Exploring top managers' innovative IT (IIT) championing behavior: Integrating the personal and technical contexts

CrossMark

Tung-Ching Lin [a], Yi-Cheng Ku [b,*], Yu-Shan Huang [a]

[a] Department of Information Management, National Sun Yat-sen University, Kaohsiung, Taiwan, ROC
[b] Department of Computer Science and Information Management, Providence University, Taichung, Taiwan, ROC

ARTICLE INFO

ABSTRACT

Innovative information technologies (IIT) will create or improve a product and enhance intra-organizational efficiency and effectiveness. Based on the TOE framework and upper echelon theory, this study investigated the relationships between top managers' individual differences and IIT championing behavior from two perspectives: the personal context and the technical context. An empirical survey was administered to 130 top managers to test the research model. The results reveal that 52.6% of the variance in top managers' IIT championing behavior can be explained by three antecedent variables: the OSL, IIT absorptive capacity, and involvement. Finally, the implications for practitioners and researchers are discussed.

1. Introduction

As IT enables businesses to improve efficiency and effective-ness, business investments in Information Technology (IT) have increased rapidly. IT investments can be classified into two groups: innovative investments and follow-up investments. *Innovative IT* (IIT) is either a new type of technology or an innovative use of existing technology [26,45]. When initially employed in an industry, IIT will create or improve a product or service and enhance intra-organizational efficiency and effectiveness [52,54]. Forms of IIT such as cloud computing, RFID (Radio Frequency Identification), and business intelligence systems have recently been implemented to enhance enterprise information infrastruc-tures or business processes. For this reason, the means by which IIT is successfully leveraged to gain a competitive advantage has become an important research issue in the Information Systems field.

Previous studies investigating the factors influencing IT adoption approached the subject from various perspectives: organizational factors [50,75,77], environmental factors [53,99], users' behavioral intention [20,97], innovation diffusion or technological innovation [76], and top management support [11,22,52,53]. Several theories and research models related to IT

adoption have also been proposed to help businesses implement IT successfully [4,42], including the technology acceptance model (TAM) [20], the theory of planned behavior (TPB) [1], the unified theory of acceptance and use of technology (UTAUT) [97], the diffusion of innovations theory (DOI) [85], and the Technology–Organization–Environment framework (TOE framework) [96]. Although the factors influencing IT End Users' usage behaviors are important to the successful implementation of IT, top management support is often prescribed as a critical factor for an organization to be able to fully realize the benefits of IT [41]. As has been stated, "*a good MIS must begin at the top with the chief executive officer*" [84]. Upper echelon theory suggests that an organization is a reflection of its top managers [35]. The theory states that an organization's upper echelon characteristics will influence performance directly and indirectly via strategic decisions. In other words, organizational choices are a reflection of the top management's values and cognitive base [35], and hence the behavior of top management in championing IIT acts as an intermediary between the environment and an organization's assimilation of IIT. This implies that top management's attitudes toward IIT adoption may permeate an organization. Therefore, it is necessary to explore the factors influencing top managers' IIT championing behavior to understand how to enhance top management support for IIT implementations.

The essence of upper echelon theory is that top management influences an organization via the processes of decision-making, strategic planning, and so on. Top management must take a leadership position in IIT implementation. Thus, enhancing top

* Corresponding author at: 200, Sec. 7, Taiwan Boulevard, Shalu Dist., Taichung City 43301, Taiwan, ROC. Tel.: +886 4 2632 8001x18120; fax: +886 4 2632 4045.
  E-mail address: ycku@pu.edu.tw (Y.-C. Ku).

managers' intentions to champion IIT is necessary for the smooth and successful implementation of an innovation [42]. However, most previous studies that investigated the factors influencing top managers' intentions to champion IT focused on the impact of top managers' demographic variables, such as gender, age, and education [6,7,52]. While these demographic variables may partially explain the differences in top managers' IT championing behavior, some studies have argued that strategic processes and outcomes are not likely to be influenced by the demographic characteristics of top managers [11,34]. However, as human variables cannot be manipulated, an organization cannot control top managers' demographic variables, such as gender and age, to enhance their IT championing behavior. Therefore, it is necessary to explore other deeper and implicit variables to predict top managers' championing behavior.

To fill this research gap, we propose an integrated model based on both upper echelon theory [35] and the TOE framework [4,96] to explore the factors influencing top management's IIT championing behavior. We explore the potential variables from two perspectives: the personal context and the technical context. The personal context focuses on the influence of a top manager's *personality* and *beliefs*, as these factors drive individual behaviors. Our results demonstrate that the individual characteristics of top managers substantially influence their IIT championing behavior. The Optimum Stimulation Level (OSL) can be predicted using a manager's degree of openness to experience and acts as a full mediator between openness to experience and IIT championing behavior. In addition, the significant association between involvement and IIT championing behavior confirms that top management's level of involvement is a significant determinant of IIT championing behavior.

From the technical context perspective, our results indicate that top managers who have a higher level of information literacy will enhance their IIT absorptive capacity, which will help them to value, assimilate and apply IT knowledge [16]. Our findings demonstrate that the top manager's IIT absorptive capacity fully mediates the relationship between information literacy and IIT championing behavior. Thus, top management's information literacy may indirectly influence IIT championing behavior via IIT absorptive capacity. Top managers who have more knowledge of and experience with IT will have a greater IIT absorptive capacity and will more strongly perceive the importance of IIT to their organization. When top managers have high IIT absorptive capacity and are highly involved in the use of IT, they are more likely to champion IIT. This study also found that top managers will strengthen their involvement in IIT if they have higher levels of information literacy. Therefore, our findings provide valuable insights for those seeking to enhance top managers' IIT championing behaviors.

The remainder of this paper is organized as follows. Section 2 reviews the literature relevant to this study. We propose our research model and hypotheses in Section 3. In Section 4, we describe the survey procedures and the results of the data analysis. We conclude in Section 5 and present the implications of this study.

2. Literature review

2.1. IIT and top manager support

In recent decades, IIT adoption has been a significant factor in sustaining an organization's competitive advantage and, thus, has been treated as a competitive strategy [30,52,56]. IIT is distinct from IT, in that innovations produce incremental change by introducing new features or new versions of existing technologies [4]. A critical factor influencing successful IIT adoption is the support of top management [42,85]. Top management support, also known as "executive support," concerns top management's behaviors related to involvement with, participation in, championing of, and assimilation of IT [2,12,33,38,41,47,53,89]. In this study, *top managers* or *top management* describes senior business executives who are responsible for key business lines or functional areas, including the Chief Executive Officer (CEO), Vice President (VP), the Chief Financial Officer (CFO), the Chief Operating Officer (COO), and other senior functional managers [2]. Compared to other types of support, championing by top management is more aggressive and more proactive. Therefore, this study focuses on the scope of top managers' IIT championing behavior.

