UNDERSTANDING IT ENTREPRENEURIAL INTENTION:
AN INFORMATION SYSTEMS VIEW

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ABSTRACT

IT (Information Technology) entrepreneurs have been contributing greatly to economic growth and job creation. Despite this, IT entrepreneurship remains understudied in business research. In particular, studying IT entrepreneurial behavior has been ignored in both Information Systems (IS) and entrepreneurship disciplines. This study for the first time empirically examines IT entrepreneurial behavior and its antecedent factors from the IS discipline. The findings suggest that two key IS constructs, personal innovativeness in IT (PIIT) and computer self-efficacy (CSE), respectively, have direct and indirect influences on IT entrepreneurial intention. As the first step of a research effort, this study calls for more empirical studies on IT entrepreneurial behavior from the IS discipline. The study concludes with discussion of the limitations and suggestions for future research.

Keywords: IT entrepreneurial intention; Personal innovativeness in IT (PIIT); Computer self-efficacy (CSE); Entrepreneurial self-efficacy (CSE); Risk propensity

1. INTRODUCTION

Entrepreneurs have been constantly contributing to economic growth and job creation. Entrepreneurs not only incubate technology innovation, but also create employment opportunities and competitiveness [67, 90]. Information technology (IT) is one of the most prominent industries which rapidly incubate entrepreneurs. The IT industry provides a fast-growing, high financial return, and technology-intensive market for technology entrepreneurs. A large number of IT companies have been created by entrepreneurs including college students and graduates. Many of them have founded the world-class businesses, such as, Dell.com, Facebook.com, Micosoft.com, and Google.com. Today, the IT industry is attracting many college students who are majoring in business, computer science, or engineering and who are planning to become entrepreneurs. College students are well-educated and technologically savvy. Many of them find themselves to be entrepreneurs, running a business and assuming the risk for the sake of profit rather than being an employee. Studying IT entrepreneurship among college students, thus, should be an important research agenda in academia and business practice.

IT entrepreneurship research studies entrepreneurial behaviors, practices, and successful factors in the IT industry. Compared to entrepreneurs in traditional industries such as food, restaurant, retail, tourism, or manufacturing, IT entrepreneurs are more knowledgeable, technology-dependent, and personally innovative [25, 36, 85]. They usually start businesses with their technology skills, intellectual property (e.g., patents and licensing), or new business models [42, 64]. In comparison with traditional entrepreneurs, IT entrepreneurs have different behavioral characteristics and antecedent factors, and their entrepreneurial behavior is highly related to their technology skills and beliefs [13, 36, 55]. However, the literature review indicated that there is no empirical support to this declaration. In particular, little is known about what the technical factors are and how they influence IT entrepreneurial behavior. In general, the study of IT entrepreneurial behavior has been ignored in both IS and entrepreneurship disciplines. Therefore, filling this research gap will contribute to both academia and practice. We believe that rich research accomplishments in IS literature (e.g., theories, empirical findings) would help us better understand IT entrepreneurial behavior from the human-technology perspective. We also hope the study of IT entrepreneurship will create a new research area in the IS discipline.

This study has two purposes. As the first step in the study of IT entrepreneurship from the IS discipline, we attempt to provide empirical evidence of the technical factors’ effects on IT entrepreneurial behavior. More specifically, we empirically investigate whether and how some major IS constructs would influence IT entrepreneurial intention among college students. Second, we expect this study will extend and enrich the IS and entrepreneurship disciplines and inspire more research interest and effort in this unexplored field. Specifically, we hope more IS scholars will study IT entrepreneurship. The rest of the paper is organized as follows. The next section gives a literature review in IT entrepreneurship, followed by a description of the research model and hypothesis development. The research method and data analysis are subsequently presented. The discussion of results is then given. The study concludes with discussions of research implications, limitations, and suggestions for future research.

