likert scale to measure the measurement items of perceived behavioral control by asking the respondent to rate each item from 1 (Strongly disagree) to 7 (Strongly agree).

Table 3.3.9 Question Items to Measure Perceived Behavioral Control

PBC1	I am able to use computer for my business.
PBC2	Using computer for my business is entirely within my control.
PBC3	I have the resources, the knowledge, and the ability to make use of computer for my business.

The trialability scale was adapted from such studies as Karahanna et al. (1999) and Moore and Benbasat (1991). Karahanna et al. (1999) have three question items, and Moore and Benbasat (1991) have four items to measure the trialability. The scale in this research is composed of four measurement items as shown in Table 3.3.10. The scale has a Cronbach's alpha of 0.923 and is modeled to be reflective. The research employed the 7-point Likert scale to measure the measurement items of trialability by asking the respondent to rate each item from 1 (Strongly disagree) to 7 (Strongly agree).

Table 3.3.10. Question Items to Measure Trialability

TR1	Before deciding whether to use any computer solutions for my business, I am able to properly try them out.
TR2	I am permitted to use computer solutions on a trial basis long enough to see what it could do for my business.
TR3	I have a great deal of opportunity to try various computer solutions for my business.
TR4	I know where I can go to satisfactorily try out various uses of computer solutions for my business.

Attitude toward behavior has been a core construct in most models of technology acceptance (e.g., Chau & Hu, 2002; Davis et al., 1989; Karahanna et al., 1999; Pavlou & Fygenson, 2006; Taylor & Todd, 1995; Tihah & Barki, 2009; Venkatesh et al., 2003). The attitude scale in this research was adapted from these previous studies by adding the "business" context of micro-enterprises. Four consistently used measurement items in previous studies comprise the attitude scale in this study as well. The 7-point Likert scale was employed to gauge the measurement items of attitude; the respondents were asked to rate each item from 1 (Strongly disagree) to 7 (Strongly agree). The scale has a Cronbach's alpha of 0.936 and is modeled to be reflective.

Table 3.3.11 Question Items to Measure Attitude

ATT1	Using computer for my business is a good idea.
ATT2	Using computer for my business is a wise idea.

ATT3	I like the idea of using computer for my business.
ATT4	Using computer for my business is pleasant.

Montazemi et al. (1996) used 14 items to measure the scale of computer anxiety; in Venkatesh (2000) the number of measurement items was nine. In Venkatesh (2000), the construct of anxiety included the construct of self-efficacy; that is, self-efficacy was separated from anxiety in Venkatesh et al. (2003); four items were used to measure each of the constructs. The scale of anxiety in this research was adapted from Venkatesh et al. (2003), in which four statements were used to measure the scale, considering the length of survey instrument employed for this research. The 7-point Likert scale was employed to assess the measurement items of anxiety; the respondent was asked to rate each item from 1 (Strongly disagree) to 7 (Strongly agree). The scale has a Cronbach's alpha of 0.912 and is modeled to be reflective.

Table 3.3.12 Question Items to Measure Anxiety

ANX1	I feel apprehensive about using computer for my business.
ANX2	It scares me to think that I could lose many business data using computer by hitting the wrong key.
ANX3	I hesitate to use computer for fear of making mistakes I cannot correct.
ANX4	Computer is somewhat intimidating to me.

The scale of resource facilitating condition was adapted from Thompson et al. (1991). The measurement items for resource facilitating condition in Thompson et al. (1991) reflect the availability of computers and the costs involved. The question items for resource facilitating condition in this research considered not only a cost factor but also a time factor because time to learn how to use hardware and software is likely to potentially influence micro-enterprises' IT adoption behavior. Four question items comprise the resource facilitating condition scale as presented in Table 3.3.13. The scale is modeled to be reflective, and has a Cronbach's alpha of 0.855.

Table 3.3.13 Question Items to Measure Resource Facilitating Condition

RF1	I have enough time to learn how to use computer hardware for my business.
RF2	I have enough time to learn how to use computer software for my business.
RF3	I have enough funding to purchase computer hardware for my business.
RF4	I have enough funding to purchase computer software for my business.

Self-efficacy has been included in many models of IT acceptance (e.g., Agarwal & Karahanna, 2000; Compeau & Higgins, 1995; Igbaria et al., 1996; Venkatesh, 2000; Venkatesh et al., 2003). However, as stated earlier, self-efficacy was not separated from anxiety in Venkatesh (2000); measurement items for self-efficacy were mixed with those for anxiety. Later, Venkatesh et al. (2003) separated self-efficacy from anxiety; four items were used to measure each of the constructs. The anxiety scale in this study was adapted from Venkatesh et al. (2003), and the four items to measure the scale are presented in Table 3.3.14. The scale has a Cronbach's alpha of 0.922 and is modeled to be reflective. The 7-point Likert scale was employed to gauge the measurement items of self-efficacy; the respondents were asked to rate each item from 1 (Strongly disagree) to 7 (Strongly agree).

Table 3.3.14 Question Items to Measure Self-efficacy

SE1	I feel comfortable using computer on my own.
SE2	I am able to complete a job using computer even if no one is around to tell me what to do as I go.
SE3	I can easily operate any computer solutions on my own.

The scale of social influence has been measured by various items (e.g., Hsieh et al., 2008; Karahanna et al., 1999; Taylor & Todd, 1995; Venkatesh et al., 2003). Taylor and Todd (1995) had peer influences and superior influences as two distinct normative constructs, while Hsieh et al. (2008) included family, relatives, friends, and peers' influence into a single normative structure. Considering the business environment of micro-enterprises, this research divides the normative structure into two different constructs: personal social influence and business social influence. The scale of personal social influence includes family, friends, and relatives' influence, and business social influence includes customers, business partners, and colleagues' influence. The measurement items for the scales of personal and business social influences are presented in Table 3.3.15 and 3.3.16, respectively. The Cronbach's alpha is 0.944 for the scale of personal social influence and 0.905 for business social influence. The 7-point Likert scale was employed to assess the measurement items in both scales, and the respondent was asked to rate each item from 1 (Strongly disagree) to 7 (Strongly agree).

Table 3.3.15 Question Items to Measure Personal Social Influence

PSI1	My friends think that I should use computer for my business.
PSI2	My immediate family thinks that I should use computer for my business.
PSI3	My relatives think that I should use computer for my business.

Table 3.3.16 Question Items to Measure Business Social Influence

BSI1	My customers think that I should use computer for the business.
BSI2	My business partners think that I should use computer for the business.
BSI3	People I work with think that I should use computer for the business.

As discussed earlier, subjective norm is a core construct of TRA and TPB. Hence, all the studies that draw on these theories have this construct in their research model (e.g., Brown & Venkatesh, 2005; Devaraji et al., 2008; Harrison et al., 1997; Hsieh et al., 2008; Tihah & Barki, 2009; etc.). Two typically used measurement items are presented in Table 3.3.17 (Ajzen, 1991; Hsieh et al., 2008; Taylor & Todd, 1995). The scale has a

Cronbach's alpha of 0.957 and is modeled to be reflective. The 7-point Likert scale was employed to evaluate the measurement items of subjective norm; the respondent was asked to rate each item from 1 (Strongly disagree) to 7 (Strongly agree).

Table 3.3.17 Question Items to Measure Subjective Norm

SN1	People who influence my behavior think that I should use computer for my business.
SN2	People who are important to me think that I should use computer for my business.

3.4 Data Collection: Surveys

A national mail survey was conducted to collect cross-sectional research data. For this, a questionnaire (instrument) was generated; question items in the questionnaire were theoretically grounded and pilot-tested in order to secure the instrument reliability and construct validity. A survey is a popular method used by the IS research community (Newsted, Huff, & Munro, 1998). According to Newsted et al. (1998), surveys provide responses that can be generalized to other members of the population and often to other similar populations, and they can provide a way of comparing responses over different groups, times, and places.

3.4.1 Sampling Strategy

The target population of the survey is the whole of micro-enterprises in the U.S. This research accepts the definition of micro-enterprise as a business with five or fewer employees, including the owner, because this definition is the most frequently cited criterion for the micro-enterprise. According to the Association of Enterprise Opportunity (2011b), the number of micro-enterprises in the United States is estimated to be approximately 25.5 million; about 83.9 percent (about 21.4 million) of the U.S. micro-enterprises are those that do not have any employees (the owner is the only worker for the micro-enterprise). These are the estimated numbers based on non-employer statistics and county business patterns released by the U.S. Census Bureau in 2010 and compiled by the Association of Enterprise Opportunity; the exact number of micro-enterprises (the population size for this study) is unknown. The following is a sampling strategy for this survey research.

Due to a confidentiality issue, (state) government agencies did not provide a list of the micro-enterprises to a third party. Statistics released from the U.S. Census Bureau about micro-enterprises did not provide enough information for a survey (i.e., owner name and address). For a sampling and survey purpose, the current best source was RefereceUSA[16] (or InfoUSA); its business database provided a list of 9.4 million[17] micro-enterprises with all the information necessary for a survey including owner name and address, and the list could be used as a sampling frame for a survey for this research.

The research conducted quantitative sampling to maximize the representativeness of respondents; respondents were randomly selected through both two-stage simple

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[16] This is the reference division of InfoGroup that provides business and residential information for reference and research (http://www.referenceusa.com).

[17] As of December 2011 when random sampling was conducted

random sampling and stratified random sampling. Two-stage simple random sampling was required to allow each micro-enterprise in the database to have an equal chance to be selected for the survey. The ReferenceUSA business database retrieved 377,873 pages with 25 leads in each page. The first stage of simple random sampling was to randomly select a certain number of pages out of 377,873 pages, and the second stage was to randomly select a certain number of micro-enterprises included in each page selected from the first stage. Stratified sampling was employed to make the sample better represent the population. Micro-enterprises with only one employee (owner) were under-represented in the ReferenceUSA business database. According to the Association of Enterprise Opportunity (2011b), about 83.9 percent of all micro-enterprises were those with one employee who was the owner of the business, but only 18.5 percent of the micro-enterprises in the sampling frame represented a group of micro-enterprises with one employee (owner). Therefore, sampling needed to be stratified to meet the proportion of each group in an attempt to make the sample more representative of the population.

Table 3.4.1.1 Estimated Population and Sampling Frame

Micro-enterprise	Population (the Association of Enterprise Opportunity)	Sampling Frame (ReferenceUSA)
A business with five or fewer employees, including the owner	25,455,768	9,446,820
A business in which the owner is the only employee	21,351,168	1,745,953

3.4.2 Sample

The total number of mailings was 2,400, but 106 mailings were returned without responses due to reasons like wrong address; as a result, the effective number of mailings was 2,294. The number of effective responses from these effective mailings was 296, resulting in the response rate of 12.9 percent. The demographic information of the respondents is shown in Table 3.4.2.1.

Table 3.4.2.1 Demographics of the Survey Respondents

Group		Frequency	Percent	Valid Percent	Cumulative Percent
Gender	Female	93	31.4	31.6	31.6
	Male	201	67.9	68.4	100.0
	Sub-total	294	99.3	100.0	
	Missing	2	0.7		
	Total	296	100.0		
Age	Less than 40	14	4.7	4.9	4.9
	40-49	34	11.5	11.9	16.8
	50-59	93	31.4	32.5	49.3
	60-69	94	31.8	32.9	82.2
	70 or more	51	17.2	17.8	100.0
	Sub-total	286	96.6	100.0	
	Missing	10	3.4		
	Total	296	100.0		

Education	High School or less	75	25.3	25.9	25.9
	Associate's	44	14.9	15.2	41.0
	Bachelor's	100	33.8	34.5	75.5
	Master's	50	16.9	17.2	92.8
	Doctor's	21	7.1	7.2	100.0
	Sub-total	290	98.0	100.0	
	Missing	6	2.0		
	Total	296	100.0		
Income	Less than $25,000	84	28.4	31.7	31.7
	$25,000-$49,999	65	22.0	24.5	56.2
	$50,000-$74,999	46	15.5	17.4	73.6
	$75,000-$99,999	26	8.8	9.8	83.4
	$100,000-$149,999	22	7.4	8.3	91.7
	$150,000 or more	22	7.4	8.3	100.0
	Sub-total	265	89.5	100.0	
	Missing	31	10.5		
	Total	296	100.0		
Industry	Agricultural production-crops	14	4.7	4.7	4.7
	Mining	2	0.7	0.7	5.4
	Construction	27	9.1	9.1	14.5
	Manufacturing	12	4.1	4.1	18.6

	Transportation, communications, electric, gas, and sanitary service	5	1.7	1.7	20.3
	Wholesale trade	15	5.1	5.1	25.3
	Retail trade	59	19.9	19.9	45.3
	Finance, insurance, and real estate	31	10.5	10.5	55.7
	Services	128	43.2	43.2	99.0
	Non-classifiable establishments	3	1.0	1.0	100.0
	Total	296	100.0	100.0	

3.4.3 Non-Response Bias (N-Bias) Analysis

The survey system of contacts for this research—(1) prenotice postcards, (2) questionnaires, (3) reminder postcards, and (4) replacement questionnaires—was adapted from Dillman's system of five compatible contacts, which includes a prenotice letter, a questionnaire, a thank you postcard, a replacement questionnaire, and a final contact (Dillman, 2007). This strategy helps increase the response rate (Dillman, 2007) and thereby minimize a potential non-response bias caused by the differences between early and late respondents, which is the case in this survey research. The survey administration for this research successfully secured some late respondents who provided significantly different answers as compared to early respondents. However, the response rate turned out to be low (about 12.9 percent), and post-hoc analyses were needed to check if there was any differences between respondents and non-respondents.

An archival analysis, one of the non-response bias analysis techniques, was conducted to check for any potential non-response bias. For this, business characteristics of the micro-enterprises in the sampling frame were used, and they included number of employees, business type (industry), sales volume, years in business, and number of computers in use. The independent samples t-test was conducted for parametric data such as number of employees, sales volume and years in business, and the chi-square test was conducted for non-parametric data such as business type and number of computers (the number of computers was categorized into groups on the ReferenceUSA business database). The results of t-tests (for such variables as number of employees, years in business, and sales volumes) and chi-square tests (for such variables as gender, industry, and number of computers) show no evidence of significant differences between the groups (respondents and non-respondents). Hence, the non-response bias is not a serious concern in this study. (Refer to Appendix for detailed statistics regarding this analysis.)

3.4.4 Sample Size and Statistical Power

A critically related issue with a sample size, which is 296 in this research, is whether it provides enough statistical power for hypothesis testing. Power analysis relies on effect size information. Effect size refers to the degree to which the phenomenon is present in the population or the degree to which the null hypothesis is false (Cohen, 1988); that is, it measures the strength of a phenomenon being observed. Effect sizes are calculated as the absolute values of the individual contributions of the corresponding independent (predictor) latent variables to the R^2 coefficient of the dependent (criterion) latent variable in each latent variable block (Kock, 2012). The recommended method for determining effect size is to identify the latent variable block of the research model that requires the largest multiple regression; for this, the largest of the following needs to be used: (1) the block with the highest number of formative indicators and (2) the dependent latent variable with the largest number of independent variables affecting it. Once the largest of the two options is identified, the effect size, Cohen's f^2, can be calculated using the R^2 of the dependent latent variable. The sample size required for testing the hypotheses can be identified by using the following power analysis table that draws on the number of predictors and effect size of R^2 for a recommended statistical power of 0.80, which was adapted from Green (1991).

Table 3.4.4.1 Sample Size Required to Test Hypotheses for a Power of 0.80

Number of Predictors	Cohen's Effect Size (f^2) of R^2		
	Small	Medium	Large
1	390	53	24
2	481	66	30
3	547	76	35
4	599	84	39
5	645	91	42
6	686	97	46
7	726	102	48
8	757	108	51
9	788	113	54
10	844	117	56
15	952	138	67

According to Cohen (1988), f^2 values of 0.02, 0.15, and 0.35 represent the independent variable's small, medium, and large impact on the dependent variable, respectively; the corresponding R^2 for small, medium, and large effect size is 0.02, 0.13, and 0.26, respectively. The research model includes eight dependent latent variable blocks: awareness, perceived usefulness, perceived ease of use, attitude, subjective norm, perceived behavioral control, behavioral intention, and actual usage behavior. Table 3.4.4.2 shows R^2, f^2, number of predictors, and sample size required to test hypotheses for a statistical power of 0.8 for each of the dependent latent variable blocks drawing on the power analysis table. According to Table 3.4.4.2, the minimum sample size to test hypotheses for a statistical power of 0.80 for all the dependent latent variable blocks in the research model is 76, and the number of respondents from the national mail survey for this research is 296. Therefore, the recommended statistical power of 0.80 is secured for this research.

Table 3.4.4.2 Sample Size Required to Test Hypotheses for a Power of 0.80

Dependent Latent Variable	R^2	Cohen's Effect Size (f^2)	Number of Predictors	Sample Size
AW	0.186	Medium (0.229)	3	76
PU	0.721	Large (2.584)	1	24
PE	0.747	Large (2.953)	3	35
ATT	0.752	Large (3.032)	5	42
SN	0.754	Large (3.065)	2	30
PBC	0.654	Large (1.890)	4	39
BI	0.619	Large (1.625)	8	51
U	0.557	Large (1.257)	8	51

Note 1: R^2 is based on the revised PLS model.
Note 2: AW=Awareness, PU=Perceived Usefulness, PE=Perceived Ease of Use, ATT=Attitude, SN=Subjective Norm, PBC=Perceived Behavioral Control, BI=Behavioral Intention, and U=Actual Usage Behavior.

3.5 Data Analysis: Structural Equation Modeling

Structural equation modeling (SEM) was performed to investigate the significant factors that influence micro-enterprises' IT adoption and to model the relationships between the constructs. Most of the studies on IT acceptance factors have chosen a SEM method to test what factors are statistically significant in influencing behavioral intention to use IT or actual IT use because of the advantage provided by SEM; it provides an analytical tool to handle both latent and measured variables. While traditional statistical approaches have treated measurement error and statistical data analysis separately—sometimes unrealistically assuming no measurement error—SEM explicitly takes measurement error into account and incorporates measured and latent variables into a model, analyzing data statistically (Schumacker & Lomax, 2004).

SEM is a multivariate statistical technique that integrates the logic of factor analysis with the logic of path modeling (Maruyama, 1998); it is designed to model the structure of a covariance matrix and to test the adequacy of such a hypothesized covariance (mean) structure in its ability to reproduce sample covariances (means) (Kaplan, 2000; Hayashi et al., 2008). SEM is a methodology to specify, identify, estimate, and test directional and non-directional relationships between variables (or constructs), including measured variables and latent variables (MacCallum & Austin, 2000; Schumacker & Lomax, 2004) in order to explain as much variance as possible with the specified model (Kline, 2005). Various theoretical models can be specified and tested in SEM, which hypothesizes how sets of variables define constructs and how these constructs are related to each other (Kaplan, 2000; Maruyama, 1998; Schumacker &

Lomax, 2004). The process of SEM analysis includes model specification, model identification, model estimation, model testing, and model modification. In general, SEM starts with a review of relevant theories to support model specification, and the process continues through model specification (diagram or equations), model identification (under-, just-, or over-identification), selection of measures for latent variables (making of measurement instruments), data collection, descriptive data analysis (to handle scaling, missing data, collinearity, and outlier issues), model estimation (of parameters in the model), model testing (assessment of model fit indices), model modification (specification of the model based on relevant theories), and interpretation of the results (Kaplan, 2000; Schumacker & Lomax, 2004). A model that contains potentially relevant constructs and their relationships to each other was developed for this study based on various technology acceptance models such as TAM, TPB and DIT as shown earlier in Figure 3.2.1.

There are two different types of SEM: Covariance-based SEM and Component-based SEM. Covariance-based SEM (CB-SEM), like all other statistical methodologies, requires that certain assumptions be met to reach accurate inferences; critical assumptions include multivariate normality, no systematic missing data, sufficiently large sample size, and correct model specification (Kaplan, 2000). Determination of an appropriate estimation method is contingent upon whether or not these assumptions are met with the data. The results of data analysis were suggestive of multivariate nonnormality in the sample. Generalized least squares (GLS) or maximum likelihood (ML) were not appropriate as they are based on the assumption of multivariate normality; in case of multivariate nonnormality, asymptotic distribution free (ADF) is appropriate because

ADF can be used regardless of the distribution of data (Hayashi et al, 2008). However, it requires a very large sample size (e.g., over 2,500) and has limitations in handling missing data. The size of sample data (296) is too small for the model with 17 latent variables and 66 measurement items in this research.