As top management support is a key factor in successful IIT implementation, the top managers' championing of IIT is an antecedent to the successful implementation of mission-critical information systems [55,81,86]. Bassellier et al. [11] indicated that the soul of championing behavior consists in promoting or advocating the use of technology or other innovations within an organization; hence, top managers' championing behavior should be proactive in supporting, promoting, and advocating IIT utilization within the organization. According to upper echelon theory, individual differences consistently play an important role in top managers' organizational decision-making and competence-building processes [52].

2.2. Antecedents of championing IT

The essence of upper echelon theory is that an organization is a reflection of the characteristics of its top managers [35,90]. As strategic choices do not lend themselves to calculable solutions, those choices reflect the characteristics of top-level decision makers [52]. This implies that an organization is influenced by top management via the processes of decision-making, strategic planning, etc. Moreover, Miles et al. [67] suggested that strategies are self-reinforcing. For IIT planning and IIT implementation to be successful, business managers must occupy a leadership role in these activities. Therefore, enhancing top managers' intentions to champion IIT is necessary for the smooth and successful implementation of an innovation [42]. The information management literature defines the many roles and responsibilities of champions [11]. As Howell and Higgins have argued, "*champions articulate a compelling vision about the positive impact of information technology on the organization*" [38]. In this study, *championing IIT* is defined as "*being proactive in promoting and supporting innovative IT utilization.*" Because championing behavior on the part of top management is a meta-structuring enabler of IT assimilation [78], strategies for enhancing top management's IIT championing behavior represent an important research issue.

2.2.1. Upper echelon characteristics

Upper echelon theory states that the characteristics of an organization's upper echelon will influence its performance directly and indirectly via strategic choices [35]. For example, Sobol and Klein [90] employed upper echelon theory to investigate the relationship between the characteristics of the CIO and the company's financial performance. They found that when the CIO's role is oriented toward IT, rather than simply toward general management, the firm's financial performance is enhanced. Thus, the characteristics of top managers may affect strategic changes, as top managers make strategic decisions, create and communicate a vision of the future, and develop key competencies and capabilities [36,37,39,40,101]. Because top managers influence strategic decision-making, including the development of the company's key competencies and capabilities, the decision to champion IIT is strategically important.

Differences among the characteristics of individual top managers will affect their influence. Individual differences characterize a specific individual's unique features [69] and relate to that individual's ability to perform. Individual differences have been measured on various dimensions such as (1) personality, attitudes, and perception [69] and (2) demographic diversity, mental ability, and personality [27]. McShane and Von Glinow [66] proposed a MARS model (i.e., motivation, ability, role perception, and situational factors [MARS]), to highlight the factors that directly influence an individual's voluntary behavior and resulting performance. To explain top managers' IT championing behavior, previous studies have typically investigated the effects of demographic variables such as age, education, gender and tenure [6,7]. However, the effects of these demographic variables obtained in these previous studies were inconsistent [52], implying a significant level of uncertainty. For example, to predict strategic decision-making and performance, Hambrick and Mason [35] focused on the CEO's background and demographic characteristics, including age, functional track, formal education and socioeconomic background, but their results were unsatisfactory. Li et al. [52] examined both the demographic characteristics and personality traits of the CIO when investigating the effects of CIO characteristics on an organization's innovative use of IT. The results also revealed that evolving characteristics such as a CIO's age and tenure have no significant influence on an organization's innovation behavior. While an individual's educational level is significant, the explanatory power of this variable is weak. Therefore, to supplement the insufficient explanatory power of demographic characteristics, previous studies adopted psychological antecedents to predict a CIO's innovative usage of IT in an organization [52]. Furthermore, certain demographic variables cannot be manipulated by an organization to enhance their effects. For example, even if gender is an important factor influencing IIT championing behavior, it is illegal to replace a top manager because of his/her gender. Thus, it is difficult to enhance top management's IIT championing behavior by controlling the demographic characteristics of the top managers. Therefore, understanding the effects of personality on IT innovation strategies has been an important research issue [52]. This study explores the effects of individual differences in top managers' IIT championing behavior that influence their enterprise's IIT adoption.

2.2.2. TOE framework

From the organization adoption perspective, the TOE framework proposed by Tornatzky and Fleisher [96] posits that the likelihood that an enterprise will adopt and implement IIT is influenced by the technological context, the organizational context, and the environmental context (thus, "TOE"). The TOE framework underscores Rogers' [85] three groups of adoption predicators: (1) leader characteristics relating to change, (2) internal characteristics, and (3) external characteristics. The technological context includes processes and relevant technologies such as internal and external equipment. The organizational context describes the features and resources of an organization, including firm size, scope, human resources, the degree of centralization and formalization, etc. The organizational context is crucial to the process of adopting innovative technology, as such implementation relies on the enterprise's organizational structure. The environmental context is related to the structure of the industry, i.e., competitive pressure, government encouragement and trading partner readiness. An enterprise's IT innovation activities are influenced by the competitive characteristics and technology-supported infrastructure of the industry to which the enterprise belongs. As the TOE framework can be used to explain an enterprise's IIT adoption behavior, several studies have investigated IIT adoption based on this framework. For example,

Kuan and Chau [49] proposed a perception-based, small business EDI adoption model based on the TOE framework. They examined factors affecting the adoption decision while a small business enjoyed the benefits of EDI in the initial stage. Because an organization is a reflection of its top managers' characteristics, we argue that the factors influencing top management's IIT championing behavior could be categorized into multiple contexts using a TOE framework. We explore the potential variables from two perspectives: the personal context and the technical context. The personal context is centered on top managers' personalities, while the technical context is centered on the influence of their individual technological absorptive capacity.

3. Research model and hypotheses

3.1. Research model

As Liang et al. [53] noted: "*external forces, no matter how strong they are, will have no effect on the behavior of an organization without first affecting the behavior of human agents within the organization*" (p. 61). Essentially, an organization adopts IIT through the agency of its top management, i.e., key organizational members. Although implementing IIT in an enterprise is an organizational-level issue, IS research needs to understand the impact of top managers' individual differences on their IIT championing behavior that, in turn, influences IIT assimilation. To the best of our knowledge, few studies have attempted to develop an integrated research model— as opposed to relying on observable demographic characteristics— to investigate the effects of top managers' implicit and personal characteristics (personality, belief, and competence [ability]) on their championing of innovative IT. Given the special role of top management and the importance of understanding its full effect on an organization's IIT adoption behavior, this study explores the effects of top management's individual differences on their IIT championing behavior.

As per the TOE framework, an organization's innovative activities will be affected by the technological, organizational, and environmental contexts. However, an individual top manager's differences do not fit into the organizational context; hence this study defines *personal context* to include the factors related to a top manager's personality and beliefs. However, as an aspect of the technological context in the TOE framework, a top manager's IT competence has significant influence on his or her championing of IIT [11]. Thus top management's abilities related to IIT are classified into the factors pertaining to the *technical context*. However, while it is also an important dimension in the TOE framework, the environmental context is not the focus of this study, as considering environmental variables may blur the effects of individual differences, which correspond to the organizational context in the TOE framework. Therefore, this study proposes an exploratory research model (see Fig. 1) to examine the effects of top managers' individual differences on IIT championing behavior from the personal and technical contexts.