2. LITERATURE REVIEW

Entrepreneurship is one of the major business disciplines and it is also an emerging business education program [66]. Entrepreneurship has also been recognized as a driver to sustaining and promoting competitive advantage [21, 39]. In the last few decades, entrepreneurship has been broadly studied in various disciplines including management science, economics, psychology, sociology, and anthropology [43, 74]. In the 1930s, Schumpeter’s [70] seminal works paved the way for today’s entrepreneurship research and practice. In his book, Schumpeter theoretically connected entrepreneurs with innovation. He insisted that entrepreneurship was rooted in innovation. In entrepreneurship literature, innovation is not just technology innovation, rather it is anything that creates new businesses and business growth. For instance, new business models/processes and new products/services are all innovations. On top of Schumpeter’s pioneer work,
a large number of studies have been conducted to examine how innovation is related to entrepreneurship. For example, Covin and Miles [20] indicated that the entrepreneur was an innovator who addressed market needs with a new business model, technologies, services, and products. Solomon and Winslow [76] defined entrepreneur as “an innovative person who creates something unique with value [added] by devoting time and effort, assuming the financial, psychological and social risks in an action oriented perspective and receiving the resulting rewards [and punishments] of monetary and personal satisfaction.”

In academia, entrepreneurship research seeks to understand how, who, and with what to create future market demand [72]. Entrepreneurs are also decision makers who construct and exploit opportunities to enter a new market [14]. Entrepreneurs are generally considered a heterogeneous group in nature, characteristics, and behaviors across industries and even in the same industry. There are major differences between IT entrepreneurship and traditional entrepreneurship. In technology-intensive industries, more knowledge is required to operate firms than in those that, for example, sell furniture [85]. Marvel and Lumpkin [57] found that formal education and prior knowledge of technology were vital to innovation outcomes of technology entrepreneurs. Similarly, Dheeriya [25] indicated that online entrepreneurs needed a good knowledge of basic HTML language, or electronic payments, or shopping cart software, and “the desire to use technology as a primary driver of business or ‘tech-savvyness’ to be an important variable influencing the success of an online venture.” Dheeriya [25] further declared that online entrepreneurs were different from traditional entrepreneurs (e.g., brick-and-mortar) in terms of some key determinant variables and that earlier entrepreneurship studies failed to differentiate the effects of these variables on online entrepreneurs as compared to traditional entrepreneurs. IT entrepreneurs usually need more technical knowledge as well as higher innovation attitudes and capabilities.

Studying IT entrepreneurship is valuable for business research, practice, and education. This is because in the past decade “the business climate has been characterized by considerable IT-based entrepreneurial activity and innovation, driven largely by the capabilities offered by new information technologies.” [4] Entrepreneurial behavior is a major area of entrepreneurship research. The behavioral approach examined individual entrepreneurial behavior in business operation [31]. Similarly, Stevenson and Jarillo [77] maintained entrepreneurial behavior revealed how entrepreneurs acted, why they acted as an entrepreneur, and what happened when they acted. Moreover, entrepreneurial behavior “is preceded and determined by some form of cognitive information processing which serves as an intervening variable between changes in circumstances and behavior.” [26] An extensive literature review indicated that studies of IT entrepreneurial behavior are very limited. This is consistent with Mourman et al.’s [58] finding that “a large and growing body of theory and data exists on entrepreneurs — which has been rarely cited or even acknowledged by IS researchers.” Studies of IT entrepreneurial behavior in the IS literature are almost nonexistent and little is known about IT entrepreneurial behavior. In addition, even though IS and entrepreneurship have been major curriculums in business schools, actual students’ IT entrepreneurial behavior has remained largely unexplored.

IT entrepreneurs usually are knowledgeable and tech-savvy, which may influence their behavior and behavioral intentions differently from those in traditional industries (e.g., food, restaurant, retail, furniture). However, in academia, there is no empirical evidence that supports the effects of technical factors on IT entrepreneurial behavior nor what they are or how resulting behaviors differ between IT entrepreneurs and those in traditional industries. The IS discipline has identified many key technical determinants of IT adoption and usage behavior, for example, personal innovativeness in IT (PIITT), computer self-efficacy (CSE), perceived usefulness (PU), perceived ease of use (PEOU), and perceived computer enjoyment. [1, 3, 19, 21, 22, 23, 50, 89]. It is rational and reasonable for us to expect that these major IS constructs may also influence IT entrepreneurial behavior. Therefore, the IS discipline provides us with knowledge and guidelines with which to empirically test the entrepreneurial effects of technical factors such as PIITT and CSE.