The research model in this study includes formative latent variables. CB-SEM has limitations in identifying a model that includes formative latent variables; even programs like AMOS do not accept a model specification for a latent variable with multiple formative indicators (Blunch, 2008). While some scholars point out that CB-SEM (e.g., LISREL, EQS, AMOS) was created to handle only reflective indicators (Chin, 1998), it is not impossible for CB-SEM to include formative indicators (Jöreskog & Goldberger, 1975). However, identifying a model with formative constructs is not easy due to restrictive identification conditions in CB-SEM (Bollen & Davis, 1994; Diamantopulos, Riefler, & Roth, 2007; Jöreskog & Goldberger, 1975; MacCallum & Browne, 1993). For example, MIMIC models suggested by Jöreskog and Goldberger (1975) require a specification of at least two additional reflective indicators; similarly, a so-called “2+ emitted paths rule” applies to modeling formative constructs (Diamantopulos et al., 2007). The research model in this study does not satisfy these conditions or rules, making it impossible to use CB-SEM.

These data and model characteristics lead to a need to conduct partial least square SEM (PLS-SEM) instead of CB-SEM because PLS-SEM, which uses a component-based estimation approach, can handle data with multivariate non-normality and missing values as well as a small sample size at the same time (Chin 1998). PLS-SEM can also handle a model with a formative construct; the research model contains a formative construct (i.e., the construct of usage behavior). Therefore, PLS-SEM is a reasonable estimation model for a data analysis in this research. SPSS 20.0 and WarpPLS 3.0 were used to analyze the data and model the relationships between constructs.

3.4.1 Construct Validity Issue

It is necessary to make sure that construct validity is guaranteed. Campbell and Fiske (1959) stressed the importance of using both discriminant and convergent validation techniques when assessing construct validity. Discriminant validity represents the degree to which a construct is different from the other constructs and can be tested for two estimated constructs by constraining or fixing the estimated correlation parameter between them to 1.0 and then conducting a difference test on the Chi-square values obtained for the constrained and unconstrained models (Joreskog, 1971). Confirmatory factor analyses are further conducted in this study to test that chi-squares of the unconstrained models are significantly lower than those of the constrained model. A significantly lower chi-square of the unconstrained model indicates that two constructs are not perfectly correlated and thereby discriminant validity is achieved (Bagozzi & Phillips 1982). Meanwhile, convergent validity can be achieved when all standardized factor loadings are greater than 0.7 and significant, when average variance extracted (AVE) of each construct is greater than 0.5 (Fornell & Larcker, 1981), and when construct reliability or internal consistency reliability is achieved. The study also uses Cronbach's alpha and composite reliability statistics to test internal consistency reliability, the degree to which responses are consistent across the items within a single factor or construct. If internal consistency reliability is significantly low, then the content of the construct may be "so heterogeneous that the total score is not the best possible unit of analysis for the measure" (Kline, 2005, p. 59).

Chapter 4: Results

4.1 Overview

This chapter presents a model assessment (measurement model) and results (structural model). The chapter also demonstrates the results of post-hoc analyses to compare between the seminal theories (i.e., TRA, TAM, TPB, and DIT) that have informed the construction of this research. A model assessment includes a reliability and validity test of the constructs employed in the research model. In the structural model section, the results of the default PLS model are first discussed. The default PLS model is revised in a way to improve the model fit indices, focusing on average R^2, drawing on the information generated by comparing the default model with a saturated model. Then, the results of the revised PLS model are discussed. Finally, the results of post-hoc analyses are presented, confirming the main findings from the revised PLS model.

4.2 Measurement Model

The construct of usage behavior is modeled to be formative in the measurement model because the causality direction is from the measurement items to the construct, and the measurement items do not necessarily have to be correlated (Diamantopoulos & Siguaw, 2006). All the other constructs are modeled to be reflective in this research. It is necessary to make sure that construct validity is guaranteed before testing hypotheses employed in the research model. Several estimates can be used to assess the measurement model in terms of the instrument's reliability, discriminant validity, collinearity, and predictive validity. Composite reliability and Cronbach's alpha coefficients are measures of reliability, and average variances extracted (AVE) and full collinearity variance inflation factors (VIFs) are used to assess discriminant validity and overall collinearity, respectively (Kock, 2012). The latent variable coefficients for these assessment criteria are shown in Table 4.2.1.

Table 4.2.1 Latent Variable Coefficients

Construct	Composite reliability	Cronbach's alpha	Average variance extracted	Full collinearity VIF
U	0.892	0.839	0.675	2.200
AW	0.970	0.959	0.891	2.234
PU	0.977	0.972	0.877	4.834
PE	0.980	0.975	0.890	4.298
COM	0.962	0.950	0.834	4.922
OB	0.914	0.872	0.728	1.580
TF	0.949	0.928	0.823	1.748
PBC	0.895	0.823	0.739	3.793
TR	0.945	0.923	0.812	2.024
ATT	0.955	0.936	0.842	5.430
ANX	0.939	0.912	0.793	2.078
RF	0.902	0.855	0.697	1.583
SE	0.951	0.922	0.865	5.139

PSI	0.964	0.944	0.900	2.912
BSI	0.941	0.905	0.841	4.729
SN	0.979	0.957	0.959	4.339
BI	0.954	0.940	0.806	2.909

Note: U=Usage; AW=Awareness; PU=Perceived Usefulness; PE=Perceived Ease of Use; COM=Compatibility; OB=Observability; TF=Technical Facilitating Conditions; PBC=Perceived Behavioral Control; TR=Trialability; ATT=Attitude; ANX=Anxiety; RF=Resource Facilitating Conditions; BI=Behavioral Intention; SE=Self-Efficacy; PSI=Personal Social Influence; BSI=Business Social Influence; SN=Subjective norm

Composite reliability and Cronbach's alpha are used to test internal consistency reliability, the degree to which responses are consistent across a set of question items within a single factor or construct. A measurement instrument can be regarded as having good reliability when the question items associated with each construct are understood in the same way by different respondents (Kock, 2012). Though there is no universal standard about how high composite reliability and the Cronbach's alpha should be, an alpha coefficient over 0.9 can be considered "excellent"; a coefficient value over 0.8 is "very good"; and a value over 0.7 is "adequate" in general (Kline, 2005, p. 59). The Cronbach's coefficient alpha for the constructs in this research are all close to or greater than 0.9, indicating that the internal consistency reliability is significantly high (very good or excellent) in this study as shown in Table 4.2.1. Only four out of the17 constructs employed in the research model present a Cronbach's alpha smaller than 0.9, but still greater than 0.8.

Campbell and Fiske (1959) stressed the importance of using both discriminant and convergent validation techniques when assessing the validity of measurement model. Discriminant validity represents the degree to which a construct is different from the other constructs and can be tested by AVEs in conjunction with latent variable correlations. Latent variable correlations are shown in Table 4.2.2. The measurement model demonstrates acceptable discriminant validity as all the correlation coefficients between paired constructs are less than the square root of AVE associated with each construct. Therefore, the discriminant validity is guaranteed in this research.

Meanwhile, convergent validity can be achieved when all standardized factor loadings are greater than 0.7 and significant, when average variance extracted (AVE) of each construct is greater than 0.5 (Fornell & Larcker, 1981), and when construct reliability or internal consistency reliability is achieved. As shown in Table 4.2.1, all AVEs are greater than 0.5. In addition, construct reliability or internal consistency reliability is demonstrated as acceptable by significantly high composite reliability and Cronbach's alpha. Finally, Table 4.2.3 presents combined factor loadings and cross-loadings that demonstrate the convergent validity of the measurement model in this research. Two criteria are recommended as the basis for concluding that a measurement model has acceptable convergent validity. First, the p-values associated with the loadings should be lower than 0.05. Second, the loadings should be equal to or greater than 0.7 (Chin, 1998) or 0.5 (Hair, Black, Babin, & Anderson, 2009). As shown in Table 4.2.3, all factor loadings are both greater than 0.7 and statistically significant ($p<0.001$); therefore, the convergent validity is guaranteed in this research.

Table 4.2.2 Latent Variable Correlations and the Square Root of AVEs

	U	AW	PU	PE	COM	OB	TF	PBC	TR	ATT	ANX	RF	BI	SE	PSI	BSI	SN
U	**0.822**																
AW	0.531	**0.944**															
PU	0.634	0.550	**0.937**														
PE	0.446	0.662	0.548	**0.944**													
COM	0.592	0.594	0.833	0.645	**0.913**												
OB	0.321	0.326	0.275	0.380	0.388	**0.853**											
TF	0.322	0.300	0.319	0.367	0.401	0.358	**0.907**										
PBC	0.528	0.580	0.656	0.713	0.725	0.348	0.460	**0.860**									
TR	0.312	0.351	0.287	0.473	0.386	0.471	0.581	0.463	**0.901**								
ATT	0.587	0.517	0.835	0.591	0.811	0.314	0.305	0.728	0.266	**0.918**							
ANX	-0.378	-0.537	-0.413	-0.641	-0.507	-0.192	-0.314	-0.530	-0.305	-0.462	**0.890**						
RF	0.263	0.393	0.326	0.399	0.407	0.349	0.407	0.429	0.448	0.318	-0.327	**0.835**					
BI	0.630	0.475	0.660	0.455	0.676	0.437	0.314	0.574	0.345	0.721	-0.288	0.342	**0.898**				
SE	0.526	0.642	0.581	0.831	0.660	0.331	0.348	0.770	0.404	0.637	-0.661	0.473	0.546	**0.930**			
PSI	0.394	0.274	0.487	0.182	0.448	0.178	0.120	0.280	0.111	0.503	-0.104	0.138	0.474	0.208	**0.949**		
BSI	0.504	0.338	0.545	0.309	0.543	0.246	0.250	0.421	0.192	0.547	-0.210	0.178	0.527	0.368	0.753	**0.917**	
SN	0.428	0.287	0.487	0.216	0.487	0.279	0.205	0.316	0.150	0.487	-0.149	0.198	0.484	0.257	0.757	0.849	**0.979**

Note: The p-values were all less than 0.001, except for the correlations between PE and PSI ($p < 0.01$), between OB and PSI ($p < 0.01$), between TF and PSI ($p < 0.05$), between TR and PSI ($p = 0.057$), between ANX and PSI ($p < 0.05$), between RF and BSI ($p < 0.01$), between TR and SN ($p < 0.05$), and between ANX and SN ($p < 0.05$).

Note: AW=Awareness; PU=Perceived Usefulness; PE=Perceived Ease of Use; COM=Compatibility; OB=Observability; TF=Technical Facilitating Conditions; PBC=Perceived Behavioral Control; TR=Trialability; ATT=Attitude; ANX=Anxiety; RF=Resource Facilitating Conditions; BI=Behavioral Intention; SE=Self-Efficacy; PSI=Personal Social Influence; BSI=Business Social Influence; SN=Subjective norm; U=Usage;

Table 4.2.3 Combined Loadings and Cross-loadings

	U	AW	PU	PE	COM	OB	TF	PBC	TR	ATT	ANX	RF	BI	SE	PSI	BSI	SN	S.E.	P-value
U1	**0.758**	0.076	0.287	-0.151	0.078	-0.026	0.067	-0.061	-0.122	-0.236	0.013	-0.076	0.070	0.292	-0.097	-0.105	0.185	0.058	<0.001
U2	**0.872**	0.044	-0.054	-0.064	0.011	0.010	-0.085	0.125	0.113	0.138	0.105	-0.007	-0.060	-0.040	-0.106	0.037	-0.010	0.048	<0.001
U3	**0.822**	-0.084	-0.079	0.281	-0.153	-0.010	0.031	-0.051	-0.033	0.089	0.013	0.133	-0.160	-0.193	0.238	-0.072	-0.135	0.045	<0.001
U4	**0.832**	-0.032	-0.127	-0.073	0.068	0.023	-0.002	-0.025	0.025	-0.017	-0.135	-0.055	0.157	-0.033	-0.035	0.128	-0.025	0.044	<0.001
AW1	0.056	**0.934**	-0.136	0.014	0.010	-0.030	-0.028	-0.002	0.030	0.114	-0.024	0.000	-0.035	-0.048	-0.044	-0.032	0.047	0.050	<0.001
AW2	0.020	**0.952**	0.025	0.048	-0.007	-0.003	-0.026	0.000	0.012	-0.040	-0.004	0.000	0.045	-0.047	0.063	-0.089	0.023	0.056	<0.001
AW3	-0.073	**0.945**	0.014	-0.041	0.015	-0.021	0.053	0.035	-0.012	-0.082	-0.026	0.006	0.001	-0.008	0.010	0.119	-0.064	0.050	<0.001
AW4	-0.002	**0.944**	0.094	-0.021	-0.017	0.054	0.001	-0.033	-0.030	0.010	0.055	-0.005	-0.012	0.104	-0.030	0.003	-0.005	0.055	<0.001
PU1	-0.009	0.076	**0.924**	0.078	-0.185	-0.060	0.027	0.079	0.033	-0.001	0.024	0.017	-0.060	-0.166	-0.023	0.032	0.026	0.081	<0.001
PU2	0.052	-0.052	**0.917**	-0.038	-0.003	0.022	0.034	0.097	0.021	-0.120	0.084	-0.035	-0.014	0.053	-0.033	0.097	-0.097	0.069	<0.001
PU3	-0.014	-0.008	**0.960**	-0.012	0.139	0.008	0.006	0.000	-0.026	-0.183	-0.029	0.003	0.017	-0.006	-0.031	-0.071	0.119	0.060	<0.001
PU4	-0.001	-0.032	**0.953**	-0.028	0.042	0.059	-0.009	-0.048	-0.013	-0.087	-0.048	-0.002	0.004	0.035	0.011	-0.051	0.039	0.061	<0.001
PU5	-0.020	-0.028	**0.951**	-0.015	0.042	-0.004	-0.050	-0.023	0.005	0.028	-0.022	0.034	-0.021	0.026	0.010	0.025	-0.059	0.071	<0.001
PU6	-0.006	0.046	**0.914**	0.016	-0.045	-0.027	-0.006	-0.104	-0.018	0.375	-0.005	-0.018	0.075	0.056	0.068	-0.028	-0.033	0.074	<0.001
PE1	0.045	-0.010	0.012	**0.928**	0.044	-0.073	-0.028	0.017	0.033	-0.070	-0.028	-0.033	0.003	-0.125	0.002	0.114	-0.081	0.040	<0.001
PE2	0.027	0.010	0.017	**0.949**	-0.069	0.033	0.043	0.062	-0.052	-0.088	0.068	-0.008	0.022	0.097	0.029	-0.120	0.068	0.040	<0.001
PE3	-0.028	0.007	0.016	**0.929**	-0.015	0.027	0.030	0.036	-0.002	0.075	0.022	0.036	0.011	-0.088	-0.056	-0.042	0.071	0.041	<0.001
PE4	0.015	-0.035	0.052	**0.946**	0.049	-0.013	-0.002	-0.048	0.023	-0.112	-0.042	-0.046	0.007	0.046	0.068	-0.002	-0.067	0.042	<0.001
PE5	-0.016	0.004	0.037	**0.958**	-0.004	0.022	-0.024	0.022	-0.007	-0.030	-0.032	0.019	-0.015	-0.009	0.009	0.066	-0.069	0.042	<0.001
PE6	-0.043	0.024	-0.134	**0.952**	-0.004	0.004	-0.019	-0.088	0.006	0.224	0.010	0.032	-0.027	0.074	-0.053	-0.016	0.078	0.040	<0.001

Note: U=Usage; AW=Awareness; PU=Perceived Usefulness; PE=Perceived Ease of Use; COM=Compatibility; OB=Observability; TF=Technical Facilitating Conditions; PBC=Perceived Behavioral Control; TR=Trialability; ATT=Attitude; ANX=Anxiety; RF=Resource Facilitating Conditions; BI=Behavioral Intention; SE=Self-Efficacy; PSI=Personal Social Influence; BSI=Business Social Influence; SN=Subjective norm

Table 4.2.3 Combined Loadings and Cross-loadings (Cont.)

	U	AW	PU	PE	COM	OB	TF	PBC	TR	ATT	ANX	RF	BI	SE	PSI	BSI	SN	S.E.	P-value
COM1	0.051	-0.090	-0.154	-0.038	**0.844**	0.104	0.004	-0.094	-0.026	-0.124	0.104	0.055	-0.011	0.167	0.006	0.120	-0.095	0.044	<0.001
COM2	0.004	0.040	0.063	-0.128	**0.922**	0.008	-0.003	-0.018	-0.071	-0.075	-0.029	0.006	-0.042	0.067	0.039	-0.005	-0.001	0.052	<0.001
COM3	-0.018	-0.016	0.121	0.001	**0.947**	-0.036	-0.010	0.059	-0.023	-0.056	-0.027	-0.050	0.046	-0.041	-0.011	-0.019	-0.003	0.054	<0.001
COM4	-0.006	0.019	0.015	0.054	**0.944**	-0.054	-0.015	-0.040	0.038	0.141	-0.030	-0.015	0.029	-0.053	-0.040	0.032	-0.033	0.054	<0.001
COM5	-0.027	0.040	-0.064	0.109	**0.906**	-0.012	0.026	0.086	0.081	0.104	-0.008	0.010	-0.026	-0.126	0.008	-0.119	0.127	0.053	<0.001
OB1	-0.086	0.042	0.016	-0.134	-0.169	**0.873**	0.046	-0.020	0.002	0.099	0.053	-0.051	0.024	0.137	-0.082	0.133	-0.029	0.043	<0.001
OB2	-0.083	-0.070	-0.038	0.187	-0.048	**0.899**	-0.079	0.022	0.001	-0.095	-0.108	0.089	0.070	-0.097	-0.073	0.059	0.029	0.041	<0.001
OB3	0.027	-0.028	0.097	0.154	-0.137	**0.916**	0.014	-0.048	-0.028	-0.108	-0.064	0.006	0.061	-0.108	0.017	0.030	-0.051	0.041	<0.001
OB4	0.176	0.074	-0.097	-0.271	0.446	**0.709**	0.026	0.060	0.032	0.139	0.154	-0.058	-0.197	0.094	0.172	-0.277	0.066	0.061	<0.001
TF1	-0.008	-0.003	-0.066	-0.023	-0.034	0.091	**0.870**	-0.071	0.094	0.216	0.027	0.011	-0.069	0.125	0.002	0.027	-0.048	0.042	<0.001
TF2	-0.028	-0.036	-0.015	0.025	0.075	-0.054	**0.936**	-0.040	-0.073	0.018	0.035	-0.026	-0.009	-0.001	-0.036	-0.101	0.148	0.032	<0.001
TF3	-0.011	0.112	-0.050	-0.083	-0.013	0.018	**0.897**	0.120	0.048	-0.118	-0.045	0.027	0.052	-0.051	-0.030	0.167	-0.126	0.047	<0.001
TF4	0.047	-0.069	0.126	0.078	-0.031	-0.048	**0.925**	-0.009	-0.062	-0.106	-0.018	-0.010	0.024	-0.068	0.064	-0.086	0.018	0.032	<0.001
PBC1	0.064	-0.092	0.262	-0.157	-0.088	0.025	0.026	**0.870**	-0.050	0.253	0.086	-0.033	-0.086	0.047	0.084	0.070	-0.128	0.077	<0.001
PBC2	0.005	-0.046	-0.255	0.101	0.091	-0.048	-0.081	**0.823**	0.038	-0.133	-0.021	-0.050	0.058	-0.290	-0.205	-0.212	0.354	0.065	<0.001
PBC3	-0.067	0.133	-0.020	0.060	0.002	0.020	0.050	**0.884**	0.014	-0.125	-0.066	0.078	0.030	0.224	0.108	0.128	-0.204	0.049	<0.001
TR1	-0.024	-0.047	-0.059	0.054	0.020	-0.023	-0.008	0.187	**0.878**	-0.139	-0.068	0.034	0.128	0.019	0.055	-0.050	-0.040	0.042	<0.001
TR2	0.014	-0.070	-0.080	0.059	0.102	-0.012	-0.126	0.011	**0.911**	0.056	-0.069	0.009	-0.059	-0.156	-0.019	0.217	-0.149	0.039	<0.001
TR3	-0.041	0.047	0.138	-0.032	-0.007	0.082	-0.003	-0.095	**0.915**	-0.010	0.046	-0.027	-0.009	0.012	-0.009	-0.018	-0.023	0.043	<0.001
TR4	0.051	0.069	-0.002	-0.080	-0.116	-0.049	0.139	-0.098	**0.899**	0.090	0.089	-0.015	-0.056	0.127	-0.025	-0.153	0.213	0.039	<0.001
ATT1	0.071	-0.092	0.085	-0.170	-0.073	0.012	0.023	0.094	-0.010	**0.933**	0.090	-0.022	-0.013	0.145	0.052	0.199	-0.237	0.082	<0.001
ATT2	0.019	0.005	0.092	-0.137	-0.082	-0.004	-0.023	0.011	-0.020	**0.950**	-0.023	-0.002	-0.050	0.006	0.065	-0.020	0.005	0.079	<0.001
ATT3	0.006	0.070	0.007	-0.015	0.038	-0.015	-0.011	-0.050	-0.012	**0.955**	0.003	0.001	0.042	-0.060	-0.052	-0.006	0.034	0.067	<0.001
ATT4	-0.109	0.018	-0.209	0.366	0.134	0.008	0.014	-0.061	0.047	**0.827**	-0.078	0.026	0.022	-0.101	-0.074	-0.194	0.221	0.058	<0.001

Table 4.2.3 Combined Loadings and Cross-loadings (Cont.)