3.2. Personal context

Previous studies have demonstrated that individuals tend to prefer intermediate levels of stimulation, i.e., what they consider to be their Optimum Stimulation Level (OSL). An individual will perceive the stimulation level to be most satisfying when his/her affective reaction to stimulation is at an intermediate level [91]. When individuals feel that the environmental stimuli are below the optimum or lower than desired, they will explore the environment (referred to as championing IIT in this study) to restore balance and reach their own Optimum Stimulation Level [79,91]. Therefore, an individual's OSL will affect his/her tendency
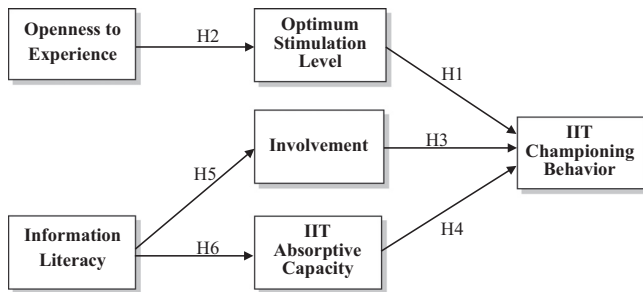
Fig. 1. Research model.

to engage in exploratory behavior. Kish and Donnenwerth [48] characterize an individual with high OSL as "*one who has a stronger than average need to seek and approach situations, activities, and ideas which are novel, changing, complex, surprising, and more intense*" (p. 49). An individual with a higher Optimum Stimulation Level is likely to exhibit a greater awareness of new products and retail facilities and will have a greater tendency to evaluate, symbolically accept, attempt, and adopt them [68]. Thus, high OSL individuals will reduce the decision-making time between the initial awareness and the trial of new products and take greater risks regarding product acceptance [79].

OSL is an important factor in explaining a wide variety of consumer behaviors with strong exploratory components such as risk taking, innovativeness, and variety seeking [43,79,91,92,98]. Raju [79] proposed that behavior aimed at modifying environmental stimulation levels toward a more optimum level of stimulation could be labeled "exploratory behavior." One of three general exploratory tendencies is risk taking: an expression of exploratory behavior that involves choosing innovative and unfamiliar alternatives that are perceived as risky. As individuals with a higher OSL engage in innovative behaviors to a greater extent than individuals with a lower OSL, we infer that a top manager with a higher Optimum Stimulation Level will have a greater tendency to notice an IIT and then champion it. Therefore, we propose H1.

H1. The Optimum Stimulation Level will positively influence IIT championing behavior.

An individual's OSL is affected by the individual's personality traits [79,91,93]. Personality is a stable set of characteristics that determine commonalities and differences in individuals' thoughts, feelings and actions [58]. An individual's personality will directly or indirectly influence his/her attitudes, beliefs, cognitions and behaviors [23]. Many previous studies have investigated the characteristics and classifications of individual personality [10,17,18,24]. For example, five personality factors (extraversion, agreeableness, conscientiousness, openness to experience, and emotional stability) were summarized as the well-known Big Five Personality Factors referred to in the Five Factors Model (FFM) [62,70]. The Big Five taxonomy is considered a comprehensive and elegant model, as these five factors theoretically capture the essence of one's personality [24]. A previous study on playfulness in computer interactions found that an individual's openness to experience will positively influence the OSL [100]. Therefore, our study adopted the individual's openness to experience to measure top managers' individual personality differences.

Openness to experience is characterized by being imaginative, cultured, curious, original, broad-minded, and artistically sensitive [10]. Individuals who are open to experience appear more likely to have positive attitudes toward learning experiences in general [10] and are more likely to explore new ideas [63]. As an individual who is open to experience would be more likely to seek change or

variety, we argue that a top manager's OSL is influenced by his/her openness to experience. Thus, we propose H2.

H2. The degree of openness to experience will positively influence the Optimum Stimulation Level.

Furthermore, executive support will positively influence the organization's progressive use of IT [41]. Top management support is a necessary condition for IIT implementation, but top managers are motivated to support IIT by their belief systems. To support an IIT, the top manager has to regard it as critical to the organization's success. For example, executive involvement is an important factor for the success of a decision support system [88]. This driving force can be measured by *involvement*, which refers to a CEO's perceptions and attitudes concerning IT. Executive involvement is "*concerned with the psychological state of the CEO, reflecting the degree of importance placed on information technology by the chief executive*" [41]. When top management has a higher degree of involvement in IIT, it will leverage IIT as a strategic tool to benefit the organization.

Jarvenpaa and Ives [41] surveyed CEOs and information systems executives and found that executive involvement is a stronger predictor of a firm's progressive use of IT than executive participation. Further, when top managers understand the benefits of IIT adoption and are willing to invest scarce resources in an IIT project, they will be able to take advantage of the promised benefits of IIT adoption, including improved organizational efficiency and effectiveness [95]. Thus, we infer that a top manager's IIT championing behavior will be influenced by his/her degree of involvement in IIT. Therefore, we propose H3.

H3. Top managers' degree of involvement in IIT will positively influence their IIT championing behavior.

3.3. Technical context

An organization's performance, as measured by the transfer of technological knowledge and the adoption of new technology, will be influenced by the organization's absorptive capacity [72,80]. For example, Teo et al. [94] found that absorptive capacity will influence an organization's intention to adopt an EDI system. An organization's absorptive capacity refers "*not only to the acquisition or assimilation of information by an organization but also to the organization's ability to exploit it*" [16, p. 131]. However, as Cohen and Levinthal [16] also stated, "*an organization's absorptive capacity will depend on the absorptive capacities of its individual members. To this extent, the development of an organization's absorptive capacity will build on prior investment in the development of its constituent, individual absorptive capacities, and, like individuals' absorptive capacities, organizational absorptive capacity will tend to develop cumulatively*" (p. 131). Therefore, an organization's absorptive capacity has been shown to be highly related to the absorptive capacities of its individual members, and individual absorptive capacity is cumulatively developed. As the scope of our research is top management, this study adapts Cohen and Levinthal's [16] definition of a firm's absorptive capacity and defines an *individual's absorptive capacity* as that individual's ability to value, assimilate and apply new knowledge.

An individual's absorptive capacity is the individual's idiosyncratic capability that influences his/her knowledge acquisition [72] and his/her ability to utilize available knowledge [32]. Therefore, absorptive capacity not only concerns the ability to understand and assimilate external knowledge but also the capacity to exploit and commercialize such knowledge for different applications [16]. Nambisan et al. [71] claimed that individuals must have a combination of both explicit knowledge (e.g., an understanding

Table 1
Conceptual definition of each construct.