We realize that IS and entrepreneurship are two different disciplines and knowledge domains, and IT users and IT entrepreneurs end up having different goals and behavior even though both of them use the same technology. That is, the IS discipline attempts to reveal how technical factors influence individuals’ behavior of IT usage and adoption. In contrast, the entrepreneurship discipline seeks to answer a question of how entrepreneurs use IT as a vehicle to exploit a business venture. Thus, IT users and IT entrepreneurs have different behavioral intentions and goals, and they solve different business problems. As a result, although we may extend technical factors’ behavioral effects in the IS discipline to the entrepreneurship discipline, such effects should be empirically tested again.

On the other hand, entrepreneurial behavior is a complex phenomenon and it is difficult to study entrepreneurs [34]. This is because entrepreneurial behaviors are shaped by so many factors such as cognitive and behavioral factors, personal background, knowledge and technology skills, and social-economic settings [26, 58]. See a complete list of factors impacting entrepreneurial behavior in Mourman et al.’s [58] paper. Lazear [49] found that entrepreneurs must possess balanced skills and talents to manage a variety of chances and risks. Thus, entrepreneurs (e.g., IT entrepreneurs) differ from specialists (e.g., IT users). Similarly, Oakey [63] posited that technical management skills, business management skills, and motivation were the main balanced elements of high-tech entrepreneurs. Giacon [34] further indicated that technical capabilities provided only the knowledge and skills necessary for individuals to become successful technical entrepreneurs, but the ability to develop management skills to exploit their expertise was more important. Therefore, technical factors in IT usage and adoption, such as PIITT and CSE, may not shape IT entrepreneurial behavior by default.

This study aims to provide empirical evidence to answer the research question of whether technical factors identified by IS literature would also influence IT entrepreneurial behavior. As the first step, we empirically examine the entrepreneurial effects of two major IS constructs: PIITT and CSE. According to an extensive literature review in both the entrepreneurship and IS disciplines, we consider these two IS constructs as most likely related to entrepreneurial intention. The detailed discussions of PIITT and CSE in the entrepreneurial context are given in the next section.

3. RESEARCH MODEL AND HYPOTHESES

Intentional models have been suggested as a good alternative to predict entrepreneurial behavior, and they offer a great opportunity to increase our understanding and predictive ability
for entrepreneurship [46, 47]. Intention is conceived of as the immediate antecedent of actual behavior and, as a result, intention has been widely used to study real behavior [6]. Sheppard et al. [73] used meta-analysis to indicate that there is an average correlation of 0.53 between intention and behavior. This study examined IT entrepreneurial intention among college students.

Entrepreneurship literature has demonstrated that entrepreneurs are innovators and risk takers [33, 60, 65, 72, 76]. Specifically, entrepreneurs are innovators who would like to take risks to earn rewards of profit and personal satisfaction [76]. In the IT industry, entrepreneurs highly depend on technology innovation to startup businesses and make them grow. Many IT entrepreneurs develop from IT adopters, users, or innovators. They usually have high interest and skills in IT and turn their technology skills into business practices in the market. In entrepreneurship literature, technology innovation is one of the key innovations which include, but are not limited to, new business models, new technologies, and new services and products [20]. Personal belief and the motivation to explore and apply new IT are major behavioral characteristics of IT entrepreneurs [4, 57].

A significant body of IS research has identified that PIIT is a key determinant of IT adoption and usage behavior [1, 3, 50, 80, 89]. PIIT is “the willingness of an individual to try out any new information technology” [1]. IS literature conceptualizes personal innovativeness in IT as a situation-specific, stable trait and has identified it as a stable influence across situations of IT [79]. Agarwal et al. [3] maintained that individuals who were high in PIIT were more likely to seek “stimulating experiences,” and demonstrate more confidence in their capacity to use a new technology. Similarly, Ahuja and Thatcher [6] found that innovating with technology can result in realizing the full potential of IT. In addition, IS researchers also considered PIIT a critical characteristic of IT innovation leaders which may lead toward entrepreneurship. For example, Agarwal and Prasad [1] indicated that “personal innovativeness helps identify individuals who are likely to adopt information technology innovations earlier than others. Such individuals can then serve as key change agents and opinion leaders to facilitate further diffusion of a new technology [69].” Therefore, we believe that PIIT is directly related to IT entrepreneurial behavior. Accordingly, the following hypothesis is proposed:

H1: Personal Innovativeness in IT (PIIT) positively influences IT entrepreneurial intention among college students.