	U	AW	PU	PE	COM	OB	TF	PBC	TR	ATT	ANX	RF	BI	SE	PSI	BSI	SN	S.E.	P-value
ANX1	0.027	0.027	-0.103	-0.083	-0.226	0.069	0.006	-0.164	-0.019	0.247	**0.850**	0.016	-0.116	0.091	-0.059	0.092	0.045	0.040	<0.001
ANX2	0.073	0.052	0.094	0.094	0.112	-0.095	-0.031	0.104	0.068	-0.211	**0.861**	-0.098	-0.004	0.124	-0.059	-0.119	0.117	0.042	<0.001
ANX3	-0.024	-0.025	-0.026	0.146	0.082	0.020	-0.004	0.003	-0.015	-0.065	**0.934**	0.013	0.069	-0.114	0.119	-0.046	-0.101	0.050	<0.001
ANX4	-0.069	-0.049	0.034	-0.161	0.021	0.005	0.028	0.051	-0.031	0.035	**0.914**	0.064	0.041	-0.085	-0.012	0.073	-0.049	0.042	<0.001
RF1	0.012	-0.041	-0.357	0.418	0.045	-0.073	0.013	-0.194	0.068	0.279	-0.079	**0.828**	-0.063	-0.097	-0.024	-0.244	0.349	0.050	<0.001
RF2	0.033	-0.089	-0.336	0.432	0.024	-0.116	0.033	-0.170	0.111	0.235	-0.015	**0.824**	-0.043	-0.052	-0.021	-0.160	0.228	0.053	<0.001
RF3	-0.005	0.069	0.336	-0.398	-0.061	0.093	-0.031	0.191	-0.090	-0.227	0.039	**0.841**	0.035	0.034	0.021	0.195	-0.277	0.039	<0.001
RF4	-0.040	0.058	0.343	-0.434	-0.007	0.092	-0.015	0.165	-0.086	-0.277	0.054	**0.846**	0.069	0.113	0.023	0.200	-0.288	0.040	<0.001
BI1	0.040	-0.086	-0.022	-0.011	-0.063	0.011	-0.010	0.042	-0.011	-0.065	0.056	0.025	**0.923**	-0.001	-0.009	0.130	-0.132	0.042	<0.001
BI2	-0.004	-0.005	0.021	0.017	-0.077	0.050	-0.025	0.085	-0.065	-0.075	-0.018	0.024	**0.929**	-0.153	0.029	-0.026	-0.001	0.041	<0.001
BI3	0.056	0.083	-0.032	-0.046	-0.091	0.015	-0.049	0.008	0.109	0.036	-0.002	0.004	**0.895**	-0.105	0.062	-0.021	-0.009	0.038	<0.001
BI4	-0.048	0.075	0.075	-0.051	0.068	-0.022	0.004	-0.117	-0.024	0.059	-0.080	-0.006	**0.873**	0.149	-0.058	-0.115	0.183	0.056	<0.001
BI5	-0.048	-0.064	-0.041	0.092	0.175	-0.058	0.083	-0.027	-0.007	0.053	0.044	-0.050	**0.867**	0.124	-0.028	0.027	-0.034	0.052	<0.001
SE1	-0.054	-0.029	0.077	-0.035	0.031	0.049	0.010	0.114	-0.066	-0.097	-0.079	0.024	0.018	**0.933**	0.075	0.102	-0.174	0.058	<0.001
SE2	0.042	-0.006	0.017	-0.129	0.001	-0.031	0.011	-0.084	0.049	0.173	0.063	-0.051	-0.102	**0.943**	-0.030	-0.049	0.075	0.050	<0.001
SE3	0.012	0.036	-0.096	0.169	-0.033	-0.018	-0.021	-0.030	0.017	-0.079	0.016	0.028	0.086	**0.915**	-0.045	-0.054	0.100	0.030	<0.001
PSI1	0.019	0.013	-0.058	0.029	-0.068	0.054	0.000	-0.052	-0.005	0.120	0.076	0.015	-0.065	0.042	**0.932**	0.072	-0.024	0.052	<0.001
PSI2	-0.026	0.003	0.010	-0.052	0.002	0.004	-0.012	0.041	-0.038	-0.027	-0.055	0.012	0.053	-0.004	**0.954**	0.004	0.022	0.054	<0.001
PSI3	0.008	-0.015	0.047	0.024	0.064	-0.057	0.011	0.010	0.043	-0.089	-0.019	-0.026	0.010	-0.037	**0.959**	-0.074	0.001	0.050	<0.001
BSI1	0.079	0.007	-0.086	-0.049	0.098	-0.030	0.002	0.082	-0.007	0.001	-0.043	0.004	0.003	-0.030	0.274	**0.886**	-0.040	0.055	<0.001
BSI2	-0.052	-0.021	0.090	0.065	-0.061	0.039	-0.011	-0.050	0.021	-0.040	-0.013	0.013	0.003	-0.039	-0.183	**0.911**	-0.063	0.054	<0.001
BSI3	-0.024	0.014	-0.006	-0.016	-0.033	-0.010	0.008	-0.028	-0.014	0.038	0.053	-0.016	-0.006	0.066	-0.081	**0.953**	0.098	0.051	<0.001
SN1	-0.012	-0.025	-0.030	0.006	0.032	0.040	-0.019	0.012	-0.057	-0.005	0.016	0.040	-0.010	0.032	-0.012	0.004	**0.979**	0.045	<0.001
SN2	0.012	0.025	0.030	-0.006	-0.032	-0.040	0.019	-0.012	0.057	0.005	-0.016	-0.040	0.010	-0.032	0.012	-0.004	**0.979**	0.047	<0.001

A Harmon one-factor test (Podsakoff & Organ, 1986) was conducted to see if the measurement involves a common method bias issue. The covariance explained by one factor (before rotated) is 49.4 percent, indicating that the common method bias is not a serious concern (not a likely contaminant of the measurement). Full collinearity VIFs can also be used to conduct a common method bias test (Lindell & Whitney, 2001) that is more conservative than Traditionally used tests relying on exploratory factor analyses (Kock, 2012). Table 4.2.1 and Table 4.2.4 present full and block collinearity VIFs for all latent variables, respectively. These VIFs are estimated by a full collinearity test that enables the identification of both vertical and lateral collinearity (Kock, 2012). Kock (2012) states that lateral collinearity may cause misleading results. While VIFs less than 5 are conservatively recommended, Hair et al. (2009) and Kline (2005) suggest that VIFs be lower than 10. The full and block VIFs in Table 4.2.1 and Table 4.2.4 are all less than ten, demonstrating no existence of serious multicollinearity issue in the measurement model.

Table 4.2.4 Block Variance Inflation Factors

	AW	PU	PE	COM	OB	TF	PBC	TR	ATT	ANX	RF	SE	PSI	BSI	SN
U		4.428		4.634	1.347	1.448	2.896		4.259		1.461				1.463
AW					1.063								2.308	2.379	
PU															
PE						1.188				1.801		1.845			
COM															
OB															
TF															
PBC			3.312			1.315					1.440	3.573			
TR															
ATT		3.607	2.030	4.533	1.375			1.414							
ANX															
RF															
SE															
PSI															
BSI															
SN													2.420	2.420	
BI		4.634		4.551	1.349	1.439	2.868		4.513		1.489				1.442

Note: U=Usage; AW=Awareness; PU=Perceived Usefulness; PE=Perceived Ease of Use; COM=Compatibility; OB=Observability; TF=Technical Facilitating Conditions; PBC=Perceived Behavioral Control; TR=Trialability; ATT=Attitude; ANX=Anxiety; RF=Resource Facilitating Conditions; BI=Behavioral Intention; SE=Self-Efficacy; PSI=Personal Social Influence; BSI=Business Social Influence; SN=Subjective norm

For a formative construct, indicator validity should be assessed by monitoring the statistical significance of the indicator weights by means of bootstrapping (Efron, 1979), and multicollinearity among the formative indicators should be assessed with the VIF (Fornell & Bookstein, 1982). Table 4.2.5 demonstrates that the measurement model satisfies this additional requirement as all indicator weights for the construct of usage, which is the only formative construct in the model, are statistically significant, and all VIF values of the formative indicators are smaller than 10, indicating that multicollinearity is not a serious issue for the measurement model in this research (Hair et al., 2009).

Table 4.2.5 Indicator Weights of the Construct of Usage Behavior

Usage Behavior	Weights	Standard Error	P-value	Variance Inflation Factor
U1	0.280	0.022	<0.001	1.569
U2	0.323	0.017	<0.001	2.318
U3	0.304	0.020	<0.001	1.970
U4	0.308	0.021	<0.001	1.894

Note: U1=Hardware Usage; U2=Software Usage; U3=Internet Usage; U4=Weekly Hours

4.3 Structural Model

The structural model was tested as the measurement model turned out to be within an acceptable level. Efron (1979) suggested using bootstrapping (a resampling technique) in determining the significance of path coefficients; hence, the resampling method used in this analysis was bootstrapping; the number of data resamples used in the analysis was 100.

The resulting model explained a substantial amount of variance in the endogenous latent variables; the average R^2 was 0.575 ($p < 0.001$). In addition, the average path coefficient was statistically significant ($\beta = 0.169$, $p < 0.001$), and the average variation inflation factor was within an acceptable level (2.164). However, further analyses are recommended to verify the statistical significance of each path coefficient in the model and to explore a model with better predictive relevance.

Gefen, Rigdon, and Straub (2011) and Ringle, Sarstedt, and Straub (2012) recommend that the default PLS model be compared with a saturated model in order to ensure that the paths in the default PLS model still remain significant in the saturated PLS model and that there is no missing paths that increase R^2. A saturated model includes all possible paths between exogenous latent variables and endogenous latent variables. In addition, the information on indirect and total effect of each latent variable is helpful in determining which latent variables play a key role in explaining the main endogenous latent variables (i.e., behavioral intention and usage behavior).

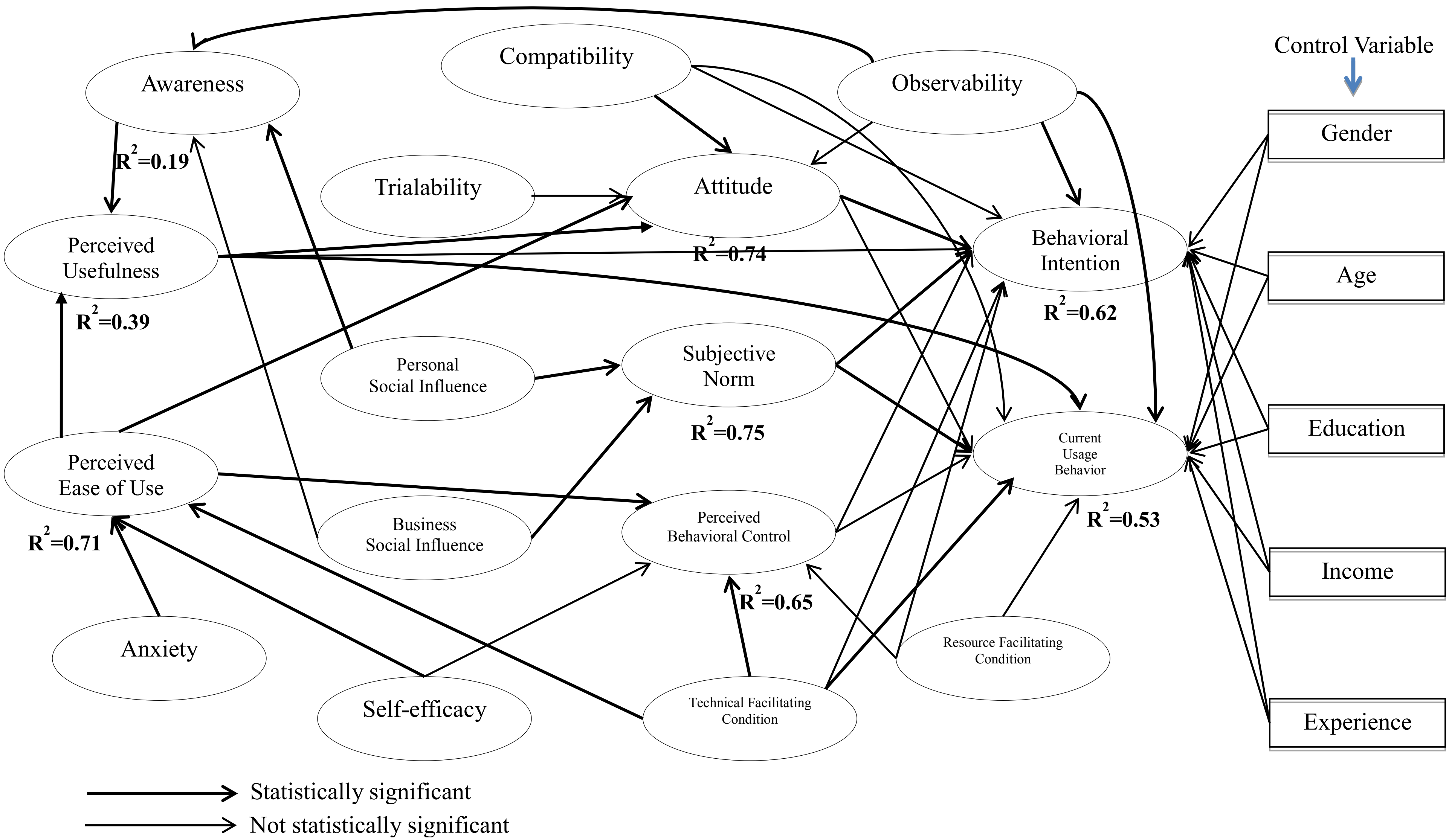

Figure 4.3.1. Results of the Default PLS Model

4.3.1 Indirect and Total Effects of the Latent Variables in the Default PLS Model.

Table 4.3.1.1 shows indirect and total effects in the default PLS model. Indirect and total effects associated with all latent variables are linked via one or more paths with more than one segment, including the sums, p-values, and effect sizes of the indirect effects. The information on indirect and total effects is critical in evaluating downstream effects of independent latent variables in dependent latent variables directly or indirectly through other mediating latent variables; it is especially important to evaluate complex models with multiple mediating effects along concurrent paths (Kock, 2012), which is the case in this research.

It is noticeable that awareness turned out to have strong indirect effects on usage behavior ($\beta = 0.186$, $p < 0.001$, $f^2 = 0.100$), attitude toward IT ($\beta = 0.270$, $p < 0.001$, $f^2 = 0.140$), and behavioral intention ($\beta = 0.148$, $p < 0.01$, $f^2 = 0.071$). In addition, perceived usefulness and compatibility had a significant indirect effect on behavioral intention ($\beta = 0.186$, $p < 0.001$, $f^2 = 0.123$) and usage behavior ($\beta = 0.125$, $p < 0.01$, $f^2 = 0.086$), respectively. Furthermore, observability also showed a significant indirect effect on attitude ($\beta = 0.073$, $p < 0.001$, $f^2 = 0.023$) and behavioral intention ($\beta = 0.054$, $p < 0.05$, $f^2 = 0.024$).

Table 4.3.1.1 Indirect and Total Effects of Each Latent Variable in the Default PLS Model

Path	Indirect Effects			Total Effects		
	Sums	P-values	Effect sizes	Sums	P-values	Effect sizes
AW→U	0.186	<0.001	0.100	0.186	<0.001	0.100

AW→PU				0.550	<0.001	0.302
AW→ATT	0.270	<0.001	0.140	0.270	<0.001	0.140
AW→BI	0.148	0.001	0.071	0.148	0.001	0.071
PU→U	0.053	0.137	0.034	0.338	<0.001	0.217
PU→ATT				0.491	<0.001	0.411
PU→BI	0.186	<0.001	0.123	0.270	<0.001	0.179
PE→U	0.154	0.002	0.069	0.154	0.002	0.069
PE→PBC				0.207	0.005	0.150
PE→ATT	0.191	<0.001	0.118	0.191	<0.001	0.118
PE→BI	0.152	<0.001	0.072	0.152	<0.001	0.072
COM→U	0.036	0.140	0.021	0.067	0.188	0.040
COM→ATT				0.330	<0.001	0.272
COM→BI	0.125	0.010	0.086	0.249	0.004	0.171
OB→U	0.054	0.009	0.017	0.133	0.006	0.043
OB→AW				0.269	<0.001	0.090
OB→PU	0.148	<0.001	0.044	0.148	<0.001	0.044
OB→ATT	0.073	<0.001	0.023	0.110	0.009	0.036
OB→BI	0.054	0.027	0.024	0.228	<0.001	0.103
TF→U	0.011	0.232	0.004	0.108	0.018	0.036
TF→PE				0.093	0.004	0.038
TF→PBC	0.019	0.059	0.009	0.206	<0.001	0.098
TF→ATT	0.011	0.070	0.004	0.011	0.070	0.004
TF→BI	0.004	0.397	0.001	0.035	0.267	0.012
PBC→U				0.045	0.237	0.024
PBC→BI				0.000	0.500	0.000
TR→U	0.007	0.223	0.002	0.007	0.223	0.002

TR→ATT				0.061	0.137	0.016
TR→BI	0.023	0.164	0.008	0.023	0.164	0.008
ATT→U				0.108	0.122	0.064
ATT→BI				0.379	<0.001	0.273
ANX→U	-0.003	0.159	0.001	-0.003	0.159	0.001
ANX→PE				-0.151	<0.001	0.097
ANX→PBC	-0.031	0.030	0.017	-0.031	0.030	0.017
ANX→ATT	-0.019	0.043	0.009	-0.019	0.043	0.009
ANX→BI	-0.007	0.104	0.002	-0.007	0.104	0.002
RF→U	0.001	0.407	0.000	0.037	0.198	0.010
RF→PBC				0.021	0.310	0.009
RF→BI	0.000	0.500	0.000	0.050	0.140	0.017
SE→U	0.040	0.170	0.021	0.040	0.170	0.021
SE→PE				0.698	<0.001	0.580
SE→PBC	0.144	0.005	0.112	0.667	<0.001	0.518
SE→ATT	0.086	0.008	0.058	0.086	0.008	0.058
SE→BI	0.033	0.260	0.019	0.033	0.260	0.019
PSI→U	0.047	0.033	0.019	0.047	0.033	0.019
PSI→AW				0.095	0.196	0.028
PSI→PU	0.052	0.207	0.027	0.052	0.207	0.027
PSI→ATT	0.026	0.219	0.014	0.026	0.219	0.014
PSI→SN				0.276	0.001	0.211
PSI→BI	0.045	0.034	0.021	0.045	0.034	0.021
BSI→U	0.106	0.013	0.054	0.106	0.013	0.054
BSI→AW				0.202	0.024	0.068
BSI→PU	0.111	0.035	0.061	0.111	0.035	0.061

BSI→ATT	0.055	0.050	0.030	0.055	0.050	0.030
BSI→SN				0.639	<0.001	0.543
BSI→BI	0.100	0.008	0.053	0.100	0.008	0.053
SN→U				0.108	0.013	0.046
SN→BI				0.110	0.004	0.054

Note: AW=Awareness; PU=Perceived Usefulness; PE=Perceived Ease of Use; COM=Compatibility; OB=Observability; TF=Technical Facilitating Conditions; PBC=Perceived Behavioral Control; TR=Trialability; ATT=Attitude; ANX=Anxiety; RF=Resource Facilitating Conditions; BI=Behavioral Intention; SE=Self-Efficacy; PSI=Personal Social Influence; BSI=Business Social Influence; SN=Subjective norm; U=Usage

4.3.2 Saturated Model

As recommended by Gefen, Rigdon, and Straub (2011) and Ringle, Sarstedt, and Straub (2012), the default PLS model was compared with a saturated model. In this research, all additional paths between exogenous latent variables, including mediating latent variables, were linked to the main endogenous latent variables: usage behavior and behavioral intention. Furthermore, additional, theoretically possible paths between exogenous variables and the mediating latent variables were included in the saturated model.