Construct	Conceptual Definitions	Number of measurement [Reference]
IIT Championing Behavior	The level of proactivity in promoting and supporting IIT utilization	4 items [11]
Openness to Experience	The extent to which an individual is imaginative, cultured, curious, original, broad-minded, and artistically sensitive	10 items [10,52]
Optimum Stimulation Level	A property that characterizes an individual in terms of his/her general response to environmental stimuli	7 items [59,79]
Information Literacy	A set of abilities requiring individuals to locate, evaluate, and effectively use necessary information	5 items [21]
IIT Absorptive capacity	The ability of a top manager to value, assimilate and apply new IIT knowledge	6 items [16,72]
Involvement	The psychological state of the top managers, reflecting the degree of importance top managers assign to IIT	5 items [8,41]

of available technologies and their basic capabilities) and tacit knowledge (personal knowledge based on an individual's experience, beliefs, perspective and values) to be able to efficiently develop IIT application ideas. According to Social Cognition Theory (SCT), which defines perceived behavioral control as comprising expectations regarding outcomes and confidence in one's ability to perform a certain behavior (self-efficacy) [5]; those who have greater absorptive capacity for IIT can perform better and have a greater ability to evaluate and use IIT. As their IIT knowledge and abilities increase, they will have more confidence regarding IIT. For example, Park et al. [72] investigated ERP systems and found that system performance was affected by the users' ability to understand ERP knowledge (absorptive capacity) and the level to which they assimilated and applied that knowledge. Thus, to enhance their performance and improve, top managers will also increase their self-efficacy with respect to championing IIT. The aspiration and ambition to innovate and the intention to champion IIT will be stronger when the absorptive capacity is greater. Thus, top managers' absorptive capacity is considered an important factor in their championing of IIT. Therefore, we propose H4.

H4. Top managers' IIT absorptive capacity will positively influence their IIT championing behavior.

An individual who is information literate must be able to "*recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information*".[1] Previous studies defined an individual's *information literacy* as the ability to apply information technologies and retrieve, organize, and synthesize information for effective decision making [19,61,64]. Information literacy not only comprises the individual's experience, skill, and knowledge but also an application-oriented, information-oriented, and usage-oriented attitude toward using and understanding IIT. Based on social learning theory, an individual who is equipped with higher computer knowledge and self-efficacy will have higher levels of commitment and persistence [60]. This implies that top managers' IT competence will influence their involvement in IT. Sabherwal et al. [87] indicated that user training facilitates user involvement and argued that users who have received IS training in the past may be more motivated to be involved in IS development projects. Because information literacy is the usual outcome of user IS training, we infer that top managers will be more motivated to be involved in IIT if they have a higher level of information literacy. Therefore, we propose the following hypothesis.

H5. Top managers' degree of information literacy will positively influence their involvement in IIT.

Top management's role in implementing IIT is to judge the value, benefit, and efficiency that the company will gain from using IIT, as opposed to operating the IIT itself. However, an individual's absorptive capacity will be affected by his/her prior knowledge [46,72]. Thus, a top manager's absorptive capacity is highly related to his/her information literacy, and in turn, information literacy enables top managers to understand the value of IIT for their business units. Furthermore, accumulated prior knowledge increases the ability to commit new knowledge to memory, and hence assimilating and using knowledge will prepare top management to develop effective absorptive capacity [16]. Therefore, we infer that a top manager who is information literate will have a higher degree of IIT absorptive capacity. Therefore, we propose H6.

H6. Top managers' degree of information literacy will positively influence their IIT absorptive capacity.

The relationships among the constructs pertaining to these six hypotheses are illustrated in our research model (Fig. 1).

3.4. Measurement development

A survey questionnaire was developed to test the proposed research model. All constructs in the model were measured using items equivalent to those employed in previous studies. The conceptual definitions and sources of the measurement items for each construct are listed in Table 1. All measurement items are listed in Appendix A. This study employed Likert Scales, allowing participants to choose one of seven levels of agreement with anchors ranging from 1 (strongly disagree) to 7 (strongly agree) with the exception of the involvement construct, which was noted in Appendix A.

Because the targeted respondents were Taiwanese, the distributed version of the questionnaire was written in traditional Chinese. A backward translation procedure was conducted to ensure consistency between the Chinese and English versions of the questionnaire. First, the English version was translated into traditional Chinese by one of the authors. Then, the Chinese version was translated back into English by another author who had not been involved in developing the measures employed. Next, to ensure content validity, each measurement item was examined by three experts. The first expert specialized in information technology, the second in psychology, and the third in English. The three experts reviewed the draft of the questionnaire, revised some ambiguous sentences based on the measurements used by previous studies, and corrected the discrepancies between the two versions of the questionnaire. The Chinese version was finalized after all three experts agreed with the results.

A pre-test was then conducted to enhance content validity. Fifteen top managers who were also EMBA (Executive Master of

---

[1] The American Library Association's Presidential Committee on Information Literacy: Final Report. This report was released on January 10, 1989 in Washington, DC.

Business Administration) program students at a large university in southern Taiwan were invited to participate in the pre-test. One author met all participants individually to introduce the purpose of the survey. All participants read the cover letter and completed the survey questionnaire. They were asked to freely express any problems with the questionnaire, such as inappropriate sentences, overlong response time, ambiguous keywords, etc. After revising the wording and format based on the participants' suggestions, we finalized the questionnaire, confident that it was clear and concise.

4. Data collection and analyses

4.1. Sample

The purpose of this study was to understand the effects of top managers' personal characteristics on IIT championing behavior; hence the sample frame was top managers in organizations. The questionnaire was emailed to 900 top managers randomly selected from a list of alumni of an EMBA program from a large university in southern Taiwan. We used this list as a sampling framework for two reasons. First, the response rate would be very low if we randomly selected top managers from an archival list such as the top 1000 companies in Taiwan or all companies listed on the TWSE (Taiwan Stock Exchange). As our target respondents would recognize our survey as honest and academic, they were expected to willingly participate. Second, all samples could be filtered in advance to confirm that the respondents were, in fact, employed in top management as defined by this study.

To increase the response rate and reduce potential non-response bias, we followed Dillman's [25] Tailored Design Method (TDM) methodology. This included careful design and pilot testing of the instrument, careful wording of the cover letter, addressing respondents by name, immediate follow-up on undelivered questionnaires by calling for correct addresses or names, and a reminder letter along with a follow-up questionnaire sent three weeks after the initial mailing [25]. All mailings were sent via first class mail. Follow-up phone calls were made two weeks after the initial mailing. For those who did not respond, additional cover letters and surveys were mailed 10 or 20 days after the initial mailing. Ultimately, 145 questionnaires were received; the valid sample size was 130.

As the response rate was 16.11%, non-response bias was analyzed to avoid the possibility that non-responding subjects had opinions that are systematically different from the opinions of those who returned the survey [13,15,48]. To verify that non-response bias was insignificant, we compared the demographic profiles of 33 individuals who responded to the second mailing with the 97 who responded to the first mailing. The results of five independent tests demonstrated there were no significant differences between first- and second-wave respondents in terms of gender, age, education, position and industry distribution. This result confirmed that non-respondent bias was not a problem in this study. As shown in Table 2, 78.5% of respondents were male, and half of the respondents were between 36 and 45 years old (51.5%). Respondents were distributed over ten industries and held positions that qualified for this study. Among our respondents, 57 (43.8%) worked in the manufacturing industry and 33 (25.4%) worked in the service industry. Most respondents held bachelor's or master's degrees.