Risk propensity is an individual’s general tendency toward either taking or avoiding risk within a particular decision context [33, 54, 60, 75, 84]. It is a decision-maker trait that is independent from any particular decision context [60]. Risk propensity has long been considered a major characteristic of the entrepreneur and one of the central research topics in entrepreneurship research [33, 60, 65]. Risk propensity and perception of opportunity directly influence entrepreneurial decision [60, 61, 72]. Kets de Vries [45] concluded that the entrepreneur was characterized by managing innovation and taking risk with the extraordinary ability to find new opportunities. Therefore, individuals with higher risk propensity have higher entrepreneurial intentions. IS studies also have demonstrated that risk propensity was linked to the adoption of technology [52, 86]. Therefore, from both IS and entrepreneurship perspectives, we see that IT entrepreneurs are
risk takers in the business-technology setting. Consequently, we assume that

**H3:** Risk propensity positively influences IT entrepreneurial intention among college students.

In summary, based on prior research findings in both IS and entrepreneurship literatures, we proposed the above hypotheses. The corresponding research model is represented in Figure 1. As illustrated in the model, PIIT, ESE, and risk propensity directly influence IT entrepreneurial intention. CSE is an antecedent factor to ESE, indirectly influencing IT entrepreneurial intention. Similarly, PIIT also impacts IT entrepreneurial intention via risk propensity. The research model in Figure 1 is empirically examined with the data collected from college students as follows.

### 4. RESEARCH METHODOLOGY

#### 4.1 Instrument development and data sample

A questionnaire was developed based on previous research in the IS and entrepreneurship disciplines. CSE was measured with Compeau and Higgins’ [19] instrument. PIIT was measured with the instrument developed by Agarwal and Prasad [2]. Risk propensity was measured with the instrument originally developed by Jaworski and Kohli [44] and later modified by Hung and Chanchai [40]. Measurements of ESE and IT entrepreneurial intention were adapted from Francis et al.’s [30] work, which was designed upon the theory of planned behavior [6]. All measurements used 7-point Likert scales.

The questionnaire was administered to college students who were majors in general business administration. We collected 116 complete questionnaires. All subjects had basic computer software skills (i.e., Microsoft Word, Excel, Access) and they were also currently enrolled in the Management Information Systems class. The demographics of the subjects are shown in Table 1.

<table>
<thead>
<tr>
<th>Variable</th>
<th># of Subjects</th>
<th>Percentage (%)</th>
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<tbody>
<tr>
<td>Gender: Male</td>
<td>62</td>
<td>53</td>
</tr>
<tr>
<td>Female</td>
<td>54</td>
<td>47</td>
</tr>
<tr>
<td>Age: 19-24</td>
<td>86</td>
<td>74</td>
</tr>
<tr>
<td>25 and above</td>
<td>30</td>
<td>26</td>
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<tr>
<td>Years of computer experience:</td>
<td></td>
<td></td>
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<tr>
<td>&gt; 5 years</td>
<td>79</td>
<td>68</td>
</tr>
<tr>
<td>&lt;= 5 years</td>
<td>37</td>
<td>32</td>
</tr>
<tr>
<td>Experience working with entrepreneurs or small business:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>73</td>
<td>63</td>
</tr>
<tr>
<td>no</td>
<td>43</td>
<td>37</td>
</tr>
</tbody>
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#### 4.2 Statistical techniques

The partial least squares (PLS) [87, 88] method was employed to analyze a complete survey dataset. PLS is suited for predictive applications and theory building [17, 32]. It is recommended in the early stage of theoretical development to test exploratory models and, therefore, PLS usually “assists researchers who focus on the explanation of endogenous constructs.” [38] PLS can also be used to test the measurement model and the structural model [29, 51]. The measurement model is used to test the relationships between observed variables (indicators) and their underlying latent variables (constructs). The structural model is used to test the hypothesized relationship among studied constructs, including estimations of path coefficients and their levels of significance.