Paths that were significant in the default PLS model but turned out to be insignificant in the saturated model are shown in Table 4.3.2.1. They include the paths from awareness to perceived usefulness ($p < 0.001 \rightarrow p = 0.056$), from observability to usage behavior ($p < 0.05 \rightarrow p = 0.085$), from technical facilitating condition to usage behavior ($p < 0.05 \rightarrow p = 0.105$) and perceived ease of use ($p < 0.01 \rightarrow p = 0.338$), and from subjective norm to usage behavior ($p < 0.05 \rightarrow p = 0.187$) and behavioral intention

($p < 0.01 \rightarrow p = 0.364$). Table 4.3.2.1 also shows paths that were insignificant in the default PLS model but turned out to be significant in the saturated model; they include the paths from compatibility to behavioral intention ($p = 0.101 \rightarrow p < 0.05$) and from resource facilitating condition to perceived behavioral control ($p = 0.199 \rightarrow p < 0.05$).

Table 4.3.2.1 Comparison of Default PLS Model with Saturated PLS Model

Path	Default Model		Saturated Model	
	Coefficient	P-value	Coefficient	P-value
AW→PU	0.304	<0.001	0.115	0.056
PU→U	0.285	0.001	0.239	0.005
PU→ATT	0.491	<0.001	0.430	<0.001
PU→BI	0.084	0.146	0.022	0.402
PE→PBC	0.207	0.005	0.206	0.006
PE→ATT	0.124	0.009	0.123	0.011
PE→PU	0.389	<0.001	0.099	0.191
COM→U	0.032	0.327	0.007	0.468
COM→ATT	0.330	<0.001	0.299	<0.001
COM→BI	0.124	0.101	0.185	0.035
OB→U	0.079	0.041	0.062	0.085
OB→AW	0.269	<0.001	0.269	<0.001
OB→ATT	0.037	0.190	0.029	0.237
OB→BI	0.174	<0.001	0.168	<0.001
TF→U	0.097	0.026	0.057	0.105
TF→PE	0.093	0.004	-0.020	0.338
TF→PBC	0.187	<0.001	0.189	<0.001
TF→BI	0.030	0.272	0.010	0.413
PBC→U	0.045	0.237	0.066	0.217

PBC→BI	0.000	0.500	0.043	0.255
TR→ATT	0.061	0.137	0.039	0.214
ATT→U	0.108	0.122	0.085	0.151
ATT→BI	0.379	<0.001	0.394	<0.001
ANX→PE	-0.151	<0.001	-0.123	0.002
RF→U	0.036	0.199	0.093	0.043
RF→PBC	0.021	0.310	0.015	0.364
RF→BI	0.050	0.136	0.018	0.354
SE→PE	0.698	<0.001	0.588	<0.001
SE→PBC	0.523	<0.001	0.457	<0.001
PSI→AW	0.095	0.196	0.095	0.196
PSI→SN	0.276	0.001	0.276	0.001
BSI→AW	0.202	0.024	0.202	0.024
BSI→SN	0.639	<0.001	0.639	<0.001
SN→U	0.108	0.013	0.057	0.187
SN→BI	0.110	0.004	-0.038	0.364

Note: AW=Awareness; PU=Perceived Usefulness; PE=Perceived Ease of Use; COM=Compatibility; OB=Observability; TF=Technical Facilitating Conditions; PBC=Perceived Behavioral Control; TR=Trialability; ATT=Attitude; ANX=Anxiety; RF=Resource Facilitating Conditions; BI=Behavioral Intention; SE=Self-Efficacy; PSI=Personal Social Influence; BSI=Business Social Influence; SN=Subjective norm; U=Usage

Paths that were not included in the default PLS model but turned out to be significant in the saturated model are shown in Table 4.3.2.2. They include the paths from awareness to usage behavior ($\beta = 0.197$, $p < 0.001$), perceived ease of use ($\beta = 0.176$, $p < 0.001$), anxiety ($\beta = -0.150$, $p < 0.05$), and behavioral intention ($\beta = 0.102$, $p < 0.05$), from perceived ease of use to usage behavior ($\beta = 0.182$, $p < 0.05$), compatibility ($\beta = 0.666$, $p < 0.001$), and behavioral intention ($\beta = 0.220$, $p < 0.01$), from compatibility to perceived usefulness ($\beta = 0.719$, $p < 0.01$), from observability to self-efficacy ($\beta = 0.353$, $p < 0.001$), from technical facilitating condition to anxiety ($\beta =- 0.122$, $p < 0.05$), from trialability to perceived ease of use ($\beta = 0.134$, $p < 0.01$) and behavioral intention ($\beta = 0.089$, $p < 0.05$), from anxiety to behavioral intention ($\beta = -0.145$, $p < 0.05$), from self-efficacy to usage behavior ($\beta = 0.195$, $p < 0.05$), anxiety ($\beta = -0.489$, $p < 0.001$), and behavioral intention ($\beta = 0.238$, $p < 0.01$), from personal social influence to perceived usefulness ($\beta = 0.134$, $p < 0.05$) and anxiety ($\beta = 0.106$, $p < 0.05$), and from business social influence to usage behavior ($\beta = 0.167$, $p < 0.05$).

As far as the effect size is concerned, those of the paths from perceived ease of use to compatibility (0.444) and from compatibility to perceived usefulness (0.611) turned out to be large in the saturated model; the path from self-efficacy to anxiety turned out to have a medium to large effect size (0.328), while the other paths had a small to medium effect size as shown in Table 4.3.2.2.

Table 4.3.2.2 Path Coefficient's Statistical Significance and Effect Size

Path	Coefficient	Standard error	P-value	Effect size
AW→U	0.197	0.053	<0.001	0.106
AW→PE	0.176	0.056	<0.001	0.119
AW→ANX	-0.150	0.084	0.038	0.083
AW→BI	0.102	0.059	0.042	0.049
PE→U	0.182	0.094	0.027	0.081
PE→COM	0.666	0.042	<0.001	0.444

PE→BI	0.220	0.077	0.002	0.104
COM→PU	0.719	0.070	<0.001	0.611
OB→SE	0.353	0.065	<0.001	0.125
TF→ANX	-0.122	0.066	0.033	0.043
TR→PE	0.134	0.044	0.001	0.064
TR→BI	0.089	0.051	0.041	0.031
ANX→BI	-0.145	0.068	0.016	0.043
SE→U	0.195	0.088	0.013	0.103
SE→ANX	-0.489	0.092	<0.001	0.328
SE→BI	0.238	0.095	0.007	0.135
PSI→PU	0.134	0.074	0.035	0.070
PSI→ANX	0.106	0.057	0.032	0.056
BSI→U	0.167	0.083	0.023	0.084

Note: AW=Awareness; PU=Perceived Usefulness; PE=Perceived Ease of Use; COM=Compatibility; OB=Observability; TF=Technical Facilitating Conditions; PBC=Perceived Behavioral Control; TR=Trialability; ATT=Attitude; ANX=Anxiety; RF=Resource Facilitating Conditions; BI=Behavioral Intention; SE=Self-Efficacy; PSI=Personal Social Influence; BSI=Business Social Influence; SN=Subjective norm; U=Usage

4.3.3 Revised PLS Model

Based on the information on the indirect effects and total effects and the comparison between the default theoretical model and the saturated model, additional analyses were conducted to explore a model that better fits the research data. Alternative Model 1 excluded two constructs—perceived behavioral control and resource facilitating condition—that turned out to be insignificant in explaining both usage behavior and behavioral intention; hence, the paths from and to these two constructs were deleted; Alternative Model 1 also excluded some paths that turned out to be highly insignificant in the saturated model, including the paths from perceived usefulness to behavioral intention, from compatibility to usage behavior, from technical facilitating condition to behavioral intention, and from trialability to attitude toward IT. Meanwhile, Alternative Model 1 included additional paths that turned out to be strongly significant in the saturated model, including the paths from awareness to usage behavior and perceived ease of use, from compatibility to perceived usefulness, and from trialability to perceived ease of use.

Alternative Model 2 is the same as Alternative Model 1 except for the construct of perceived behavioral control; that is, Alternative Model 2 included perceived behavioral control again because, unlike resource facilitating condition, perceived behavioral control is a mediating latent variable that conveys indirect effects on usage behavior and/or behavioral intention. The path coefficients and their statistical significance are shown in Table 4.3.3.1.

Table 4.3.3.1 Comparison of Default PLS Model with Alternative PLS Models

Path	Default Model		Alternative Model 1		Alternative Model 2	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
AW→U			0.191	<0.001	0.195	<0.001
AW→PU	0.304	<0.001	0.105	0.034	0.105	0.034
AW→PE			0.177	<0.001	0.177	<0.001
PU→U	0.285	0.001	0.239	0.001	0.241	0.002
PU→ATT	0.491	<0.001	0.491	<0.001	0.491	<0.001
PU→BI	0.084	0.146				

PE→PBC	0.207	0.005			0.205	0.007
PE→ATT	0.124	0.009	0.110	0.013	0.110	0.013
PE→PU	0.389	<0.001				
COM→U	0.032	0.327				
COM→PU			0.791	<0.001	0.791	<0.001
COM→ATT	0.330	<0.001	0.332	<0.001	0.332	<0.001
COM→BI	0.124	0.101	0.184	0.017	0.174	0.030
OB→U	0.079	0.041	0.051	0.136	0.051	0.131
OB→AW	0.269	<0.001	0.269	<0.001	0.269	<0.001
OB→ATT	0.037	0.190				
OB→BI	0.174	<0.001	0.190	<0.001	0.186	<0.001
TF→U	0.097	0.026	0.082	0.057	0.086	0.042
TF→PE	0.093	0.004				
TF→PBC	0.187	<0.001			0.193	<0.001
TF→BI	0.030	0.272				
PBC→U	0.045	0.237			-0.021	0.412
PBC→BI	0.000	0.500			0.033	0.296
TR→PE			0.144	<0.001	0.144	<0.001
TR→ATT	0.061	0.137				
ATT→U	0.108	0.122	0.103	0.097	0.113	0.092
ATT→BI	0.379	<0.001	0.418	<0.001	0.404	<0.001
ANX→PE	-0.151	<0.001	-0.118	0.002	-0.118	0.002
RF→U	0.036	0.199				
RF→PBC	0.021	0.310				
RF→BI	0.050	0.136				
SE→PE	0.698	<0.001	0.580	<0.001	0.580	<0.001
SE→PBC	0.523	<0.001			0.532	<0.001
PSI→AW	0.095	0.196	0.095	0.196	0.095	0.196
PSI→SN	0.276	0.001	0.276	0.001	0.276	0.001

BSI→AW	0.202	0.024	0.202	0.024	0.202	0.024
BSI→SN	0.639	<0.001	0.639	<0.001	0.639	<0.001
SN→U	0.108	0.013	0.114	0.006	0.112	0.006
SN→BI	0.110	0.004	0.113	0.004	0.117	0.003
Model Fit Indices	APC=0.169, P<0.001		APC=0.200, P<0.001		APC=0.199, P<0.001	
	ARS=0.575, P<0.001		ARS=0.621, P<0.001		ARS=0.625, P<0.001	
	AVIF=2.164		AVIF=1.879		AVIF=2.002	

Note: AW=Awareness; PU=Perceived Usefulness; PE=Perceived Ease of Use; COM=Compatibility; OB=Observability; TF=Technical Facilitating Conditions; PBC=Perceived Behavioral Control; TR=Trialability; ATT=Attitude; ANX=Anxiety; RF=Resource Facilitating Conditions; BI=Behavioral Intention; SE=Self-Efficacy; PSI=Personal Social Influence; BSI=Business Social Influence; SN=Subjective norm; U=Usage; APC=Average Path Coefficient; ARS=Average R^2; AVIF=Average Variance Inflation Factor.

As shown in Table 4.3.3.1, Alternative Model 1 has improved model fit with the data in terms of average path coefficient (APC), average R^2 (ARS), and average variation inflation factor (AVIF). However, Alternative Model 2 turned out to be slightly better than Alternative Model 1 in terms of ARS. Although the APC and AVIF of Alternative Model 2 were slightly lower than Alternative Model 1, the Alternative Model 2 is chosen as the revised PLS model hereafter in this research because it satisfies the purpose of this research: to model the factors in a way to increase the predictive relevance.

As discussed earlier, the revised PLS model excluded the construct of resource facilitation condition due to its lack of statistical significance and negative influence on the model fit. However, a further analysis needs to be conducted for any moderating effects by resource facilitating condition on the paths to behavioral intention and usage behavior—the paths from compatibility, observability, perceived behavioral control, attitude, and subjective norm to behavioral intention and the paths from awareness, perceived usefulness, observability, technical facilitating condition, perceived behavioral control, attitude, and subjective norm to usage behavior—because, if a moderating effect is significant, then it would influence the coefficients and their statistical significance of those paths and therefore need to be retained in the model. To determine whether to retain the moderating effects of resource facilitating condition in the model, the model with the moderating effects was compared with the model without the moderating effect; the results are shown in Table 4.3.3.2.

Table 4.3.3.2. Moderating Effects of Resource Facilitating Condition in the Revised PLS Model

Path from	Model with Moderation Effects		Model without Moderation Effects	
	Path Coefficient to U	Path Coefficient to BI	Path Coefficient to U	Path Coefficient to BI
AW	0.223***		0.195***	
PU	0.239**		0.241**	
COM		0.162*		0.174*
OB	0.044	0.193***	0.051	0.186***
TF	0.067		0.086*	
PBC	-0.036	0.052	-0.021	0.033
ATT	0.127	0.394***	0.113	0.404***
SN	0.116	0.133**	0.112**	0.117**
GEN	-0.060	0.008	-0.068*	0.011
AGE	-0.102	-0.114	-0.095	-0.119*

EDU	0.047	0.003	0.052	0.001
INC	0.166***	0.075*	0.167***	0.076*
EC	0.156**	-0.021	0.152**	0.023
RF*TF	0.055			
RF*PBC	0.043	0.012		
RF*PU	0.053			
RF*OB	0.047	0.020		
RF*SN	0.019	0.066		
RF*ATT	0.132	-0.019		
RF*COM		0.022		
RF*AW	0.080			
Model Fit Indices	APC=0.164, P<0.001		APC=0.199, P<0.001	
	ARS=0.617, P<0.001		ARS=0.625, P<0.001	
	AVIF=2.546		AVIF=2.018	

Note 1: *** p<0.001, ** p<0.01, * p<0.05

Note 2: AW=Awareness; PU=Perceived Usefulness; COM=Compatibility; OB=Observability; TF=Technical Facilitating Conditions; PBC=Perceived Behavioral Control; ATT=Attitude; RF=Resource Facilitating Conditions; BI=Behavioral Intention; SN=Subjective norm; U=Usage; APC=Average Path Coefficient; ARS=Average R^2; AVIF=Average Variation Inflation Factor

Three model fit indices are a useful set of measures related to model quality when comparing different models to find out if model has a better fit with the original data than another (Kock, 2012). While the model with moderating effect of resource constraint has an average path coefficient (APC) of 0.164 (p<0.001), an average R^2 (ARS) of 0.617

(p<0.001), and an average variation inflation factor (AVIF) of 2.546, the model without the moderating effects has an APC of 0.190 (p<0.001), an ARS of 0.625, and an AVIF of 2.002. These results demonstrate that the model without the moderating effects of resource facilitating condition on the paths to the main endogenous variables (i.e., usage behavior and behavioral intention to use) has a better fit with the data than the model with the moderating effects of resource facilitating condition in terms of all three model fit indices. In addition, the moderating effects of resource facilitating condition are all statistically insignificant, and the difference between two models is minimal in terms of the size of path coefficients and their statistical significance. Therefore, the model without the moderating effects is retained for the analyses hereafter. The revised PLS model is shown in Figure 4.3.3.1.

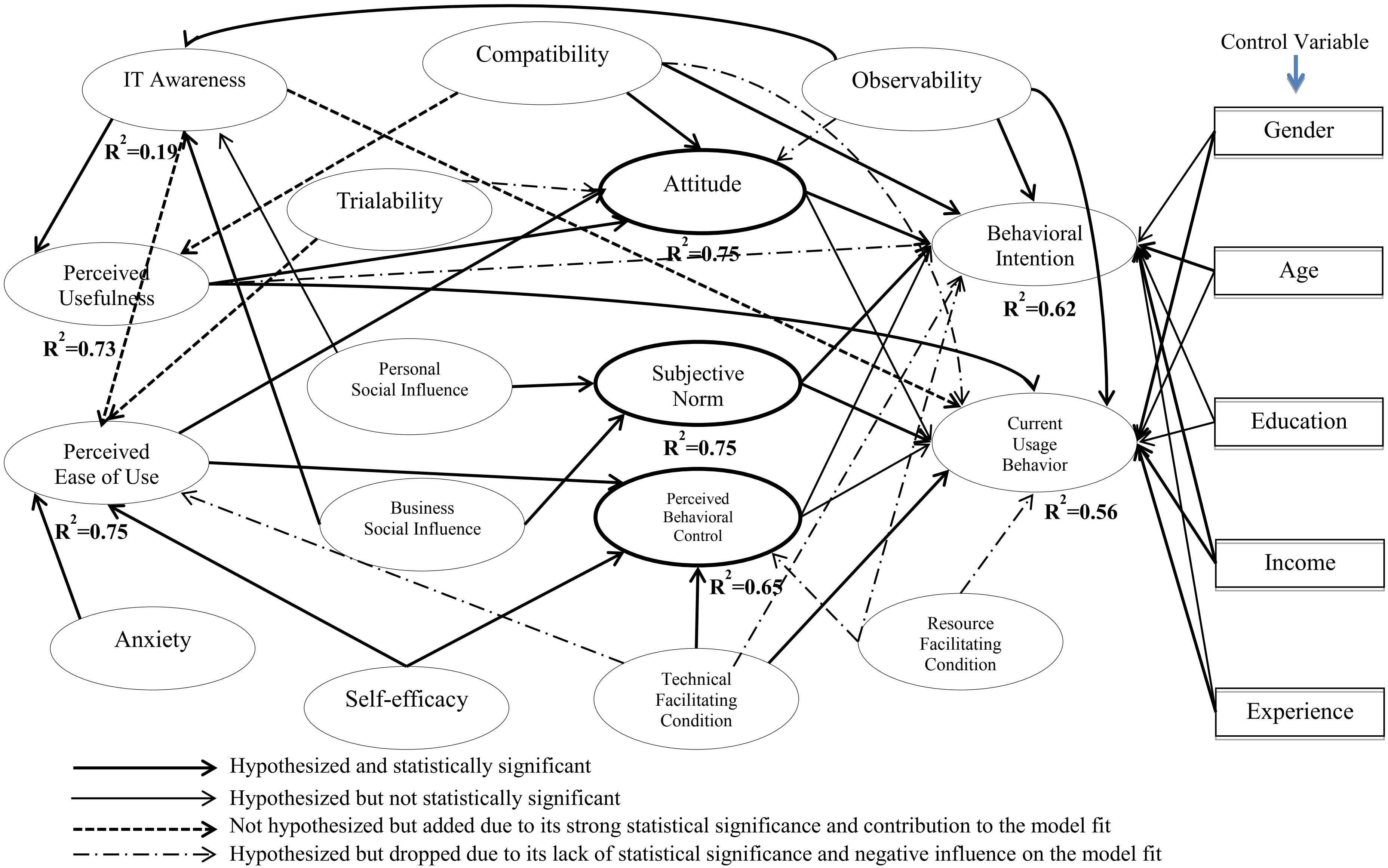

Figure 4.3.3.1. Results of the Revised PLS Model

Although good of fit (GoF) indices have not been well established yet for the assessment of PLS-SEM (Urbach & Ahlemann, 2010), some criteria have been used to evaluate component-based structural equation modeling; they include coefficient of determination, predictive relevance, path coefficients, and effect size. The first statistic that can be used in assessing a PLS model is the coefficient of determination (R^2) of each endogenous latent variable (LV). R^2 coefficients for endogenous latent variables represent the percentage of explained variance associated with latent variables. The R^2 needs to be high enough for the model to have a certain level of explanatory power (Chin, 1998). In an empirical application of PLS-SEM, Chin (1998) regards the value of 0.67 as a substantial R^2, 0.33 as moderate, and 0.19 as weak. The average R^2 in the research model is 0.625 (p-value<0.001). The R^2 values of the endogenous latent variables in the research model range from 0.186 for the construct of awareness to 0.754 for the construct of subjective norm. The R^2 coefficients for the constructs of behavioral intention to use and usage behavior, two main dependent variables in the research model, are 0.619 and 0.557, respectively, as shown in Table 4.3.3.3, providing evidence that the constructs in the model explain a substantial amount of variance of the endogenous latent variables.