4.2. Reliability and validity

Reliability and discriminant validity were tested before the research model was tested. First, three items (i.e., item 4 of involvement [IV-4], items 6 and 7 of Optimum Stimulation Level [OSL-6 and OSL-7]) were deleted to increase the reliability before factor analysis was conducted. Five items were deleted during factor analysis (i.e., AC-1, IITCB-1, OSL-4, OE-6, and OE-9), as their loadings were lower than 0.5. Finally, all filtered items pertaining to the six constructs were extracted as six factors. As shown in Table 3, the Cronbach's Alpha of each construct was higher than 0.84, and all factor loadings were higher than 0.64 without significant cross-loading. Hence, a final set of 28 reflective indicators was adopted to measure the respective latent constructs in our research model.

As a survey method was used to collect independent and dependent data from the same source [3], common method variance (CMV) might be a concern in this study. CMV refers to the systematic measurement errors that occur when cross-sectional data are collected and both independent and dependent variables come from the same source. Such errors might lead to over or under estimates of the relationship between the independent and dependent variables and, therefore, bias the interpretation of the results [74]. Several measures can be employed to avoid or detect CMV. For this reason, our instrument was refined via a pilot study to eliminate possibly vague or confounding questions. In addition, by protecting respondent anonymity and reducing evaluation apprehension, this study complied with the procedure proposed by Podsakoff et al. [74] to reduce method biases. This study also employed a Harman's single factor test to detect possible CMV. The

Table 2
Respondents' profiles (n = 130).

Measure	Categories	Freq.	Percent	Categories	Freq.	Percent
Gender	Male	102	78.5	Female	28	21.5
Age	Less than 36	9	6.9	51–55	17	13.0
	36–40	32	24.6	56–60	12	9.3
	41–45	35	26.9	More than 60	1	0.8
	46–50	24	18.5			
Education (degree)	High school's	2	1.5	Master's	38	29.3
	Associate's	17	13.1	Doctor's	2	1.5
	Bachelor's	71	54.6			
Professional title	President	5	3.8	Vice President	16	12.3
	CEO	2	1.5	Assistant VP	18	13.8
	General manager	11	8.5	Senior Manager	78	60.0
Industry	Manufacture	57	43.8	Service	33	25.4
	Financial	15	11.5	Retailing	1	0.8
	Public Utility	6	4.6	Medicine	7	5.4
	Logistic	3	2.3	Government	3	2.3
	IT/IS	4	3.1	Other	1	0.8

Table 3
Reliability and discriminant validity test.

Items	OE	AC	IL	OSL	IV	IITCB
Eigenvalue	4.929	4.239	4.033	2.946	2.473	2.414
Variance explained (%)	17.605	15.140	14.403	10.523	8.832	8.622
Cronbach's Alpha	0.908	0.937	0.916	0.876	0.841	0.898
OE-2	**0.773**	−0.049	0.232	0.079	0.087	0.111
OE-7	**0.748**	0.138	0.227	0.270	0.000	0.037
OE-3	**0.711**	0.096	0.179	0.159	0.016	0.047
OE-4	**0.708**	0.068	0.174	−0.028	0.080	0.391
OE-1	**0.688**	0.231	0.023	0.220	0.058	−0.197
OE-10	**0.683**	0.358	0.136	0.350	0.019	0.001
OE-5	**0.680**	0.188	0.323	0.195	0.010	0.321
OE-8	**0.659**	0.424	0.077	0.346	0.034	−0.102
AC-5	0.256	**0.812**	0.223	0.065	0.148	0.247
AC-3	0.129	**0.789**	0.386	0.158	0.062	0.199
AC-4	0.174	**0.750**	0.396	0.204	0.117	0.224
AC-6	0.201	**0.733**	0.265	0.172	0.137	0.212
AC-2	0.177	**0.640**	0.354	0.251	0.055	0.190
IL-2	0.202	0.296	**0.783**	0.069	0.088	0.176
IL-4	0.323	0.099	**0.765**	0.180	0.162	0.054
IL-3	0.205	0.360	**0.756**	0.041	0.011	0.111
IL-5	0.171	0.289	**0.749**	0.260	0.058	0.095
IL-1	0.226	0.351	**0.729**	0.113	0.081	0.232
OSL-1	0.229	0.113	0.170	**0.790**	0.077	0.152
OSL-2	0.256	0.293	0.048	**0.746**	0.130	0.101
OSL-3	0.456	0.161	0.183	**0.666**	0.186	0.238
OSL-5	0.353	0.129	0.277	**0.648**	0.060	0.246
IV-2	0.071	0.096	0.050	0.114	**0.870**	0.219
IV-1	0.035	0.006	−0.001	0.136	**0.860**	0.037
IV-3	0.047	0.230	0.227	0.001	**0.790**	0.165
IITCB-4	0.106	0.276	0.204	0.239	0.164	**0.737**
IITCB-3	0.095	0.349	0.258	0.206	0.279	**0.725**
IITCB-2	0.032	0.425	0.133	0.231	0.253	**0.674**

Note: OE, Openness to Experience; AC, IIT Absorptive Capacity; IL, Information Literacy; OSL, Optimum Stimulation Level; IV, Involvement; IITCB, IIT Championing Behavior.

Table 4
Descriptive statistics and factor loading.

Construct	Indicator	Mean	S.D.	Loading	ITC
Openness to Experience	OE-1	5.59	1.047	0.726	0.658
	OE-2	5.91	0.802	0.745	0.672
	OE-3	5.70	1.017	0.743	0.669
	OE-4	5.79	0.887	0.710	0.625
	OE-5	5.68	1.043	0.821	0.741
	OE-7	5.34	1.089	0.832	0.759
	OE-8	5.35	1.179	0.816	0.745
	OE-10	5.41	1.076	0.847	0.781
Optimum Stimulation Level	OSL-1	5.50	1.021	0.839	0.734
	OSL-2	5.08	1.353	0.835	0.721
	OSL-3	5.39	1.210	0.912	0.815
	OSL-5	5.48	1.094	0.842	0.694
Information Literacy	IL-1	5.16	1.193	0.891	0.816
	IL-2	5.29	1.164	0.897	0.832
	IL-3	5.40	1.016	0.865	0.780
	IL-4	5.45	0.949	0.818	0.736
	IL-5	5.08	1.107	0.858	0.772
Absorptive Capacity	AC-2	5.35	1.199	0.821	0.727
	AC-3	5.16	1.212	0.924	0.876
	AC-4	5.10	1.206	0.936	0.890
	AC-5	5.18	1.158	0.918	0.869
	AC-6	5.23	1.046	0.875	0.807
Involvement	IV-1	4.74	1.224	0.809	0.664
	IV-2	5.33	1.184	0.916	0.767
	IV-3	4.98	1.114	0.883	0.689
IIT Championing Behavior	IITCB-2	5.20	1.229	0.894	0.756
	IITCB-3	4.99	1.367	0.938	0.847
	IITCB-4	5.09	1.266	0.903	0.801

assumption of this measure is that CMV exists when all indicators fall into a single construct or when the first construct can explain most of the variance [74]. Factor analysis results revealed no serious problem.