There are several advantages of using PLS in the path model testing. According to Henseler et al. [38], PLS requires small sample size and allows the model to have less stringent assumptions about the distribution of variables and error terms, and it can also test both reflective and formative variables in a model. The small sample size required by PLS results from the fact that PLS applies the principal components regression only on those closely connected latent variables and looks for local optimization among them [17, 18].

According to the “10 times” rule of thumb for the minimum sample size in PLS analysis [11, 17], the sample size is determined by (a) the block with the largest number of formative indicators or (b) the dependent latent variable with the largest number of independent latent variables impacting it. The minimum sample size is suggested to be 10 times either (a) or (b), whichever is greater. In the research model of this study, there is no formative indicators and the largest number of independent latent variables that impact the same dependent variable (i.e., IT entrepreneurial intention) is 3. Therefore, the minimum required sample size for this study is 30. This study applies 116 complete data samples in the PLS analysis, which is far larger than the suggested minimum.
sample size, 30. SmartPLS software (http://smartpls.de) was used to perform both instrument validation and structural path modeling.

5. DISCUSSION OF RESULTS

5.1 Measurement reliability and validity

Prior to the research model testing, the reliability and validity of the measurement were examined. We assessed the reliability with Cronbach’s $\alpha$ and composite reliability. The accepted values for both Cronbach’s $\alpha$ and composite reliability are 0.70 or higher [62]. Table 2 shows the SmartPLS output of reliability testing. All Cronbach’s $\alpha$ and composite reliability values listed in Table 2 are greater than 0.70, indicating the measurement instrument is reliable.

Two important construct validities — convergent validity and discriminant validity — were assessed in the study. Convergent validity describes the degree to which a measure is correlated with other measures in a single variable measurement. Discriminant validity refers to the degree to which the measurement for one variable does not correlate with the measurement for another variable. Both convergent and discriminant validities are inferred if the following conditions are met: 1) the measurement indicators load much higher on their measured construct than on other constructs; that is, the own-loadings are higher than the cross-loadings, and 2) the square root of each construct’s average variance extracted (AVE) is larger than its correlations with other constructs. Table 3 represents the item loadings on their measured constructs. All items are well loaded on their constructs; that is, their own (on their measured construct) loadings (in bold font in Table 3) are much higher than the cross loadings (on other constructs). Table 4 shows the AVE values for all constructs. The accepted AVE should be above 0.5 in order to achieve convergent and discriminant validities [28]. The results of both cross loadings and AVEs suggest that all construct measurements have adequate convergent and discriminant validities. Overall, the measurement model used in this study exhibited acceptable construct validity and reliability.
5.2 PLS path modeling and hypotheses testing

Figure 2 shows the path coefficients and their corresponding t-values. The bootstrap approach (500 re-samples) [17, 27] was used to test the significance of path and hypothesis in the path model. A one-tailed t-test was used since all hypotheses are directional in the study. According to the one-tailed t-test (df = 500), the 95% significance level or p<0.05 requires a t-value > 1.645 and the 99% significance level or p<0.01 requires a t-value > 2.34. When df>100, the t-test is actually very close to a z-test. As illustrated in Figure 2, all paths have t-values that are greater than 2.34; that is, all hypotheses are significantly supported at the 99% significance level or p<0.01.