Table 4.3.3.3. Latent Variable Coefficients: R^2 and Q^2 of the Default PLS Model

Construct	R^2	Q^2
Usage Behavior	0.557	0.552
Awareness	0.186	0.189
Perceived Usefulness	0.731	0.729
Perceived Ease of Use	0.747	0.747

Perceived Behavioral Control	0.654	0.654
Attitude	0.752	0.752
Subjective Norm	0.754	0.755
Behavioral Intention	0.619	0.619

Note: U=Usage; AW=Awareness; PU=Perceived Usefulness; PE=Perceived Ease of Use; PBC=Perceived Behavioral Control; ATT=Attitude; SN=Subjective norm; BI=Behavioral Intention

In addition to the R^2, Q^2 coefficients can be used to show the model's predictive relevance (Urbach & Ahlemann, 2010); that is, Q^2 coefficients demonstrate predictive validity associated with latent variables in the structural model. A Q^2 coefficient larger than zero suggests an acceptable predictive validity (Kock, 2012). The analysis results show that the Q^2 coefficients for the endogenous latent variables range from 0.189 for the construct of awareness to 0.755 for the construct of subjective norm, which are all significantly greater than the proposed threshold (>0), indicating that the model has predictive relevance.

The second statistic that can be used in assessing a PLS model is the path coefficient between the constructs; that is, a PLS model can be evaluated in terms of the path coefficient's algebraic sign, magnitude, and significance. Table 4.3.3.4 shows that the path coefficients' algebraic signs are all positive as hypothesized in the research model, except for the path coefficients between compatibility and usage behavior and between anxiety and perceived ease of use. The path coefficient of anxiety to perceived ease of use was hypothesized as negative. The path coefficient of compatibility to usage behavior, despite its negative sign, is not a serious issue because it is minimal and not statistically significant.

Table 4.3.3.4 Hypothesis Testing

Path	Default Model	Revised Model	Significant or supported?
AW→U		0.195***	Not hypothesized but significant
AW→PU	0.550***	0.105*	Hypothesized and supported
AW→PE		0.177***	Not hypothesized but significant
PU→U	0.285**	0.241**	Hypothesized and supported
PU→ATT	0.491***	0.491***	Hypothesized and supported
PU→BI	0.084		Hypothesized but not supported (dropped)
PE→PBC	0.207**	0.205**	Hypothesized and supported
PE→ATT	0.124**	0.110*	Hypothesized and supported
COM→U	0.032		Hypothesized but not supported (dropped)
COM→PU		0.791***	Not hypothesized but significant
COM→ATT	0.330***	0.332***	Hypothesized and supported
COM→BI	0.124	0.174*	Hypothesized and supported
OB→U	0.079*	0.051	Hypothesized but not supported
OB→AW	0.269***	0.269***	Hypothesized and supported
OB→ATT	0.037		Hypothesized but not supported (dropped)
OB→BI	0.174***	0.186***	Hypothesized and supported
TF→U	0.097*	0.086*	Hypothesized and supported
TF→PE	0.093**		Hypothesized but not supported (dropped)
TF→PBC	0.187***	0.193***	Hypothesized and supported
TF→BI	0.030		Hypothesized but not supported (dropped)
PBC→U	0.045	-0.021	Hypothesized but not supported

PBC→BI	0.000	0.033	Hypothesized but not supported
TR→PE		0.144***	Not hypothesized but significant
TR→ATT	0.061		Hypothesized but not supported (dropped)
ATT→U	0.108	0.113	Hypothesized but not supported
ATT→BI	0.379***	0.404***	Hypothesized and supported
ANX→PE	-0.151***	-0.118**	Hypothesized and supported
RF→U	0.036		Hypothesized but not supported (dropped)
RF→PBC	0.021		Hypothesized but not supported (dropped)
RF→BI	0.050		Hypothesized but not supported (dropped)
SE→PE	0.698***	0.580***	Hypothesized and supported
SE→PBC	0.523***	0.532***	Hypothesized and supported
PSI→AW	0.095	0.095	Hypothesized but not supported
PSI→SN	0.276**	0.276**	Hypothesized and supported
BSI→AW	0.202*	0.202*	Hypothesized and supported
BSI→SN	0.639***	0.639***	Hypothesized and supported
SN→U	0.108*	0.112**	Hypothesized and supported
SN→BI	0.110**	0.117**	Hypothesized and supported

Note: AW=Awareness; PU=Perceived Usefulness; PE=Perceived Ease of Use; COM=Compatibility; OB=Observability; TF=Technical Facilitating Conditions; PBC=Perceived Behavioral Control; TR=Trialability; ATT=Attitude; ANX=Anxiety; RF=Resource Facilitating Conditions; BI=Behavioral Intention; SE=Self-Efficacy; PSI=Personal Social Influence; BSI=Business Social Influence; SN=Subjective norm; U=Usage.

Table 4.3.3.4 reveals that hypothesis 1 is supported; the direction of the path coefficient from awareness to perceived usefulness turned out to be positive as hypothesized, and statistically significant ($\beta = 0.105$, $p < 0.05$); that is, micro-enterprises with higher awareness of IT solutions in relation to their business showed higher perceptions of IT's usefulness for their businesses. The revised model also indicates that awareness has a positive association with usage behavior ($\beta = 0.195$, $p < 0.001$) and perceived ease of use ($\beta = 0.177$, $p < 0.001$).

In the default research model, perceived usefulness is hypothesized to be positively associated with usage behavior (hypothesis 2a), attitude toward IT (hypothesis 2b), and behavioral intention to use IT (hypothesis 2c). Table 4.3.3.4 shows that hypotheses 2a and 2b were supported while hypothesis 2c is not supported. The path coefficients from perceived usefulness to the constructs of usage behavior and attitude toward IT were 0.285 and 0.491, respectively, and they were statistically significant ($p < 0.01$ and $p < 0.001$, respectively). However, the path coefficient from perceived usefulness to behavioral intention to use IT is not statistically significant ($\beta = 0.084$, $p = 0.146$). Due to its lack of statistical significance and negative influence on the model fit, the path from perceived usefulness to behavioral intention is excluded in the revised PLS model. These results demonstrate that micro-enterprise owners' perceptions of IT's usefulness are significantly associated with their attitude toward IT and current usage behavior, but not with behavioral intention to use IT in the future for their businesses.

Hypotheses 3a and 3b were supported as presented in Table 4.3.3.4. Table 4.3.3.4 shows that perceived ease of use is positively and significantly associated with both perceived behavioral control and attitude toward IT as hypothesized. The path coefficients from perceived ease of use to perceived behavioral control and attitude toward IT were 0.205 ($p < 0.01$) and 0.110 ($p < 0.05$), respectively, in the revised PLS model.

Compatibility is hypothesized to be associated with current usage behavior, attitude toward IT, and behavioral intention to use IT in the future. As expected, the association between compatibility and attitude toward IT turned out to be positive and statistically significant ($\beta = 332$, $p < 0.001$) in the revised PLS model. However, compatibility's association with current usage behavior turned out to insignificant ($\beta = 0.032$, $p = 0.101$) in the default PLS model; the path is dropped out of the revised PLS model due to its lack of statistical significance and negative effect on the overall model fit. It is noticeable that the association between compatibility and behavioral intention is insignificant in the default PLS model but turned out to be significant in the revised PLS model ($\beta = 174$, $p < 0.05$). Meanwhile, the revised PLS model supports the influence of compatibility on perceived usefulness; the path coefficient between compatibility and perceived usefulness is the largest one in the model ($\beta = 791$, $p < 0.001$). As such, Hypotheses 4b and 4c were supported while hypothesis 4a is not.

Observability is hypothesized to be associated with usage behavior, awareness of IT solutions, attitude toward IT, and behavioral intention to use IT. The association of observability with attitude toward IT is not statistically significant ($p = 190$) although the path coefficient is positive as hypothesized ($\beta = 0.037$); hypothesis 5c is not supported in the default PLS model, and the path between observability and attitude is dropped out of the revised PLS model due to its lack of statistical significance and negative influence on the model fit. However, observability's associations with awareness and behavioral intention were positive and statistically significant as expected; the path coefficients from observability to awareness and behavioral intention were 0.269 ($p <0.001$) and 0.186 ($p < 0.001$), respectively, supporting hypotheses 5b and 5d. Meanwhile, the path from observability to usage behavior is significant in the default PLS model but turned out to be insignificant in the revised PLS model.

As far as technical facilitating condition is concerned, its associations with usage behavior and perceived behavioral control were positive and statistically significant as hypothesized; the path coefficients were 0.086 ($p < 0.05$) and 0.193 ($p < 0.001$), respectively, in the revised PLS model. The path coefficients from technical facilitating condition to perceived ease of use ($\beta = 0.097$) is statistically significant ($p < 0.05$) in the default PLS model as hypothesized but turned to be insignificant in the revised PLS model; it is deleted from the revised PLS model due to its lack of statistical significance and negative influence on the model fit. Meanwhile, the association of facilitating condition with behavioral intention to use turned out to be insignificant ($p = 272$) even if the sign of the relationship is positive ($\beta = 0.030$) in the default PLS model; the path is also excluded from the revised PLS model due to its lack of statistical significance and negative influence on the model fit. As such, hypotheses 6a and 6c were supported, but hypotheses 6b and 6d were not.

It is noticeable that the path coefficients from perceived behavioral control to usage behavior and behavioral intention were all statistically insignificant. In addition one of the signs is negative as opposed to its corresponding hypothesis. Table 4.3.3.4 shows that the path coefficient between perceived behavioral control and usage behavior is -0.021 and that between perceived behavioral control and behavioral intention is 0.033 in the revised PLS model; hence, hypotheses 7a and 7b were not supported.

The association between trialability of IT solutions and attitude toward IT turned out to be statistically insignificant ($p = 0.137$) even if its sign is positive as expected ($\beta =$

0.061) in the default PLS model; hypothesis 8 is not supported, and the path is deleted in the revised PLS model due to its negative influence on the model fit. Meanwhile, it is noticeable that trialability turned out to influence perceived ease of use significantly (β = 144, $p < 0.001$) in the revised PLS model.

It is also noticeable that attitude toward IT is not significantly associated with usage behavior although the association is positive as hypothesized ($\beta = 0.113$, $p = 0.092$); hence, hypothesis 9a is not supported. However, the path coefficient from attitude toward IT to behavioral intention to use IT turned out to be both positive and statistically significant ($\beta = 0.404$, $p < 0.001$), supporting hypothesis 9b. Meanwhile, anxiety turned out to be negatively and statistically significantly associated with perceived ease of use as hypothesized ($\beta = -0.118$, $p < 0.01$), supporting hypothesis 10.

Another noticeable result is that all the hypothesized associations regarding resource facilitating condition were not supported; that is, hypotheses 11a, 11b, and 11c were not supported. The path coefficients from resource facilitating condition to usage behavior, perceived behavioral control, and behavioral intention were 0.036 ($p = 0.199$), 0.021 ($p = 0.310$), and 0.050 ($p = 0.136$), respectively, in the default PLS model; all the paths from resource facilitating condition were excluded in the revised PLS model due to their lack of statistical significance and negative influence on the overall model fit. Meanwhile, the analysis results support hypotheses 12a and 12b regarding self-efficacy. The path coefficients from self-efficacy to perceived ease of use and perceived behavioral control were 0.580 ($p < 0.001$) and 0.532 ($p < 0.001$), respectively.

As far as personal social influence is concerned, its association with awareness turned out to be positive but statistically insignificant ($\beta = 0.095$, $p = 0.196$) while its association with subjective norm turned out to be both positive and statistically significant ($\beta = 0.276$, $p < 0.001$); hence, hypothesis 13b is supported, but hypothesis 13a is not. In addition, all the associations of business social influence turned out to be both positive and statistically significant, supporting hypotheses 14a and 14b. The path coefficients from business social influence to awareness and subjective norm were 0.202 ($p < 0.05$) and 0.693 ($p < 0.001$), respectively.

Finally, subjective norm is hypothesized to be positively associated with usage behavior (hypothesis 15a) and behavioral intention to use (hypothesis 15b), and both associations were supported. The coefficient from subjective norm to usage behavior and behavioral intention to use IT were 0.112 ($p < 0.01$) and 0.117 ($p < 0.01$), respectively, in the revised PLS model. However, it is noticeable that the associations were not statistically significant in the saturated model for this research. Subjective norm as well as perceived behavioral control remained in the revised PLS model due to its contribution to the overall model fit and its mediating role.

4.3.4 Path Coefficient's Effect Size (f^2) in the Revised PLS Model

In addition to the significance of path coefficients, the effect size of each path in the model can be used to assess the model fit. Effect size is rarely reported in studies; this failure to report effect size constitutes a "defect" (Kline, 2009, p. 154). As stated earlier, Cohen's f^2 values of 0.02, 0.15, and 0.35 represent the independent variable's small, medium, and large impact on the dependent variable, respectively (Cohen, 1988). For example, values below 0.02 suggest effects that are too weak to be considered relevant from a practical point of view, even when the corresponding p-values are statistically significant. In this sense, an effect size complements p-values in interpreting the relationship between two variables.

Table 4.3.4.1 shows effect sizes of the path coefficients in the research model. According to Cohen (1988), the effect sizes between perceived usefulness and attitude, between compatibility and perceived usefulness, between self-efficacy and perceived ease of use, between self-efficacy and perceived behavioral control, and between business social influence and subjective norm turned out to be large, having 0.410, 0.673, 0.482, 0.413, and 0.543, respectively. The relationships that have a medium to large effect size are those between perceived usefulness and usage behavior (0.155), between compatibility and attitude (0.274), between attitude and behavioral intention (0.291), and personal social influence and subjective norm (0.211). The relationships of which effect size are small to medium include those between awareness and usage behavior (0.105), between awareness and perceived usefulness (0.058), between awareness and perceived ease of use (0.119), between perceived ease of use and perceived behavioral control (0.148), between perceived ease of use and attitude (0.68), between compatibility and behavioral intention (0.119), observability and awareness (0.090), between observability and behavioral intention (0,084), between technical facilitating condition and usage behavior (0.029), between technical facilitating condition and perceived behavioral control (0.092), between trialability and perceived ease of use (0.069), between attitude and usage behavior (0.067), between anxiety and perceived ease of use (0.076), between personal social influence and awareness (0.028), between business social influence and awareness (0.068), between subjective norm and usage behavior (0.048), and between subjective norm and behavioral intention (0.057).

Table 4.3.4.1 Effect Sizes (f^2) of the Path Coefficients in the Revised PLS Model

	AW	PU	PE	COM	OB	TF	PBC	TR	ATT	ANX	RF	SE	PSI	BSI	SN
U	0.105	0.155			0.017	0.029	0.011		0.067						0.048
AW					0.090								0.028	0.068	
PU	0.058			0.673											
PE	0.119							0.069		0.076		0.482			
COM															
OB															
TF															
PBC			0.148			0.092						0.413			
TR															
ATT		0.410	0.068	0.274											
ANX															
RF															
SE															
PSI															
BSI															
SN													0.211	0.543	
BI				0.119	0.084		0.020		0.291						0.057

Note: AW=Awareness; PU=Perceived Usefulness; PE=Perceived Ease of Use; COM=Compatibility; OB=Observability; TF=Technical Facilitating Conditions; PBC=Perceived Behavioral Control; TR=Trialability; ATT=Attitude; ANX=Anxiety; RF=Resource Facilitating Conditions; BI=Behavioral Intention; SE=Self-Efficacy; PSI=Personal Social Influence; BSI=Business Social Influence; SN=Subjective Norm; U=Usage

It is noticeable that, despite the statistical insignificance of the relationship between attitude and usage behavior, its effect size (0.067) turned out to be greater than those between technical facilitating condition and usage behavior (0.029), between subjective norm and usage behavior (0.048), and between subjective norm and behavioral intention (0.057), which turned out to be statistically significant.

4.3.5 Indirect and Total Effects of Each Latent Variable in the Revised PLS Model

Table 4.3.5.1 shows sums of indirect effects and total effects of independent latent variables in behavioral intention to use IT. The independent latent variables that have significant total effects in behavioral intention include awareness ($\beta = 0.030$, $p = 0.015$, $f^2 = 0.014$), perceived usefulness ($\beta = 0.198$, $p < 0.001$, $f^2 = 0.131$), perceived ease of use ($\beta = 0.051$, $p = 029$, $f^2 = 0.024$), compatibility ($\beta = 0.465$, $p < 0.001$, $f^2 = 0.319$), observability ($\beta = 0.194$, $p < 0.001$, $f^2 = 0.087$), attitude ($\beta = 0.404$, $p < 0.001$, $f^2 = 0.291$), personal social influence ($\beta = 0.035$, $p = 0.009$, $f^2 = 0.017$), business social influence ($\beta = 0.081$, $p = 0.006$, $f^2 = 0.042$), and subjective norm ($\beta = 0.117$, $p = 0.003$, $f^2 = 0.057$). The constructs of technical facilitating condition, perceived behavioral control, trialability, anxiety, and self-efficacy turned out to be insignificant in their total effects in behavioral intention. Meanwhile, the sums of indirect effects of awareness, perceived usefulness, perceived ease of use, technical facilitating condition, trialability, anxiety, self-efficacy, personal social influence, and business social influence are exactly the same as the total effects as there were no direct links in the revised PLS model. The constructs of perceived behavioral control, attitude, and subjective norm were not modeled to have indirect paths to behavioral intention. The constructs of compatibility and observability were theorized to have both direct and indirect paths to behavioral intention; both sums of indirect effects turned out to be statistically significant (β = 0.291, $p < 0.001$, $f^2 = 0.200$ for compatibility and β = 0.006, $p = 0.044$, $f^2 = 0.004$ for observability).