4.3. Evaluating the measurement model

Partial Least Squares (PLS) was employed to test the research model and the six hypotheses because PLS is more appropriate to measure research models that are in the early development stages and have yet to be extensively tested [94]. PLS is a latent structural equation modeling technique that utilizes a component-based approach to estimation [44]. This study utilized SmartPLS software to conduct PLS analysis [82]. Item reliability, convergent validity, and discriminant validity tests are often applied to evaluate a measurement model in PLS. As shown in Table 4, the factor loading of each item is higher than 0.7, and the ITC is higher than 0.62. As shown in Table 5, the composite reliability of each construct is higher than 0.9, and all paired correlations among constructs are lower than 0.72. Notably, each square root of AVE is higher than 0.78 and higher than the inter-construct correlation coefficients. Therefore, the reliability and validity indicators for the measurement model (i.e., item reliability, convergent validity, and discriminant validity) are all acceptable [14,31].

We conducted ANOVA analyses to examine the effects of three control variables (i.e., gender, age, and education) on IIT championing behavior before we tested the research model using PLS. The results revealed that the effects of gender (male and female; $p = 0.585$), age (6 groups under 60 years old; $p = 0.096$), and education (associate's degree, bachelor's, and master's; $p = 0.921$) are non-significant. Therefore, we excluded these demographic variables from our research model.

4.4. Results of PLS analysis

PLS was employed to assess the structural model. A bootstrapping procedure generating 500 random samples with a size of 130 was used to estimate the significance of the path coefficients of the research model. All path coefficients and explained variances for the model are depicted in Fig. 2.

The results of the PLS analysis demonstrate that the explanatory power (R^2) of top management's IIT championing behavior is 52.6%. The path coefficient from Optimum Stimulation Level to IIT championing behavior is 0.191 ($p < 0.05$), meaning that H1 is significantly supported. In addition, there is also a significantly positive association between openness to experience and OSL ($b = 0.681$, $p < 0.001$). Thus, H2 is significantly supported, and 46.4% of the variance of OSL can be explained by openness to experience. The path coefficient from involvement to IIT championing behavior is 0.261 ($p < 0.01$). Thus, H3 is supported. From a personal context perspective, our findings reveal that openness to experience affects the OSL, which in turn, affects IIT championing behavior. Furthermore, top management's involvement is a significant determinant of IIT championing behavior.

From a technical context perspective, IIT absorptive capacity also has a significant effect on top management's IIT championing behavior ($b = 0.457$, $p < 0.001$). Thus, H4 is significantly supported. In addition, IIT absorptive capacity is significantly affected by information literacy ($R^2 = 0.504$). The path coefficient from information literacy to IIT absorptive capacity is 0.710 ($p < 0.001$), meaning that H6 is significantly supported. Our findings indicate that the relationship between information literacy and IIT absorptive capacity is strong and significant. Furthermore, IIT absorptive capacity is one of the primary antecedents of IIT championing behavior. Conversely, involvement is significantly affected by information literacy ($b = 0.293$, $p < 0.001$), but the explanatory power is less than 0.1 ($R^2 = 0.086$). This implies that while H5 is significantly supported,

Table 5
Correlation matrix and average variance extracted for the principal constructs.

Constructs	Composite reliability	OE	OSL	IL	AC	IV	IITCB
Openness to Experience	0.926	0.782					
Optimum Stimulation Level	0.917	0.681	0.858				
Information Literacy	0.938	0.566	0.505	0.866			
Absorptive Capacity	0.953	0.545	0.560	0.711	0.896		
Involvement	0.903	0.199	0.319	0.285	0.341	0.870	
IIT Championing Behavior	0.937	0.382	0.530	0.537	0.655	0.479	0.912

Note: The shaded numbers in the diagonal row are square roots of the average variance extracted.

some factors that influence involvement were not explored. Therefore, involvement has a significant effect on top management's IIT championing behavior. However, although the effect of information literacy on involvement is significant, it is also limited.

Following the Baron and Kenny procedures [9,57], we performed supplementary tests to verify whether OSL mediates the effect of openness to experience and whether both involvement and IIT absorptive capacity mediate the effect of information literacy. Full mediation occurs when the inclusion of the mediating variable negates the effect of the independent variable on the dependent variable. If the effect of the independent variable on the dependent variable is merely reduced when the mediator is included, then the direct effect is considered partially mediated. We tested four models to assess mediation effects (see Table 6). The analysis of OSL revealed that the conditions for mediation were met. Openness to experience (independent variable) was found to relate significantly to OSL (mediator), and OSL was found to significantly relate to IIT championing behavior (dependent variable). When the model did not control for OSL, openness to experience was found to significantly impact IIT championing behavior. When OSL was included as a mediator in the model, however, the above relationship between openness to experience and IIT championing behavior became non-significant, suggesting that OSL fully mediates this relationship. Moreover, IIT absorptive capacity also exhibits a full mediating effect. In contrast, the analyses reveal that involvement has only a partial mediating effect.

5. Conclusion and implications

Most previous studies investigated IT championing behavior from, among others, the organizational, environmental, and IT perspectives. Few studies have simultaneously considered the effects of top managers' personality- and technology-related characteristics. However, according to upper echelon theory, the organization is a reflection of its top managers. Therefore, top management's characteristics and IIT championing behavior are

Fig. 2. Results of PLS analysis.

Table 6
Test results for mediation effects.

Optimum Stimulation Level

Model 1	Openness to Experience → IIT Championing Behavior	$b = 0.409^{***}$
Model 2	Openness to Experience → OSL	$b = 0.682^{***}$
Model 3	OSL → IIT Championing Behavior	$b = 0.529^{***}$
Model 4	Openness to Experience → IIT Championing Behavior	$b = 0.053^{ns}$
	Openness to Experience → OSL	$b = 0.682^{***}$
	OSL → IIT Championing Behavior	$b = 0.494^{***}$

Involvement

Model 1	Information Literacy → IIT Championing Behavior	$b = 0.540^{***}$
Model 2	Information Literacy → Involvement	$b = 0.317^{***}$
Model 3	Involvement → IIT Championing Behavior	$b = 0.481^{***}$
Model 4	Information Literacy → IIT Championing Behavior	$b = 0.434^{***}$
	Information Literacy → Involvement	$b = 0.295^{***}$
	Involvement → IIT Championing Behavior	$b = 0.354^{***}$

IIT Absorptive Capacity

Model 1	Information Literacy → IIT Championing Behavior	$b = 0.540^{***}$
Model 2	Information Literacy → IIT Absorptive Capacity	$b = 0.712^{***}$
Model 3	IIT Absorptive Capacity → IIT Championing Behavior	$b = 0.655^{***}$
Model 4	Information Literacy → IIT Championing Behavior	$b = 0.144^{ns}$
	Information Literacy → IIT Absorptive Capacity	$b = 0.711^{***}$
	IIT Absorptive Capacity → IIT Championing Behavior	$b = 0.552^{***}$

*** $p < 0.001$.
^{ns} Non-significant.

crucial to successful IIT implementation. Despite this, most previous studies on IT adoption only discuss the impact of the demographic characteristics and participation behaviors of top managers. To the best of our knowledge, this study is the first to propose an integrated research model to explore the factors influencing top management's IIT championing behavior from the both the personal and technical contexts.