As illustrated in Figure 2, PIIT has a positive influence on IT entrepreneurial intention, and thus, hypothesis H1 is empirically supported at the level of p<0.01. This is consistent with prior entrepreneurship findings that personal innovativeness plays a critical role in entrepreneurial intention [20, 60, 72]. IS studies have also demonstrated that PIIT is a key determinant to IT adoption and usage [1, 3, 51, 80, 89]. IT entrepreneurs are usually technologically savvy and their business practices greatly rely on technology management, innovation, and application. IT entrepreneurs usually are IT adopters and/or innovators or at least they have a sense of and insight into technology (e.g., what technology is, how it works) so that they can explore business ventures from the technology standpoint. Therefore, it is reasonable to believe that some IS constructs like PIIT can play a role in IT entrepreneurial behavior. In fact, innovation is the core value and the enabler of entrepreneurship. Without innovation, there is no entrepreneur. In the IT industry, technology innovation is a key driver to entrepreneurship and business growth. Innovativeness is, thus, one of the most important personal characteristics for exploring a new world such as entrepreneurship [60, 72] and emerging technology adoption [5]. The willingness to “try out any new information technology” [1] is a key determinant of IT entrepreneurial intention.

The supported H1 provides important empirical evidence to the prior declaration that IT entrepreneurs are knowledgeable, technology-dependent, and personally innovative and that technical factors influence IT entrepreneurial behavior [25, 36, 85]. PIIT, thus, is one important antecedent variable in IS literature but also in entrepreneurship literature in that it reveals and describes personal attitudinal belief and motivation in technology innovation for both IT users and IT entrepreneurs. The belief and motivation in technology innovation is a major driver of today’s rapid technological and economic developments. This finding lays a good foundation for future study of IT entrepreneurship in the IS discipline.

Hypothesis H2, that ESE has a direct influence on IT entrepreneurial intention, was supported at the level of p<0.01. This finding confirms prior entrepreneurship findings that self-efficacy is a key determinant to behavioral intention [16, 47, 71]. In addition, this study also supported hypothesis H2a; that is, CSE positively influences ESE at the level of p<0.01. CSE, a key IS construct, is significantly related to ESE, an important antecedent factor of entrepreneurial behavior in the IT context. This finding further confirms that technology skills/capabilities are important characteristics of IT entrepreneurs. Like PIIT, CSE is another IS construct which is related to IT entrepreneurial intention. In general, individuals who are in high CSE also have high ESE when they think about becoming IT entrepreneurs.

For IT entrepreneurs, technology skills/capabilities can be viewed as a sixth self-efficacy in addition to the five self-efficacies (i.e., marketing, innovation, management, risk-taking, and financial control) suggested by Chen et al. [16]. It is noteworthy that although the findings of this study support CSE’s positive effect on ESE, it may not be reasonable to assume that CSE would have a direct influence on IT entrepreneurial intention. This is because CSE and ESE are in different contexts. CSE is the perceived capability of using IT, not the capability of creating IT (e.g., marketing, innovation, management, risk-taking, and financial control) suggested by Chen et al. [16]. It is noteworthy that although the findings of this study support CSE’s positive effect on ESE, it may not be reasonable to assume that CSE would have a direct influence on IT entrepreneurial intention. This finding not only empirically supports the declaration that IT entrepreneurs are usually well-educated and technologically savvy [25, 57], but also extends the IS research findings (i.e., CSE is one of key factors that impact IT usage behavior) across the discipline boundary. The latter is more important in that the IS discipline not only borrows and applies knowledge from other reference disciplines but also contributes to them. This finding thus provides one more piece of evidence that IS has been becoming a reference discipline or at least “perhaps the time has come for IS to become a reference discipline for others.” [12]

In addition, the results support hypothesis H2b; that is, PIIT positively influences CSE. This confirms prior IS findings that PIIT is an antecedent to CSE [79, 81] in the entrepreneurial context. Individuals with high PIIT have been shown to be active
seekers of new ideas and have a high self-efficacy with computers [1, 3, 53, 69], and thus they may be more inclined to become entrepreneurs once they find a business opportunity or market.