Table 4.3.5.1 Sum of Indirect Effects and Total Effects in Behavioral Intention

Constructs	Sum of Indirect Effects in Behavioral Intention				Total Effects in Behavioral Intention			
	Effects	P-values	Standard Errors	Effect Sizes	Effects	P-values	Standard Errors	Effect Sizes
AW	0.030	0.024	0.015	0.014	0.030	0.024	0.015	0.014
PU	0.198	<0.001	0.049	0.131	0.198	<0.001	0.049	0.131
PE	0.051	0.029	0.027	0.024	0.051	0.029	0.027	0.024
COM	0.291	<0.001	0.070	0.200	0.465	<0.001	0.079	0.319
OB	0.008	0.044	0.005	0.004	0.194	<0.001	0.045	0.087
TF	0.006	0.307	0.013	0.002	0.006	0.307	0.013	0.002
PBC					0.033	0.296	0.062	0.020
TR	0.007	0.062	0.005	0.003	0.007	0.062	0.005	0.003
ATT					0.404	<0.001	0.097	0.291
ANX	-0.006	0.098	0.005	0.002	-0.006	0.098	0.005	0.002
SE	0.047	0.133	0.043	0.027	0.047	0.133	0.043	0.027
PSI	0.035	0.009	0.015	0.017	0.035	0.009	0.015	0.017
BSI	0.081	0.006	0.032	0.042	0.081	0.006	0.032	0.042
SN					0.117	0.003	0.042	0.057

Note: AW=Awareness; PU=Perceived Usefulness; PE=Perceived Ease of Use; COM=Compatibility; OB=Observability; TF=Technical Facilitating Conditions; PBC=Perceived Behavioral Control; TR=Trialability; ATT=Attitude; ANX=Anxiety; RF=Resource Facilitating Conditions; BI=Behavioral Intention; SE=Self-Efficacy; PSI=Personal Social Influence; BSI=Business Social Influence; SN=Subjective norm; U=Usage

In addition to sums of the indirect effects, Table 3.5.2 reveals individual indirect effect of each path segment from the independent latent variables to behavioral intention to use IT. The information on the indirect effect of individual path segment helps understand which paths from an independent latent variable to a dependent variable make more sense than the others. Statistically significant paths include the paths: from awareness through perceived usefulness and attitude to behavioral intention ($\beta = 0.021$, $p = 0.045$, $f^2 = 0.010$), from perceived usefulness through attitude to behavioral intention ($\beta = 0.198$, $p < 0.001$, $f^2 = 0.131$), from perceived ease of use through attitude to behavioral intention ($\beta = 0.044$, $p < 0.001$, $f^2 = 0.021$), from compatibility through perceived usefulness and attitude to behavioral intention ($\beta = 0.157$, $p < 0.001$, $f^2 = 0.108$), from compatibility through attitude to behavioral intention ($\beta = 0.164$, $p = 0.001$, $f^2 = 0.112$), from trialability through perceived ease of use and attitude to behavioral intention ($\beta = 0.006$, $p = 0.048$, $f^2 = 0.002$), from self-efficacy through perceived ease of use and attitude to behavioral intention ($\beta = 0.026$, $p = 0.025$, $f^2 = 0.015$), and from personal social influence through subjective norm to behavioral intention ($\beta = 0.032$, $p = 0.013$, $f^2 = 0.015$).

Table 4.3.5.2 Individual Indirect Effects in Behavioral Intention

From	Through	To	Indirect effect	P-value	Standard errors	Effect size
AW	PU - ATT	BI	0.021	0.045	0.013	0.010
AW	PE - ATT	BI	0.008	0.064	0.005	0.004
AW	PE - PBC	BI	0.001	0.323	0.003	0.001
PU	ATT	BI	0.198	<0.001	0.049	0.131
PE	ATT	BI	0.044	<0.001	0.023	0.021
PE	PBC	BI	0.007	0.313	0.014	0.003
COM	PU - ATT	BI	0.157	<0.001	0.040	0.108
COM	ATT	BI	0.164	0.001	0.055	0.112
OB	AW – PU - ATT	BI	0.006	0.065	0.004	0.003
OB	AW – PE - ATT	BI	0.002	0.119	0.002	0.001
OB	AW – PE - PBC	BI	0.000	0.342	0.001	0.000
TF	PBC	BI	0.006	0.307	0.013	0.002
TR	PE - ATT	BI	0.006	0.048	0.004	0.002
TR	PE - PBC	BI	0.001	0.333	0.002	0.000
ANX	PE - ATT	BI	-0.005	0.077	0.004	0.002
ANX	PE - PBC	BI	-0.001	0.346	0.002	0.000
SE	PE - ATT	BI	0.026	0.025	0.013	0.015
SE	PE - PBC	BI	0.004	0.305	0.008	0.002
SE	PBC	BI	0.018	0.298	0.034	0.010
PSI	AW – PU - ATT	BI	0.002	0.270	0.003	0.001
PSI	AW – PE - ATT	BI	0.001	0.282	0.001	0.000

PSI	AW – PE - PBC	BI	0.000	0.396	0.000	0.000
PSI	SN	BI	0.032	0.013	0.014	0.015
BSI	AW – PU - ATT	BI	0.004	0.116	0.004	0.002
BSI	AW – PE - ATT	BI	0.002	0.108	0.001	0.001
BSI	AW – PE - PBC	BI	0.000	0.321	0.001	0.000
BSI	SN	BI	0.074	0.009	0.031	0.039

Note: AW=Awareness; PU=Perceived Usefulness; PE=Perceived Ease of Use; COM=Compatibility; OB=Observability; TF=Technical Facilitating Conditions; PBC=Perceived Behavioral Control; TR=Trialability; ATT=Attitude; ANX=Anxiety; RF=Resource Facilitating Conditions; BI=Behavioral Intention; SE=Self-Efficacy; PSI=Personal Social Influence; BSI=Business Social Influence; SN=Subjective norm; U=Usage

Meanwhile, Table 4.3.5.3 presents sums of indirect effects and total effects of independent latent variables in actual usage behavior. The independent latent variables that have significant total effects in usage behavior include awareness ($\beta = 0.227$, $p < 0.001$, $f^2 = 0.122$), perceived usefulness ($\beta = 0.296$, $p < 0.001$, $f^2 = 0.190$), compatibility ($\beta = 0.272$, $p < 0.001$, $f^2 = 0.161$), observability ($\beta = 0.113$, $p = 0.010$, $f^2 = 0.036$), personal social influence ($\beta = 0.053$, $p = 0.037$, $f^2 = 0.021$), business social influence ($\beta = 0.117$, $p = 0.010$, $f^2 = 0.059$), and subjective norm ($\beta = 0.112$, $p = 0.006$, $f^2 = 0.048$). The constructs of perceived ease of use, technical facilitating condition, perceived behavioral control, trialability, attitude, anxiety, and self-efficacy turned out to be insignificant in their total effects in usage behavior. Meanwhile, the sums of indirect effects of compatibility, personal social influence, and business social influence, among others, are exactly the same as the total effects as there were no direct links to usage behavior in the revised PLS model. The constructs that were theorized to have direct and indirect effects in usage behavior are awareness and observability, and their sums of indirect effects in usage behavior turned out to be statistically significant (β = 0.033, p = 0.049, f^2 = 0.018 for awareness and β = 0.061, p = 0.001, f^2 = 0.020 for observability).

Table 4.3.5.3 Sum of Indirect Effects and Total Effects in Usage Behavior

Constructs	Sum of Indirect Effects in Usage Behavior				Total Effects in Usage Behavior			
	Effects	P-values	Standard Errors	Effect Sizes	Effects	P-values	Standard Errors	Effect Sizes
AW	0.033	0.049	0.020	0.018	0.227	<0.001	0.055	0.122
PU	0.055	0.114	0.046	0.035	0.296	<0.001	0.078	0.190
PE	0.008	0.370	0.024	0.004	0.008	0.370	0.024	0.004
COM	0.272	<0.001	0.070	0.161	0.272	<0.001	0.070	0.161
OB	0.061	0.001	0.020	0.020	0.113	0.010	0.048	0.036
TF	-0.004	0.412	0.019	0.001	0.082	0.052	0.050	0.027
PBC					-0.021	0.412	0.095	0.011
TR	0.001	0.385	0.004	0.000	0.001	0.385	0.004	0.000
ATT					0.113	0.092	0.085	0.067
ANX	-0.001	0.391	0.003	0.000	-0.001	0.391	0.003	0.000
SE	-0.007	0.458	0.062	0.004	-0.007	0.458	0.062	0.004
PSI	0.053	0.037	0.029	0.021	0.053	0.037	0.029	0.021
BSI	0.117	0.010	0.050	0.059	0.117	0.010	0.050	0.059
SN					0.112	0.006	0.044	0.048

Note: AW=Awareness; PU=Perceived Usefulness; PE=Perceived Ease of Use; COM=Compatibility; OB=Observability; TF=Technical Facilitating Conditions; PBC=Perceived Behavioral Control; TR=Trialability; ATT=Attitude; ANX=Anxiety; RF=Resource Facilitating Conditions; BI=Behavioral Intention; SE=Self-Efficacy; PSI=Personal Social Influence; BSI=Business Social Influence; SN=Subjective norm; U=Usage

Finally, Table 4.3.5.4 presents the individual indirect effect of each path segment from the independent latent variables to actual usage behavior. Statistically significant paths include the paths: from compatibility through perceived usefulness to usage behavior (β = 0.191, p = 0.001, f^2 = 0.113), from observability through awareness to usage behavior (β = 0.052, p = 0.003, f^2 = 0.017), from perceived ease of use through attitude to behavioral intention (β = 0.044, p < 0.001, f^2 = 0.021), from personal social influence through subjective norm to usage behavior (β = 0.031, p = 0.010, f^2 = 0.012), and from business social influence through subjective norm to usage behavior (β = 0.125, p = 0.002, f^2 = 0.063).

Table 4.3.5.4 Individual Indirect Effects in Usage Behavior

From	Through	To	Indirect Effects	P-Values	Standard Errors	Effect Sizes
AW	PU – ATT	U	0.006	0.187	0.007	0.003
AW	PU	U	0.025	0.060	0.016	0.014
AW	PE - ATT	U	0.002	0.140	0.002	0.001
AW	PE - PBC	U	-0.001	0.423	0.004	0.000
PU	ATT	U	0.055	0.114	0.046	0.035
PE	ATT	U	0.012	0.114	0.011	0.006
PE	PBC	U	-0.004	0.420	0.022	0.002
COM	PU - ATT	U	0.044	0.115	0.036	0.026
COM	PU	U	0.191	0.001	0.063	0.113
COM	ATT	U	0.046	0.091	0.034	0.027
OB	AW - PU - ATT	U	0.002	0.186	0.002	0.001
OB	AW - PU	U	0.007	0.088	0.005	0.002
OB	AW	U	0.052	0.003	0.019	0.017
OB	AW- PE -ATT	U	0.001	0.185	0.001	0.000
OB	AW – PE - PBC	U	0.000	0.431	0.001	0.000

TF	PBC	U	-0.004	0.412	0.019	0.001
TR	PE - ATT	U	0.002	0.157	0.002	0.001
TR	PE - PBC	U	-0.001	0.426	0.003	0.000
ANX	PE - ATT	U	-0.001	0.169	0.002	0.001
ANX	PE - PBC	U	0.001	0.429	0.003	0.000
SE	PE - ATT	U	0.007	0.122	0.006	0.004
SE	PE - PBC	U	-0.003	0.418	0.012	0.001
SE	PBC	U	-0.011	0.412	0.051	0.006
PSI	AW – PU - ATT	U	0.001	0.347	0.001	0.000
PSI	AW - PU	U	0.002	0.258	0.004	0.001
PSI	AW	U	0.019	0.206	0.023	0.007
PSI	AW – PE - ATT	U	0.000	0.297	0.000	0.000
PSI	AW – PE - PBC	U	0.000	0.446	0.001	0.000
PSI	SN	U	0.031	0.010	0.013	0.012
BSI	AW – PU – ATT	U	0.001	0.230	0.002	0.001
BSI	AW – PU	U	0.005	0.119	0.004	0.003
BSI	AW	U	0.039	0.068	0.026	0.020
BSI	AW – PE - ATT	U	0.000	0.173	0.000	0.000
BSI	AW – PE - PBC	U	0.000	0.415	0.001	0.000
BSI	SN	U	0.125	0.002	0.042	0.063

Note: AW=Awareness; PU=Perceived Usefulness; PE=Perceived Ease of Use; COM=Compatibility; OB=Observability; TF=Technical Facilitating Conditions; PBC=Perceived Behavioral Control; TR=Trialability; ATT=Attitude; ANX=Anxiety; RF=Resource Facilitating Conditions; BI=Behavioral Intention; SE=Self-Efficacy; PSI=Personal Social Influence; BSI=Business Social Influence; SN=Subjective norm; U=Usage

4.4 Comparison Between the Seminal Theories

The results of post-hoc analyses to compare between the seminal theories (i.e., TRA, TAM, TPB, and DIT) are as follows. It should be noted that the construct of actual usage behavior is included in the models below only to show how the original models were specified. Due to the cross-sectional nature of the data used in this research, the path coefficient between behavioral intention and actual usage behavior does not represent a causal relationship just like the other path coefficients. In addition, the path coefficient and the coefficient of determination of actual usage behavior do not change over different models. The model comparisons focus on the average path coefficient and the average coefficient of determination as well as the coefficient of determination of the construct of behavioral intention as they are seen to be appropriate.

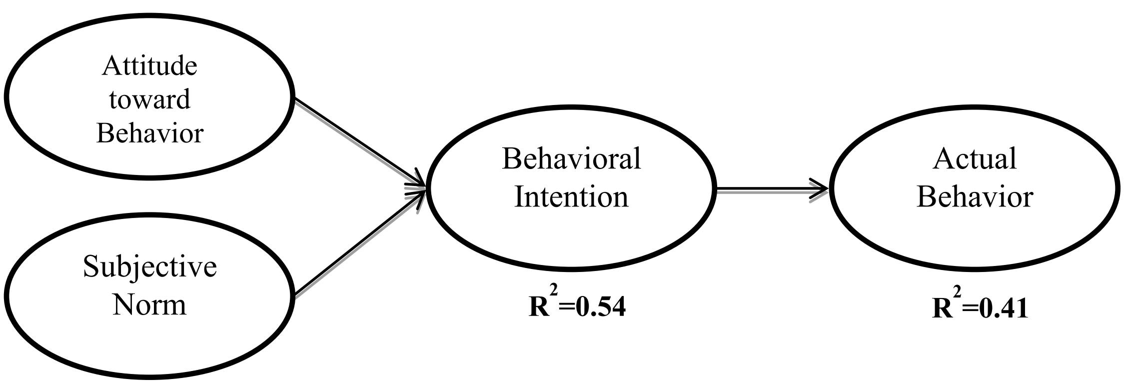

Figure 4.4.1 Explanation Power of TRA

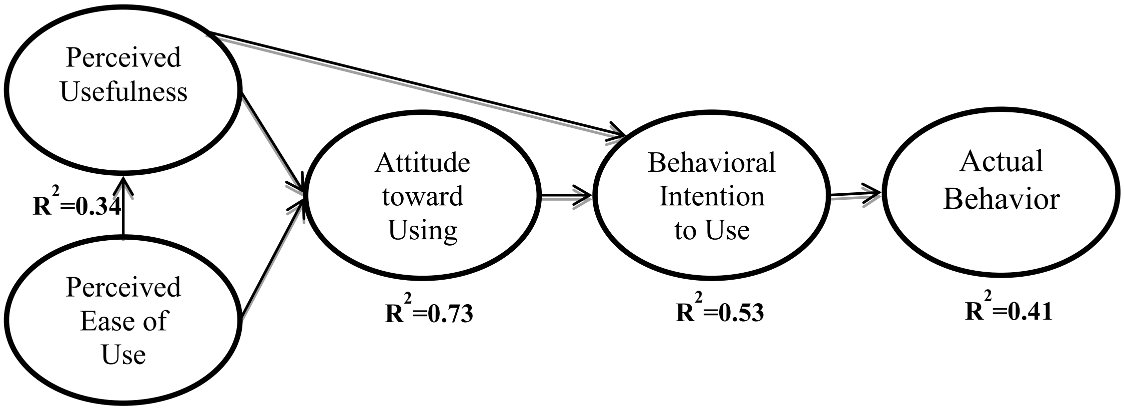

Figure 4.4.2 Explanation Power of TAM

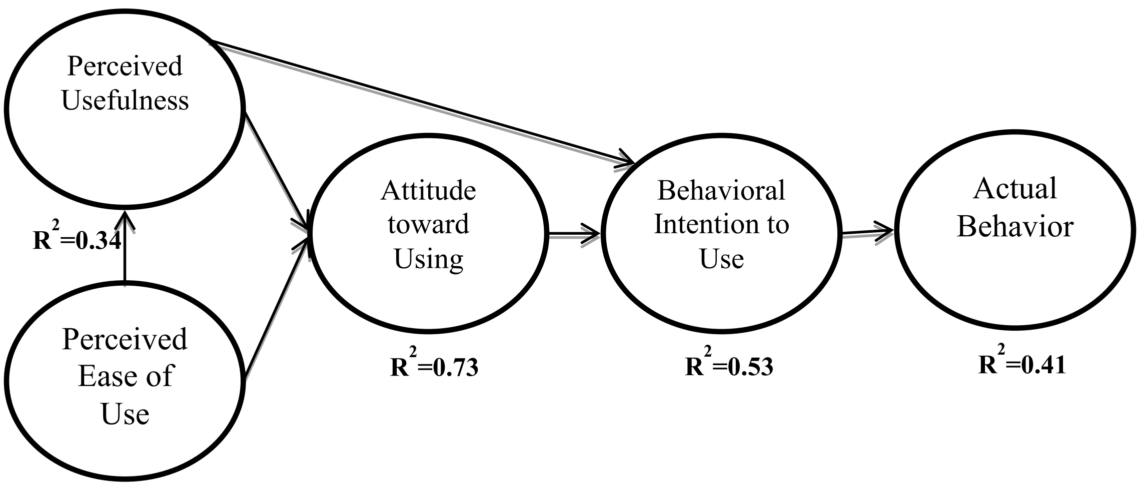

Figure 4.4.3 Explanation Power of TPB

DIT was not modeled in a way to compare with the models above; it provided theoretical underpinnings about the importance of relative advantage, complexity, compatibility, observability, and trialability as the determinants of innovation adoption, some of which have been used in modeling IT acceptance models as the determinants of behavioral intention or actual usage behavior. The model in Figure 4.4.4 is constructed for the purpose of comparing with the previous three models.

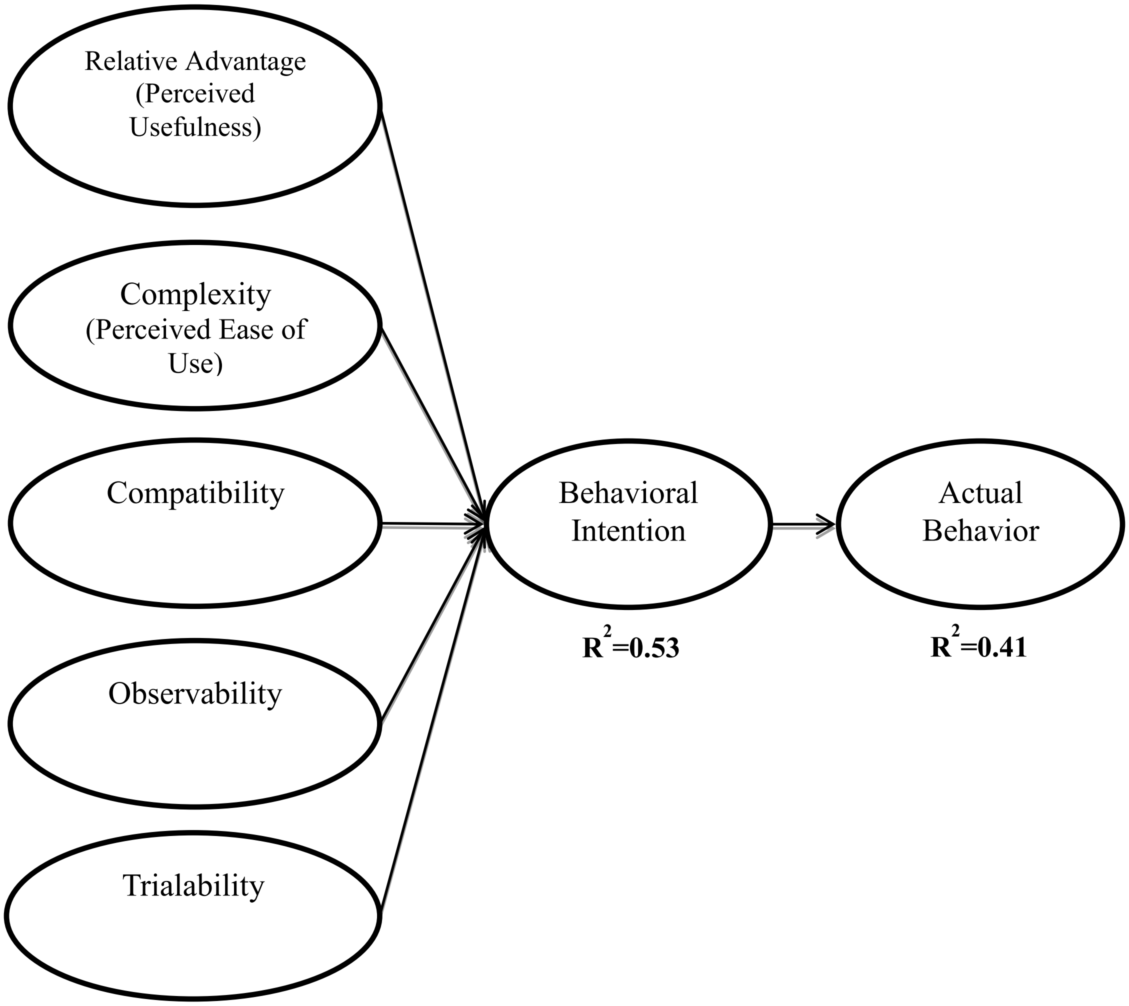

Figure 4.4.4 Explanation Power of DIT

Figures 4.4.1 through 4.4.4 do not suggest a significant difference between the models in terms of the coefficient of determinant for behavioral intention: the coefficient of determinant for the construct of behavioral intention with the survey data from micro-enterprises turned out to be 0.54 for TRA, 0.53 for TAM, 0.55 for TPB, and 0.53 for DIT. These results are interesting because previous studies found a significant difference between TRA and TAM and between TRA and TPB; the coefficient of determinant for the construct of behavioral intention in TAM was higher than that in TRA (Davis et al., 1989; Venkatesh et al., 2003), and TPB was found to be better explaining behavioral intention than TRA (Venkatesh et al., 2003). However, the results in this research do not support the findings. Table 4.4.1 presents a summary of the analyses above, including path coefficients.