5.1. Implications for researchers and practitioners

Most previous studies investigating the factors influencing IT championing behavior emphasized the impact of top managers' demographic characteristics and participation behaviors on the adoption of IT. For example, three demographic characteristics of top managers (age, tenure, and education) have been found to be particularly influential in affecting an organization's innovative behavior [6,7,52]. However, some studies argued that strategic processes and outcomes are not likely to be influenced by the demographic characteristics of top managers. These studies proposed that deeper and implicit variables such as personality are more appropriate to predict IT innovation strategies [11,34]. Our study found that a top manager who has a high degree of information literacy will understand fundamental IT concepts and the value of IT in his/her organization. This ability allows a top manager to have greater IIT absorptive capacity. An IT-competent top manager can easily communicate with IT personnel and properly understand the proposed benefits of IIT projects. An IT-competent manager is also more likely to partner with the IT unit to maximize the value of IT in his/her
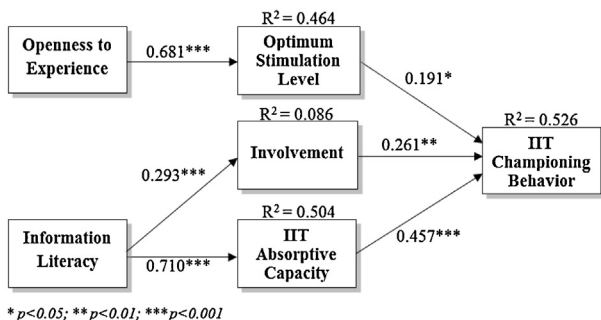
organization [73]. Rockart et al. [83] indicated that when line managers have the appropriate IT education and training, they are more likely to assume leadership role in IT adoption. Therefore, IT-competent managers are expected to champion IIT—to a greater extent than other managers who lack IT-competence—because they are more likely to accept or adopt innovative technologies. It is important for an organization to enhance the top managers' information literacy to increase their absorptive capacity and involvement.

Educational events can change users' attitudes toward IT [29], and IS executives regularly suggest education as a means to facilitate strategic IS planning [51]. As additional IS education implies a higher level of information literacy, we suggest that top managers should be educated or trained to enhance their information literacy [65]. For example, top managers should be familiar with how to communicate with IT professionals and be equipped with the ability to access, create, present, and disseminate information via executive information systems (EIS), business intelligence systems (BI), etc. In addition, top managers should have the ability to evaluate the benefits and limitations of IIT. Top managers with a higher degree of information literacy are more likely to have both good IIT absorptive capacity and deep involvement, which will increase their IIT championing behavior. As McNurlin and Sprague [65] indicated, it is unnecessary for top managers to possess technical skills (i.e., how to create, operate or develop the latest technologies), but they do need to understand the strategic opportunities that technology brings to the firm. To enhance information literacy at the executive level, we suggest that the organization or MIS department should prepare customized educational programs for top managers. Three general types of educational programs have proven successful for top managers: informal programs, semiformal programs, and formal programs [65]. Informal study programs, including learning by doing, reading publications, learning from subordinates, and individual demonstrations, can help top managers understand the new opportunities that IIT can offer. Top managers' information literacy may be improved via the training provided by these programs.

Our findings also reveal that the top managers' level of involvement will positively influence IIT championing behavior, but top managers' involvement in IIT could not be accurately predicted using their information technology literacy. According to Agenda Building Theory [28], a new strategy or proposal cannot attract the top managers' attention unless it has following characteristics: immediacy, simplicity, magnitude (importance) and abstractness (scope of the issue). This implies that to enhance the top managers' involvement, the MIS department must convince the top managers that the proposed IIT project is important because it will significantly impact the organization's competitive advantage. To obtain top management support, MIS departments may employ other useful strategies such as maintaining good relationships between the CIO and other top managers, promoting the benefits of IIT, educating top managers to help them understand IIT, and so on [65]. These additional strategies may serve to enhance top managers' involvement in IIT, in addition to increasing their information literacy.

Moreover, as an individual who has a high degree of openness to experience is curious, broadminded and adventurous [100], we infer that a top manager whose personality is curious or adventurous will have a high Optimum Stimulation Level, which in turn, positively influences IIT championing behavior. Furthermore, top managers will have favorable attitudes and intentions toward the championing of new information technology if they have positive beliefs about the use of new IT based on their own knowledge of and experience with it [52]. This implies that a top manager with a mind open to new experiences is more likely to have a higher OSL. Thus, if IIT is an organization's most important strategic tool, the organization needs to fill relevant top management positions with managers who have a high degree of openness to experience. Because these top managers will also have a higher OSL, they will be willing to explore and support IIT. In other words, they will be more likely to champion IIT.

Finally, our research model not only explores top managers' IIT championing behavior from the perspectives of the personal and technical contexts, our integrated model also reveals the mediating effects of OSL, involvement, and IIT absorptive capacity. Although the effects of these three factors have been investigated in previous studies, their mediating effects had yet to be investigated. Our findings reveal that top managers' personality traits and information literacy are not significant predictors of IIT championing behavior when mediating variables exist. These results provide insights for future studies related to top management's IT support or championing behavior.

5.2. Limitations and suggestions for future research

Although this study collected empirical data to test our comprehensive research model, we acknowledge certain limitations and provide suggestions for future research. First, the empirical data were collected from a list of alumni of an EMBA program from a large university in southern Taiwan. A broader empirical survey is required to generalize our findings. Second, we examined the impact of top managers' individual differences on IIT championing behavior from the perspectives of the personal and technical contexts, but many individual factors were not investigated in this study: e.g., motivation, self-efficacy, role perception, value system, etc. Future studies should investigate more such factors to enhance the explanatory power of top managers' IIT championing behavior. Third, this study excluded the environmental context from the research model. The investigation of the relationships between environmental factors and top managers' individual differences is also an important issue for future research.

Appendix A. Measurements of constructs

Openness to Experience

OE-1	I like to challenge norms.
OE-2	I seldom have difficulty understanding abstract ideas.
OE-3	I have a vivid imagination.
OE-4	I am interested in abstract ideas.
OE-5	I know which team members have expertise in specific areas.
OE-6[b]	I always have excellent ideas.
OE-7	I have a good imagination.
OE-8	I love to read challenging material.
OE-9[b]	I spend time reflecting on things.
OE-10	I love to think up new ways of doing things.