The results of this study indicate that risk propensity positively influences IT entrepreneurial intention at the level $p < 0.01$; thus, hypothesis H3 is supported. Entrepreneurship literature has identified risk propensity as a major characteristic of entrepreneurs [33, 60, 65]. Risk propensity is also an important antecedent to IT adoption in IS literature [52, 86]. In general, risk propensity enhances an individual's intentions to pioneer a new business venture and their willingness to take risks. In particular, risk propensity increases an individual's intention to explore IT innovation to achieve high financial return from entrepreneurship. In this sense, individuals who have high risk propensity are more likely to explore business opportunities from IT. This finding provides further confirmation for the effect of risk propensity on behavioral intention in both IS and entrepreneurship literatures. IT entrepreneurs often are facing more opportunities and definitely more risks than those in traditional industries. IT entrepreneurs must manage business risks and technology risks (e.g., risks of technology and innovation failures, risk that technology doesn't fit business strategy or market demand). As a result, managing risks can be more challenging for IT entrepreneurs. In addition, the highly dynamic technology market and business environment require IT entrepreneurs to have high risk tolerance and risk management skills. The supported H3 suggests that future studies of IT entrepreneurial behavior should further examine the multiple-facets of risk (e.g., risk of technology usage/adoption, risk of technology development and innovation management, risk of the availability, usability and reliability of technology) and their effects on IT entrepreneurial behavior.

In summary, the research findings empirically support the entrepreneurial effects of two major IS constructs: PIIT and CSE. The data analysis further reveals how they influence IT entrepreneurial intention. Accordingly, the findings lay an empirical research foundation for future study of IT entrepreneurship in the IS discipline.

### 6. CONCLUSION AND IMPLICATIONS

This study for the first time empirically examined IT entrepreneurial intention among college students as well as its antecedent factors from the IS discipline. Drawing upon previous findings in IS literature, we developed a conceptual research model and empirically tested hypotheses with data collected from college students. The findings have revealed that two key IS constructs: PIIT and CSE can influence IT entrepreneurial intention directly and indirectly, respectively. The implications for research and practice are discussed below, followed by limitations and recommendations for future research.

#### 6.1 Implications for research

IS research has made great contributions to understanding IT adoption and usage behavior. This study extends prior behavioral studies in the IS discipline to entrepreneurship. IT entrepreneurs have been contributing greatly to economic development and employment creation. Many IT entrepreneurs form their entrepreneurial intention or even take action as early as when they are in college. We realized that IT entrepreneurs have unique behavioral features from traditional entrepreneurs. IT entrepreneurs are not only entrepreneurs but also technology adopters or innovators. Technology skills and innovation motivation could play an important role in their entrepreneurial behavior. Although IT entrepreneurial intention can be impacted by many intrinsic and extrinsic factors, this study demonstrates two major IS constructs as possible antecedent factors to IT entrepreneurial intention. The findings of this study help us better understand how IT entrepreneurs are different from traditional entrepreneurs and what technical variables can impact IT entrepreneurial behavior. We hope that this study will shed more light on IT entrepreneurial behavior and enrich IS and entrepreneurship literatures. As the first attempt to study IT entrepreneurship in IS literature, we also expect this study will inspire more research efforts and interests in this field, particularly from the IS discipline.

#### 6.2 Implications for practice

Today college students are more technologically savvy than ever before. Investigating IT entrepreneurial intention among college students helps entrepreneurship educators and practitioners better understand what shapes entrepreneurial intention in the IT context and how to identify, incubate, and mentor potential entrepreneurs. The findings of this study provide some insights into the roles of technology skills (i.e., CSE) and technology innovative attitudes (i.e., PIIT) on entrepreneurial intention. Entrepreneurship educators can better understand students' future intention toward IT entrepreneurship by evaluating their CSE, ESE and PIIT. As a result, they can tailor the curriculum to meet students' special needs and behavioral intentions. For example, entrepreneur incubators can emphasize and enhance students' intrinsic motivation in IT innovation and encourage them to hedge business- and technology-related risks with the rewards from technology innovation. To enhance entrepreneurial intentions, entrepreneur incubators can also increase students' CSE so that they can have enough technology skills and self-encouragement to handle various risks and situations in business practices.

On the other hand, IS educators can introduce entrepreneurship curriculum into IS programs. With the knowledge of entrepreneurship, IS students can better understand IT's business implications and integrate technology skills into their future business practices. More specifically, with such knowledge, IS students can broaden their insight and vision into future technology development and market demand and prepare themselves for future career development in the technology-driven business environment. In addition, IS educators can help incubate more IT entrepreneurs among students who have high entrepreneurial intention and potential.