Table 4.4.1 Comparison of TRA, TAM, TPB, and DIT Models

Models	Path	Coefficient	P-value	R^2 for BI
TRA	ATT→BI	0.636	<0.001	0.542
	SN→BI	0.170	<0.001	
	BI→U	0.641	<0.001	
TAM	PU→ATT	0.719	<0.001	0.533
	PU→BI	0.203	0.018	
	PE→PU	0.581	<0.001	
	PE→ATT	0.202	<0.001	
	ATT→BI	0.553	<0.001	
	BI→U	0.641	<0.001	
TPB	ATT→BI	0.522	<0.001	0.554
	SN→BI	0.176	<0.001	
	PBC→U	0.249	<0.001	
	PBC→BI	0.155	0.043	
	BI→U	0.501	<0.001	

DIT	PU→BI	0.315	<0.001	0.531
	PE→BI	0.062	0.135	
	COM→BI	0.360	<0.001	
	OB→BI	0.216	<0.001	
	TR→BI	0.064	0.171	
	BI→U	0.641	<0.001	

Note: PU=Perceived Usefulness; PE=Perceived Ease of Use; COM=Compatibility; OB=Observability; PBC=Perceived Behavioral Control; TR=Trialability; ATT=Attitude; BI=Behavioral Intention; SN=Subjective norm; U=Usage

It is important to note that although DIT as a whole is found to be no better than the other three models, some of its constructs (e.g., compatibility, observability) contribute to the significance of the default and revised PLS model as discussed earlier. To validate the significance of those constructs in the context of micro-enterprises' IT adoption, the research re-specified the seminal models in a way to replace less significant constructs in the original models with more significant constructs provided by DIT. The first is a re-specified TPB model; the model has replaced subjective norm with observability suggested by DIT. This re-specified TPB also represents a re-specified TRA because TPB shares the same constructs as TRA; TPB extended TRA simply by adding perceived behavioral control (Ajzen, 1991).

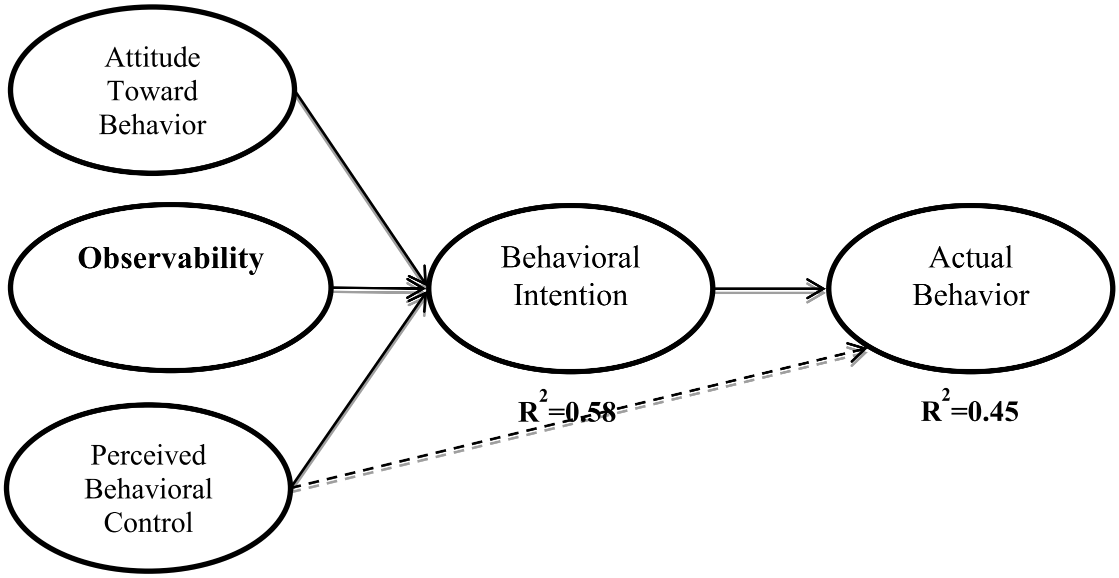

Figure 4.4.5 Re-Specified TPB Model

As shown in Figure 4.4.5, the coefficient of determinant for behavioral intention has slightly increased from 0.55 to 0.58. The next re-specified model has substitute compatibility suggested by DIT for perceived ease of use in TAM as shown below.

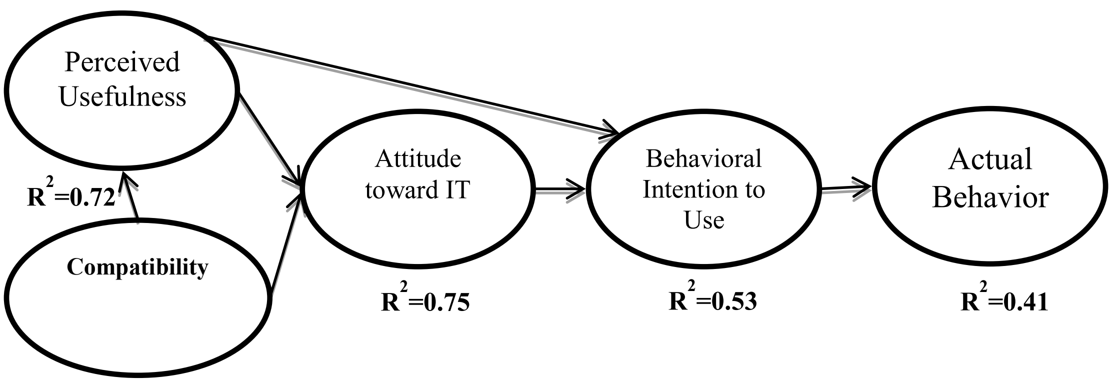

Figure 4.4.6 Re-Specified TAM Model

The coefficient of determinant for behavioral intention is the same because compatibility does not have a direct link to behavioral intention. However, the coefficients of determinant have increased from 0.73 to 0.75 for attitude toward IT and from 0.34 to 0.72 for perceived usefulness. These results of post-hoc analyses demonstrate that DIT provides factors that better fit to the context of micro-enterprises' IT adoption. The following is a summary table of these results.

Table 4.4.2 Comparison between the Original and Re-specified TAM and TPB

Models	Original Model				Re-specified Model			
	Path	Coefficient	P-value	R^2	Path	Coefficient	P-value	R^2
TAM	PU→ATT	0.719	<0.001	0.533 for BI; **0.338 for PU**; **0.727 for ATT**	PU→ATT	0.492	<0.001	0.533 for BI; **0.723 for PU**; **0.745 for ATT**
	PU→BI	0.203	0.018		PU→BI	0.203	0.018	
	PE→PU	**0.581**	<0.001		**COM→PU**	**0.850**	<0.001	
	PE→ATT	**0.202**	<0.001		**COM→ATT**	**0.406**	<0.001	
	ATT→BI	0.553	<0.001		ATT→BI	0.553	<0.001	
	BI→U	0.641	<0.001		BI→U	0.641	<0.001	
TPB	ATT→BI	0.522	<0.001	**0.554 for BI**	ATT→BI	0.595	<0.001	**0.576 for BI**
	SN→BI	**0.176**	**<0.001**		**OB→BI**	**0.230**	**<0.001**	
	PBC→U	0.249	<0.001		PBC→U	0.249	<0.001	
	PBC→BI	0.155	0.043		PBC→BI	0.073	0.156	
	BI→U	0.501	<0.001		BI→U	0.501	<0.001	

Note: PU=Perceived Usefulness; PE=Perceived Ease of Use; COM=Compatibility; OB=Observability; PBC=Perceived Behavioral Control; ATT=Attitude; BI=Behavioral Intention; SN=Subjective norm; U=Usage

Chapter 5. Discussion and Conclusion

5.1 Overview of Findings

IT Awareness is hypothesized to be positively associated with perceived usefulness, and the study findings support this hypothesis. In the revised PLS model, awareness has additional significant relationships with perceived ease of use and actual IT usage behavior with the third largest total effect, demonstrating the importance of this construct in explaining IT adoption by micro-enterprises. Awareness is also significantly associated with behavioral intention to use IT indirectly through perceived usefulness and attitude toward IT. Albeit marginal, awareness has a significant indirect effect in behavioral intention via the constructs of perceived ease of use and attitude toward IT. The significance of awareness may be explained by Wolcott et al. (2008), in which micro-enterprises' IT use is argued to be limited by their lack of IT awareness.

The research findings support the relationship between perceived usefulness and attitude toward IT. This relationship has been consistently supported by various studies since the seminal study by Davis et al. (1989), (e.g., Bharttacherjee & Sanford, 2006; Chau & Hu, 2002; Davis, Bagozzi, & Warshaw, 1989; Hsieh et al., 2008; Karahanna et al., 1999; Pavlou & Fygenson, 2006; Riemenschneider et al., 2003; Taylor & Todd, 1995; Wixom & Todd, 2005). According to Hsieh et al. (2008), the relationship between perceived usefulness and attitude is significant regardless of the socio-economic status of the adopters (i.e., both socially advantaged and disadvantaged group). The research also supports the hypothesis about the relationship between perceived usefulness and actual IT usage behavior as evidenced in the previous studies (Adams, Nelson, & Todd, 1992; Compeau & Higgins, 1995b; Gefen & Straub, 1997; Igbaria et al., 1996; Igbaria et al., 1997; Karahanna & Straub, 1999; Karahanna et al., 2006; Moore & Benbasat, 1991; Thompson et al., 1991). Karahanna et al. (2006) separated usage behavior into two distinct constructs—usage intensity and usage scope—and found that perceived usefulness was significantly associated with both usage intensity and scope, which are reflected in the measurement of usage behavior in this research. However, the hypothesis about the direct relationship between perceived usefulness and behavioral intention to use IT, which was initially proposed by TAM (Davis et al., 1989), is not supported in this research. Instead, the effect of perceived usefulness on behavioral intention is mediated by attitude. Perceived usefulness has the largest total effect on actual IT usage behavior and the third largest total effect in behavioral intention to use IT, indicating that functionality of IT plays a key role in micro-enterprises' decision to adopt and use IT.

Perceived ease of use is hypothesized to be positively associated with perceived behavioral control and attitude, and the research findings support both of these hypotheses. The significance of the relationship between perceived ease of use and perceived behavioral control has been evidenced in Chau and Hu (2002), Hsieh et al. (2008), and Riemenschneider et al. (2003), and the positive association between perceived ease of use and attitude has been empirically supported in Pavlou and Fygenson (2006), Riemenschneider et al. (2003), Taylor and Todd (1995b), and Wixom and Todd (2005). Perceived ease of use has a significant total effect in behavioral intention to use IT and a significant indirect effect on behavioral intention through attitude.

According to the revised PLS model in this research, compatibility has the largest total effect in behavioral intention and the second largest total effect in actual usage behavior, demonstrating the importance of this construct in the context of micro-enterprises' IT adoption. As hypothesized, the relationship between compatibility and attitude is supported in this research. In the revised PLS model, compatibility is significantly associated with behavioral intention, which is consistent with Plouffe et al. (2001). In addition, the revised PLS model shows a strong relationship between compatibility and perceived usefulness, as in Chau and Hu (2002) and Karahanna, Agarwal and Angst (2006). Replacing perceived ease of use with compatibility makes TAM better fit to explaining the context of IT adoption by micro-enterprises.

The findings by the revised PLS model also support the hypotheses about the relationships between observability and behavioral intention, as in Hsieh et al. (2008), and between observability and awareness. However, the hypothesis about the direct relationship between observability and usage behavior is not supported. The effect of observability on usage behavior is significantly mediated by attitude ($p < 0.01$). The findings also show that substituting observability for subjective norm makes TRA and TPB better suited to explaining IT adoption by micro-enterprises. These findings demonstrate that being exposed to innovations or observing others' successful IT utilization significantly influences micro-enterprises in their decision to adopt and use IT.

This research split facilitating condition into technical facilitating condition—external technical support—and resource facilitating condition—lack of time and funding. Igbaria et al. (1996) demonstrate the effect of organizational support on usage behavior. However, this relationship between technical facilitating condition and usage behavior was not supported in Thompson et al. (1991), of which measurement items are used to measure technical facilitating condition for this research. Venkatesh et al. (2003) also do not support the effect of facilitating condition on usage behavior. In their study, the construct of facilitating condition includes both technical and resource facilitating condition measurement items. The findings from this research reveal the statistical significance of the relationship between technical facilitating condition and usage behavior as hypothesized in the revised PLS model.

Also supported by the findings in this research is the hypothesis about the effect of resource facilitating condition on perceived behavioral control as evidenced in Hsieh et al. (2008) and Pavlou and Fygenson (2006). However, the effect of resource facilitating condition on actual IT usage behavior and behavioral intention is not significant. Apparently, this unexpected result does not reflect the context of micro-enterprises' IT adoption, where lack of funding is known to negatively influence micro-enterprises behavior (Wolcott et al., 2008). Actually, there is a high correlation between resource facilitating condition and usage behavior or behavioral intention without other constructs being controlled. A possible explanation may be that the costs for IT adoption may be not high enough to influence the behavioral constructs. A list of hardware and software given in the questionnaire may have been considered as affordable for most of the respondents (i.e., micro-enterprise owners) in this study. In this case, the variation in resource facilitating condition may not correlate with the variation in usage behavior or behavioral intention. Another possible explanation would be that micro-enterprises owners are entrepreneurs who are willing to invest in IT if they become confident that IT contributes to their business growth. In this sense, resource facilitating condition may be considered a necessary condition but not a sufficient condition for micro-enterprises' IT adoption. According to Taylor and Todd (1995b), although lack of resources may inhibit the formation of behavioral intention and/or usage behavior, "the presence of facilitating resources may not, per se, encourage usage" (p. 153). Therefore, micro-enterprises' IT adoption may be influenced more by other constructs (e.g., perceived usefulness, compatibility, observability, perceived ease of use, etc.) that may influence their formation of confidence about the benefits of IT rather than resource facilitating condition. The statistical insignificance of the effect of perceived behavioral control on behavioral intention and usage behavior can be understood in the same context of resource facilitating condition.

Trialability does not have a significant relationship with attitude in this study, and this finding is consistent with Karahanna et al. (1999). Instead it was significantly associated with perceived ease of use in the revised PLS model. Furthermore, trialability has a significant effect on behavioral intention indirectly through perceived ease of use and attitude ($p < 0.05$), although the effect size is small. Trialability provides opportunities to experience IT solutions, and experiences with IT, in turn, may increase perceived ease of use (Stoel & Lee, 2003).

Although the relationship between attitude and behavior is significant as consistently evidenced in various previous studies (Bhattacherjee & Sanford, 2006; Chau & Hu, 2002; Davis et al., 1989; Harrison et al., 1997; Hsieh et al., 2008; Karahanna et al., 1999; Pavlou & Fygenson, 2006; Riemenschneider et al., 2003; Taylor & Todd, 1995; Tihah & Barki, 2009; Wixom & Todd, 2005), attitude's relationship with usage behavior is not statistically significant in this research. The findings about this relationship between attitude and usage behavior is mixed; for example, it was significant in Compeau and Higgins (1995) but not in Thompson et al. (1991).

The hypotheses involving anxiety (i.e., the association between anxiety and perceived ease of use) is supported in this research as evidenced in Venkatesh (2000). In addition, albeit marginal, anxiety has a negative effect on behavioral intention indirectly through perceived ease of use and attitude. Regarding self-efficacy, both hypotheses (i.e., the association of self-efficacy with perceived ease of use and perceived behavioral control) are also supported in this research. Lack of skills faced by micro-enterprises (Wolcott et al., 2008) may be considered as influential in these relationships. Skills level is a well-known factor that influences the level of self-efficacy (Pavlou & Fygenson, 2006).

In this study, social influence is split into two distinct constructs: personal social influence and business social influence. With regard to social influence, the only hypothesis that is not supported in this research is the relationship between personal social influence and awareness. All other hypotheses are supported. The significance of the relationship between social influence and subjective norm is evidenced in Hsieh et al. (2008), Karahanna et al. (1999), and Taylor and Todd (1995). The findings from this study also support all relationships involving subjective norm as hypothesized in the research model. The effect of subjective norm on behavioral intention has been supported in previous studies (Harrison et al., 1997; Riemenschneider et al., 2003; Taylor & Todd, 1995b, Tihah & Barki, 2009).

5.2 Theoretical Implications

In this research, the factors relevant to explaining micro-enterprises' IT adoption are identified through literature review and preliminary case studies. The factors were modeled and tested in a manner to maximize the explanation power (i.e., average R^2), drawing on TRA (Fishbein and Ajzen, 1975), TAM (Davis et al., 1989), TPB (Ajzen, 1991), and DIT (Rogers, 2003). The research findings reveal that TAM is more appropriate than TPB in explaining the context of micro-enterprise IT adoption as shown by the insignificance of perceived behavioral control, which is the core construct in TPB. In their comparison between TAM and TPB, Taylor and Todd (1995b) show that the predictive power of TPB is roughly comparable to TAM, concluding that the construct of perceived behavioral control does not add much value beyond TAM in terms of the predictive power. In addition to their findings, this research further implies the limited role of TPB in explaining IT adoption behavior depending on the specific context in which IT adoption is involved. As such, the findings from this research suggest that research should be conducted to further develop a more general theory of IT adoption by incorporating variables that represent different IT adoption contexts.

An interesting finding in this research is that TAM, although better than TPB, is not the best in itself because the construct of compatibility suggested by DIT turned out to have a better fit than perceived usefulness in explaining micro-enterprises' behavioral intention to use IT. Perceived usefulness has been modeled to positively influence behavioral intention to use IT (Agarwal & Karahanna, 2000; Bhattacherjee & Sanford, 2006; Brown & Venkatesh, 2005; Chau & Hu, 2002; Chin et al, 2008) and usage behavior (Thompson et al., 1991; Premkumar & Potter, 1995; Igbaria et al., 1996; Karahanna & Straub, 1999; Wu & Lederer, 2009). Perceived usefulness has the largest total effect on current IT usage behavior in micro-enterprises. However, as far as micro-enterprises are concerned, compatibility has the largest total effect on behavioral intention to continue using IT in the context of micro-enterprises. Micro-enterprises tend to appreciate a symbolic value of technology excessively while suffering from mismatch between technology and their social and/or business systems (Wolcott et al., 2008). Their current IT usage is likely to be influenced by this symbolic value related to perceived usefulness of technology. However, micro-enterprises may realize some incompatibility of IT with their existing values, experience, or business as they face technology mismatches once they begin to use IT. This may be due to the lack of consideration of how technology would fit with the way they operate businesses. Technology mismatches observed in micro-enterprises may be due to this limited access or lack of access to reliable IT consultation services. Their behavioral intention to continue using IT may be influenced by experienced incompatibility of technology with business. DIT has a better fit to the context of micro-enterprises' IT adoption as it supports these explanations; that is, it considers the characteristics of an individual context of innovation adoption (Rogers, 2003).

The significance of DIT in this research also suggests an important implication to the research field of IT for development. One of the primary research purposes in this research discipline of IT for development is to understand the notion of local adaptation of IT (Walsham & Sahay, 2006). Local adaptation suggests the core role of socio-cultural values and previous ideas or experience in IT adoption. According to DIT, the characteristics of not only the innovation being considered for adoption but also the potential innovation adopter are associated with innovation adoption (Rogers, 2003). Therefore, it becomes critical to understand how the innovation is perceived to be consistent with the potential innovation adopter's socio-cultural values and previous ideas or experience. In micro-enterprises, these values and/or ideas can be represented by the unique business contexts, business styles, or simply ways of doing business. Therefore, the significance of DIT illustrates how important it is to understand the notion of local adaptation. In this sense, the findings in this research contribute to the research body of IT for development by adding rich discussions to the discipline about the importance of local context of IT adoption.

5.3 Practical Implications

The findings in this research have significant practical implications for designing and implementing an effective public and non-profit intervention for the use of IT in micro-enterprises. The findings from this study serve to extend knowledge in the area of micro-enterprises' engagement with technology. First, the findings from this research show limited significance of resource facilitating condition and significance of awareness and compatibility of IT. These findings demonstrate that an effective IT assistance for micro-enterprises requires not only access to technology but also significant social support through relevant and timely consultations about information of relevant IT solutions that would fit in individual micro-enterprises' business contexts. IT consultation services for micro-enterprises are limited in the current market, causing information asymmetries (hence digital divide) between enterprises, which call for public and non-profit interventions to assist micro-enterprises in integrating IT solutions into their businesses. Consultations need to take the unique circumstances and environments of micro-enterprises into consideration for enhanced compatibility. For example, an IT assistance program that provides micro-enterprises with free or discounted business software without relevant consultations and/or trainings would be somewhat limited in its effectiveness or performance. Social support through consultations needs to accompany contextualized or customized information for individual micro-enterprises about how a specific IT solution could make a positive difference on a specific business operation of individual micro-enterprises. Second, trialability provides micro-enterprises with an opportunity to make sense of how IT would work for them. As the socially embedded approach implies (Avgerou, 2008, 2010), micro-enterprises' IT adoption process would not occur without individual micro-enterprises' making sense of the way IT benefits their businesses in their own specific business operation terms (i.e., seeing compatibility of IT with their business operations). It is "the real availability of opportunities and the real achievement of functionings" (Madon, 2004, p. 10) from the business context of individual micro-enterprises that will effectively influence them in their IT adoption and use. Third, the findings in this research also demonstrate the significance of the construct of observability, providing implications for the importance of strong social networks of IT promotion. For this, it may be required that a social network be built to enable micro-enterprises to observe good practices of successful IT adoption in other micro-enterprises. A personal network exposure motivates people to change (Hsieh et al., 2008). Micro-enterprises may be better motivated by observing how other micro-enterprises adopt IT successfully for their businesses as they get better or more informed through the network.

Micro-enterprise development has been one of the demand-side local economic development strategies (Clarket & Gaile, 1997; Coleman, 1988; Flora, 1998; Malizia, 1985; Portes & Sesenbrenner, 1993). Eisinger (1988) emphasizes the role of the government or public sector in identifying business opportunities that the private sector may overlook. IT, if appropriately adopted and utilized, contributes to economic development because it enables and facilitates various forms of economic development (e.g., introduction of a new product or service and a new method of production, opening of a new market). For example, web presence of a business extends a market boundary or opens a new market, otherwise impossible to reach. Here, the role of the entrepreneur comes into play to realize development through innovation. Schumpeter describes the individuals who carry out new combinations of technologies as entrepreneurs (Frank, 1998; Schumpeter, 2002). Individual entrepreneurs are the prime cause of innovation and hence economic change or development. According to these concepts or notions, micro-enterprise owners, who carry out a combination of IT solutions for their businesses, contribute to realizing economic development. Schumpeter (2002) emphasizes the skills and attributes required to perform the entrepreneurial function. This is the point where the findings of this research may have a link to economic development as they provide ideas and implications on how to effectively empower micro-enterprise owners with the knowledge and skills that are necessary in combining IT solutions, which, in turn, would result in economic development through innovation. Public and non-profit organizations can utilize the findings from this research in designing and implementing an effective form of IT support program that would empower micro-enterprises with the knowledge and skills.

5.4 Limitations and Future Research

As with all empirical studies, this research has potential limitations in terms of its external and internal validity. External validity would be limited to the degree which the sample of this research does not represent the different segments of micro-enterprises. The sampling frame used for this survey research underrepresents the group of micro-enterprises that have only one employee (owner him/herself). There is a possibility that this underrepresentation may have been caused by a systematic reason (e.g., too small earnings). Internal validity may be limited due to the fact that the survey data for this research have been collected based on self-report scales from micro-enterprise owners. This is related to the well-known common method bias. This bias has been cited as one of the critical issues in the IS research community in relation to testing theories with data collected through a survey questionnaire with self-report scales (Straub et al., 2004). This bias occurs when the structure of a survey instrument influences the scores or measures; for example, a respondent is likely to correlate the answer to two subsequent questions. The survey questionnaire of this study may not be an exception to this bias. Although not serious, the variance explained by one factor is close to 50 percent in this study. The common method bias is unavoidable as far as a survey questionnaire with self-report scales is used to collect research data.

The study on micro-enterprises' IT adoption is in its early stage, calling for further research that informs scholars and practitioners. This study relies on a set of cross-sectional data from a national mail survey. Longitudinal research needs to be conducted to further test the relationships employed in the model of this research or new relationships, reaching more robust explanations about the relationships between the factors influencing micro-enterprises' IT adoption. In addition, in-depth qualitative case studies need to be conducted in an attempt to provide rich information about the process of IT adoption by micro-enterprises. Lee et al. (2003) suggest a need to conduct qualitative research for in-depth description of the process of IT acceptance in order to better understand factors influencing IT acceptance. Meanwhile, current practices of IT assistance for micro-enterprises are more or less fragmented, and their effectiveness is unknown. Therefore, research on current practices of IT assistance for micro-enterprises is compelling. Along with research on the current practices, evaluation studies on IT assistance programs for small or micro-enterprises need to be conducted to promote evidence-based practices in this field. The evaluation research would be on the continuum of this research. It aims to investigate the gap between the theory and practice of the IT assistance programs for small or micro-enterprises, attempting to contribute to evidence-based policies or programs and to provide implications for policy makers in designing an effective IT intervention program.

In addition, further research is warranted about the role of demographic variables in explaining IT adoption behaviors by micro-enterprises to provide implications for building a more general theory of IT adoption. For example, a study on the differences in IT adoption behaviors in micro-enterprises between knowledge-driven industries and non-knowledge-driven industries may contribute to explaining the different findings in previous studies and between prior research and this research. A study on the role of gender in explaining IT adoption behavior in micro-enterprises would provide an implication for improving IT support programs by customizing the services according to gender.

5.5 Concluding Remarks

IT assistance programs that focus only on providing affordable (free or discounted) hardware and software or training services would be limited in their effects. The findings in this research imply that access to technology would not be a main concern (or issue) in the context of micro-enterprises' IT adoption. In fact, micro-enterprises would be willing to invest in relevant IT solutions once they become confident about how the solutions are useful and compatible with their business operations. The findings suggest that an effective IT assistance program would be one that provides micro-enterprises with information about appropriate IT solutions that fit to their business contexts. The findings also support the idea of providing micro-enterprises with opportunities to observe how other micro-enterprises utilize IT solutions for effective and/or efficient business operations. This observation may result in increased IT awareness, which in turn is significantly associated with increased perceived usefulness and compatibility that are associated with increased behavioral intention to adopt (use) IT through more positive attitudes toward IT.

This study broadly demonstrates how a policy or program that relies on untested theories or mere assumptions without a solid empirical foundation could be ineffective. In this context, policy makers in public and non-profit organizations should make every effort to ensure that they have relevant empirical foundations to support their current or new policies and programs. In this regard, the main contribution of this research is to providing an empirical foundation about the significant factors that should be taken into consideration in attempting to design and implement an effective form of IT support programs for small or micro-enterprises. Public and non-profit organizations need to incorporate the findings and implications from this research in designing and implementing new programs and improving current programs to support micro-enterprises' IT adoption and continuous utilization. This way, public and non-profit organizations may be able to improve the cost-efficiency or cost-effectiveness of their IT support programs, using tax money wisely.

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Appendices

Survey Instrument: Cover Letter

University of Nebraska Omaha

IRB Approved
Valid until 12-16-16

IRB # 705-11-EX

School of Public Administration
College of Public Affairs and Community Service

July 23, 2012

[redacted]

My name is Changsoo Song. I am a doctoral student at University of Nebraska at Omaha (UNO), working on my dissertation research under the advisement of Dr. Kenneth Kriz at the School of Public Administration (SPA). I am writing ***to ask your help in my research on information technology (e.g. computer) use by very small businesses called micro-enterprises; a micro-enterprise is generally defined as a very small business with five or fewer employees***.

It is my understanding that you own a micro-enterprise. I am contacting a random sample of micro-enterprises from every state in the United States to ask how you are using computer for your business. ***You don't need to be knowledgeable about computer to help me with this survey because the survey is simply about general computer usage behaviors and user perceptions in relation to using computer***. You will find the questions very easy to answer.

This study is part of an effort to learn how to assist micro-enterprises with information technology in an effective manner and honorably sponsored by the Graduate Research and Creative Activity Grant Program, University of Nebraska at Omaha. ***Results from the survey will provide insights that would help decision makers design effective information technology assistance programs for small business development***. Your response will help us understand various challenges facing micro-enterprises like yours in using computer for business growth and suggest ways in which more effective computer assistance to micro-enterprises could be implemented addressing those challenges.

A comment on our survey procedures. A questionnaire identification number (your zip-code) is printed on the back cover of the questionnaire so that we can check your name off of the mailing list when it is returned. The list of names is then destroyed so that individual names can never be connected to the results in any way. Protecting the confidentiality of small business owners' answers is very important to us, as well as the University. This survey is voluntary. However***, you can help us very much by taking about 15 minutes to share your experiences about using computer for your business***.

If you have any questions or comments about this study, we would be happy to talk with you. My contact information is at the bottom of this letter. If you wish, you may request a copy of results of this research by writing to the researcher. Thank you very much for helping with this important study

Sincerely,

Changsoo Song
Ph.D. Candidate
Email: changsosong@mail.unomaha.edu

Enclosed: Survey questionnaire* and postage-paid return envelope

* If you prefer an online version of this survey, go to "https://www.zoomerang.com/Survey/WEB22G83UGY9QH"

6001 Dodge Street / Omaha, NE 68182-0276
402-554-2625 / FAX: 402-554-2682

Survey Instrument: Questionnaire

Thank you for your time. Please allow about 15 minutes to complete this survey.

University of Nebraska Omaha

IRB Approved
Valid until 12-16-16

IRB # 705-11-EX

MICRO-ENTERPRISES' INFORMATION TECHNOLOGY ADOPTION

National Survey

Honorably Sponsored by

Graduate Research and Creative Activity Grant Program
& School of Public Administration
University of Nebraska at Omaha

An online version of this survey is available at "https://www.zoomerang.com/Survey/WEB22G83UGY9QH"

Some question items look the same or similar to each other; this is intentional and for the purpose of a statistical analysis. So, please don't skip any questions even if they look redundant.

To begin with, I would like to ask you some questions about your current computer usage for business. How often do you use computer hardware, software, and Internet? Please circle the level of frequency below (*Circle "Not Applicable" if the corresponding item is not needed for your business).*

	Frequency of Use				
	Never	Occasionally	Often	Always	Not Applicable
Hardware Products Currently Being Used for Your Business					
Personal Computer including Tablet PC ----------------------------------	[1]	[2]	[3]	[4]	[99]
Smartphone --	[1]	[2]	[3]	[4]	[99]
Printer --	[1]	[2]	[3]	[4]	[99]
Scanner --	[1]	[2]	[3]	[4]	[99]
Digital Camera or Camcoder ---	[1]	[2]	[3]	[4]	[99]
Data Backup Devices --	[1]	[2]	[3]	[4]	[99]
Software Products Being Used for Your Business					
Word Processing (MS Word or similar) ----------------------------------	[1]	[2]	[3]	[4]	[99]
Spreadsheet (MS Excel or similar)--	[1]	[2]	[3]	[4]	[99]
Database (MS Access or similar) --	[1]	[2]	[3]	[4]	[99]
Accounting (QuickBooks or similar) ---------------------------------------	[1]	[2]	[3]	[4]	[99]
Presentation (MS Powerpoint or similar) --------------------------------	[1]	[2]	[3]	[4]	[99]
Scheduling (Google Calendar or similar) ----------------------------------	[1]	[2]	[3]	[4]	[99]
Custom Applications --	[1]	[2]	[3]	[4]	[99]
Internet Use for Business					
Searching for business-related information (e.g., laws and regulation, market and trade information, etc.)---------------------------	[1]	[2]	[3]	[4]	[99]
Using email to communicate with business stakeholders (e.g., customers, suppliers, etc.) ---	[1]	[2]	[3]	[4]	[99]
Using Internet for advertising or promoting the business (e.g., building an informational business website, online yellow pages, etc.) --	[1]	[2]	[3]	[4]	[99]
Conducting business-related transactions (e.g., sales, procurement, etc.) --	[1]	[2]	[3]	[4]	[99]

Q. In a typical week, how many hours do you use computer for your business?

[1] Less than 1 hour	[2] 1-5 hours	[3] 5-10 hours
[4] 10-20 hours	[5] 20-30 hours	[6] More than 30 hours

Please circle the level of your general awareness about computer solutions relevant to your business.

	Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
I am well aware of computer hardware relevant to my business operations --	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I have a clear idea about how using computer hardware benefits my business --	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I am well aware of computer software relevant to my business operations --	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I have a clear idea about how using computer software benefits my business --	[1]	[2]	[3]	[4]	[5]	[6]	[7]

Now I would like to ask some questions about your perceptions in relation to those computer solutions on the previous page that you've circled as using for your business.

	Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
Using computer in my business enables me to accomplish tasks more quickly --	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Using computer improves my business performance ----------	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Using computer in my business increases my productivity ----	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Using computer enhances my effectiveness in the business --	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Using computer makes it easier to do my business ------------	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I find computer useful in my business --------------------------	[1]	[2]	[3]	[4]	[5]	[6]	[7]

Learning to use computer is easy for me ------------------------	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I find it easy to get computer to do what I want it to do -------	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I find computer to be flexible to interact with ------------------	[1]	[2]	[3]	[4]	[5]	[6]	[7]
It is easy for me to become skillful at using computer ---------	[1]	[2]	[3]	[4]	[5]	[6]	[7]
My interaction with computer is clear and understandable ---	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I find computer easy to use --	[1]	[2]	[3]	[4]	[5]	[6]	[7]

The Internet has enough safeguards to make me feel comfortable using it --	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I feel assured that legal and technological structures adequately protect me from having problems on the Internet --	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I feel confident that encryption and other technological advances on the Internet make it safe for me to transact there--	[1]	[2]	[3]	[4]	[5]	[6]	[7]

Please continue to answer about your perceptions in relation to those computer solutions or IT services on the first page that you've circled as using for your business.

	Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
Using computer is compatible with all aspects of my business	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Using computer is compatible with my current business situation --	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Using computer fits well with the way I prefer to do my business --	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Using computer fits into my business style ----------------------	[1]	[2]	[3]	[4]	[5]	[6]	[7]
The setup of computer is compatible with the way I do business --	[1]	[2]	[3]	[4]	[5]	[6]	[7]

I have seen what other micro-enterprises do using computer	[1]	[2]	[3]	[4]	[5]	[6]	[7]
It is easy for me to observe other micro-enterprises using computer --	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I have had plenty of opportunity to see computer being used for other micro-enterprises --	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Computer is very visible in my business community -----------	[1]	[2]	[3]	[4]	[5]	[6]	[7]

Guidance is available to me in the selection of computer hardware and software for my business ------------------------	[1]	[2]	[3]	[4]	[5]	[6]	[7]
A specific person (or group) is available for assistance with computer software difficulties -------------------------------------	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Specialized instruction concerning the popular computer software for my business is available to me -------------------	[1]	[2]	[3]	[4]	[5]	[6]	[7]
A specific person (or group) is available for assistance with computer hardware difficulties ------------------------------------	[1]	[2]	[3]	[4]	[5]	[6]	[7]

I am able to use computer for my business ---------------------	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Using computer for my business is entirely within my control	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I have the resources, the knowledge, and the ability to make use of computer for my business ----------------------------------	[1]	[2]	[3]	[4]	[5]	[6]	[7]

Before deciding whether to use any computer solutions for my business, I am able to properly try them out ----------------	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I am permitted to use computer solutions on a trial basis long enough to see what it could do for my business ----------	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I have a great deal of opportunity to try various computer solutions for my business --	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I know where I can go to satisfactorily try out various uses of computer solutions for my business --------------------------------	[1]	[2]	[3]	[4]	[5]	[6]	[7]

Please continue to answer about your perceptions in using IT solutions and services on the first page that you've circled as using for your business.

	Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
Using computer for my business is a good idea -----------------	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Using computer for my business is a wise idea -----------------	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I like the idea of using computer for my business --------------	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Using computer for my business is pleasant --------------------	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I feel apprehensive about using computer for my business ---	[1]	[2]	[3]	[4]	[5]	[6]	[7]
It scares me to think that I could lose many business data using computer by hitting the wrong key ----------------------	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I hesitate to use computer for fear of making mistakes I cannot correct --	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Computer is somewhat intimidating to me ---------------------	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I have enough time to learn how to use computer hardware for my business --	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I have enough time to learn how to use computer software for my business --	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I have enough funding to purchase computer hardware for my business --	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I have enough funding to purchase computer software for my business --	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I intend to use computer more intensively for my business ---	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I intend to use computer more frequently for my business ---	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I intend to explore more computer solutions for my business	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I intend to use computer to do my business whenever it has a feature to help me perform it ----------------------------------	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I intend to use computer in as many cases/occasions as possible --	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I feel comfortable using computer on my own -----------------	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I am able to complete a job using computer even if no one is around to tell me what to do as I go --------------------------	[1]	[2]	[3]	[4]	[5]	[6]	[7]
I can easily operate any computer solutions on my own -------	[1]	[2]	[3]	[4]	[5]	[6]	[7]

Now please answer the following questions.

	Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree	Not Applicable
My friends think that I should use computer for my business --	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[99]
My immediate family thinks that I should use computer for my business ------------------------------	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[99]
My relatives think that I should use computer for my business --	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[99]
My customers think that I should use computer for the business --	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[99]
My business partners think that I should use computer for the business --------------------------	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[99]
People I work with think that I should use computer for the business --------------------------	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[99]
People who influence my behavior think that I should use computer for my business --------------	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[99]
People who are important to me think that I should use computer for my business --------------	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[99]

Finally I would like to ask you some questions about you and your business.

Q. How long have you been using computer for your business? ______________ Years

Q. How old are you? ______________ Years

Q. What is the highest degree or level of school you have completed? If currently enrolled, mark the previous grade or highest degree received.

[1] High School or less [2] Associate's [3] Bachelor's
[4] Master's [5] Doctor's

Q. What is your annual net income (after tax) earned from your business approximately?

[1] Less than $25,000 [2] $25,000-$49,999 [3] $50,000-$74,999
[4] $75,000-$99,999 [5] $100,000-$149,999 [6] $150,000 or more

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Thank you so much for your volunteering and taking time to help me by responding to this survey.