#### 6.3 Limitations and recommendations for future research

This study has some methodological limitations that provide opportunities for future research. Using college students is very common and convenient in entrepreneurship research, and students' entrepreneurial intention is homogeneous and stable over a long period of time [24, 59]. This practice has been criticized, however, in that students lack work experience and maturity, and they may not represent the general population [68]. This limitation exists in this study and it may cause sample biases. IT entrepreneurs are usually technologically savvy and innovative. The subjects in this study were general business administration students in a four-year college in Midwest of the United States. They have limited knowledge and skills in computers and most of them don't have any working experiences with computer software.
or hardware. The only computer experience they have is related to Internet usage and Microsoft Office (Word, PowerPoint, Excel, or Access). Student subjects who have limited computer skills or knowledge may have low behavioral beliefs, CSE, and PIIT [41, 78]. Therefore, the measurement of CSE and PIIT could have sample biases. Similarly, student subjects majoring in general business administration usually lack knowledge of entrepreneurship. Prior entrepreneurship findings have shown that entrepreneurship students tended to be more innovative than other business administration students [35]. The measurements of ESE, entrepreneurial intention, and risk propensity could also have biases. Therefore, we suggest the measurement model be confirmed with more studies. Recommendations are as follows.

Future research should distinguish and categorize college students into three homogenous groups: entrepreneurship students who have good knowledge of entrepreneurship but do not have experience in computers; computer science or engineering students who are skillful in computers but are not good at entrepreneurship; and MIS major students who know both computers and business or entrepreneurship well. Within each group, the factors that are related to IT skills or entrepreneurial knowledge could be controlled and thus remove the possible sample biases. This would also help to compare IT entrepreneurial behaviors among different groups so as to better understand differences of entrepreneurial behavioral between business majors and science/engineering majors. With such information and knowledge, entrepreneurship education could be improved by tailoring curriculum designs for different student groups. Entrepreneurship curriculums can change students’ attitudes towards entrepreneurship [37].

In retrospect we also recognize that adapting measurement instruments directly from IS literature may be another limitation in this study. Even though the measurements we used have been successfully tested and well applied in prior IS studies, they primarily were used for studying IT adoption rather than IT entrepreneurship. There are behavioral differences between IT adopters and IT entrepreneurs. For example, the measurement of CSE adapted in this study may not reflect the entrepreneurial context because the CSE in IS literature was used to measure individuals’ abilities with computers rather than abilities that would help them explore a new business venture. Future studies can develop new measurement instruments for IS constructs in the study of IT entrepreneurial behavior to reflect their specific research context.

Lastly, we call for more empirical studies on the relationship between CSE and ESE. As explorative research, this study treated both CSE and ESE as a unitary construct and assumed that CSE was an antecedent to ESE for IT entrepreneurial intention. Although the research model and all hypotheses were well supported by the data, we felt treating ESE as a unitary construct was a limitation. While Chen et al. [16] indicated that ESE had five different types, we think future studies should distinguish different types of ESE in the research model. Specifically, the relationship between CSE and ESE should be reexamined with a different model. We propose to utilize a hierarchical or higher-order model to describe the relationship between CSE and ESE. Hierarchical or higher-order models are used to describe multiple facets of a complex phenomenon that could be explained by a unitary factor [48]. The relationships between lower and higher order constructs can be either reflective or formative. If the first (lower) order constructs causes the second (higher) order construct, the relationship is formative; vice versa it is reflective. The relationship between CSE and ESE is more likely formative since CSE can be one type of ESE (e.g., a sixth type of self-efficacy in addition to Chen et al.’s [16] five types) and CSE causes ESE. The findings of this study support this assertion; that is, CSE is a first (lower) order construct, ESE is a second (higher) order construct, and the relationship between them is formative. We suggest future studies examine the formative relationship between CSE and ESE in the behavior model.

In summary, although there are limitations, this study is a first step to opening a new research area in the IS discipline. This study not only enriches our understanding of IT entrepreneurial behavior but also sets up a good research model for future entrepreneurial studies in the IS discipline.

REFERENCES