Optimum Stimulation Level

OSL-1	I like to experience novelty and change in my daily routine.
OSL-2	I like a job that offers change, variety, and travel, even if it involves some danger.
OSL-3	I am continually seeking new ideas and experiences.
OSL-4[b]	I like continually changing activities.
OSL-5	When things get boring, I like to find new and unfamiliar experiences.
OSL-6[a]	I like to continue doing the same old things rather than trying new and different things.
OSL-7[a]	I prefer a routine way of life to an unpredictable one full of change.

Information Literacy

IL-1	I am very familiar with the methods how to communicate with information technology.
IL-2	I am very familiar with the appropriate usage to access, create, present and disseminate information.
IL-3	I am very familiar with the applications of information technology.
IL-4	I have the capacity to judge the necessity and usefulness of using information technology.
IL-5	I recognize not only the scope and limitations of applying information technology but also its influences on society, economics, the individual, family, and community.

IIT Absorptive Capacity

AC-1[b]	I am successful at learning new things within this group.
AC-2	I am able to identify and acquire internal (e.g., within the group) and external (e.g., market) knowledge.
AC-3	I can successfully integrate our existing knowledge with the new information and knowledge acquired.
AC-4	I am effective in transforming existing information into new knowledge.
AC-5	I can successfully exploit internal and external information and knowledge into concrete applications.
AC-6	I am effective in utilizing knowledge for new products.

Involvement

IV-1	Your prevailing thinking about innovative IT spending. (1–7) 1 = expense to be controlled; 4 = resource to be allocated fairly; 7 = strategic investment.
IV-2	Your perception of innovative IT's importance to the firm. (1–7) 1 = no concern for IIT; 7 = IIT is single most critical factor for the firm.
IV-3	Your vision for innovative IT. (1–7) 1 = no vision; 3 = technical vision; 5 = functional vision; 7 = strong, generic vision
IV-4[a]	Your endorsement of applications not meeting traditional criteria. (1–7) 1 = rarely; 4 = occasionally; 7 = frequently.

IIT Championing Behavior

IITCB-1[b]	I always support the use of innovative IT in my company.
IITCB-2	I always promote the use of innovative IT in my company.
IITCB-3	I always create partnership/alliances with IT people within my organization.
IITCB-4	I always strengthen partnership/alliances with IT people within my organization.

Note: This study adopted Likert Scales, allowing participants to choose one of seven levels of agreement with anchors ranging from 1 (strongly disagree) to 7 (strongly agree), except for the involvement construct.

  [a] Item was deleted before the factor analysis was conducted.

  [b] Item was deleted during the factor analysis procedure, as the factor loadings were lower than 0.5.

References

[1] I. Ajzen, The theory of planned behavior, Organizational Behavior and Human Decision Processes 0 (2), 1991, pp. 179–211.

[2] C.P. Armstrong, V. Sambamurthy, Information technology assimilation in firms: the influence of senior leadership and IT infrastructures, Information Systems Research 0 (4), 1999, pp. 304–327.

[3] B.J. Avolio, F.J. Yammarino, B.M. Bass, Identifying common methods variance with data collected from a single source: an unresolved sticky issue, Journal of Management 7 (3), 1991, pp. 571–587.

[4] J. Baker, The technology–organization–environment framework, in: Y.K. Dwivedi, M.R. Wade, S.L. Schneberger (Eds.), Information Systems Theory, 2012231–245.

[5] A. Bandura, Social Foundations of Thought and Action: A Social Cognitive Theory, Prentice-Hall, Inc., Englewood Cliffs, NJ, 1986.

[6] K.A. Bantel, S.E. Jackson, Top management and innovations in banking: does the composition of the top team make a difference? Strategic Management Journal 0 (S1), 1989, pp. 107–124.

[7] V.L. Barker, G.C. Mueller, CEO characteristics and firm R&D spending, Management Science 8 (6), 2002, pp. 782–801.

[8] H. Barki, J. Hartwick, Rethinking the concept of user involvement, MIS Quarterly 3 (1), 1989, pp. 53–63.

[9] R.M. Baron, D.A. Kenny, The moderator–mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations, Journal of Personality and Social Psychology 51 (6), 1986, pp. 1173–1182.

[10] M.R. Barrick, M.K. Mount, The big five personality dimensions and job performance: a meta-analysis, Personnel Psychology 4 (1), 1991, pp. 1–26.

[11] G. Bassellier, I. Benbasat, B.H. Reich, The influence of business managers' IT competence on championing IT, Information Systems Research 4 (4), 2003, pp. 317–336.

[12] C.M. Beath, Supporting the information technology champion, MIS Quarterly 5 (3), 1991, pp. 355–372.

[13] M.A. Carpenter, M.A. Geletkanycz, W.G. Sanders, Upper echelons research revisited: antecedents, elements, and consequences of top management team composition, Journal of Management 30 (6), 2004, pp. 749–778.

[14] W.W. Chin, The partial least squares approach for structural equation modeling, in: G.A. Marcoulides (Ed.), Modern Methods for Business Research, Lawrence Erlbaum Associates Inc., Mahwah, NJ, 1998, pp. 295–336.

[15] W.G. Cochran, Sampling Techniques, John Wiley & Sons, New York, 1977.

[16] W.M. Cohen, D.A. Levinthal, Absorptive capacity: a new perspective on learning and innovation, Administrative Science Quarterly 5 (1), 1990, pp. 128–152.

[17] P.T. Costa Jr., R.R. McCrae, Still stable after all these years: personality as a key to some issues in adulthood and old age, in: P.B. Baltes, O.G. Brim, Jr. (Eds.), Life-Span Development and Behavior, (3), 198065–102.

[18] P.T.J. Costa, R.R. McCrae, The NEO Personality Inventory Manual, Psychological Assessment Resources, FL, 1985.

[19] C. Curran, Information literacy and the public librarian, Public Libraries 9 (6), 1990, pp. 349–353.

[20] F.D. Davis, Perceived usefulness, perceived ease of use, and user acceptance of information technology, MIS Quarterly 13 (3), 1989, pp. 319–340.

[21] G. De Landsheere, The Information Society and Education: Synthesis of The National Reports, ERIC Clearinghouse, Washington, D.C., 1989.

[22] W.H. DeLone, Determinants of success for computer usage in small business, MIS Quarterly 2 (1), 1988, pp. 51–61.

[23] S. Devaraj, R.F. Easley, J.M. Crant, Research note—how does personality matter? Relating the five-factor model to technology acceptance and use Information Systems Research 9 (1), 2008, pp. 93–105.

[24] J.M. Digman, Personality structure: emergence of the five-factor model, Annual Review of Psychology 1 (1), 1990, pp. 417–440.

[25] D.A. Dillman, Mail and Internet Surveys: The Tailored Design Method, John Wiley & Sons, New York, 2000.

[26] B.L. Dos Santos, K. Peffers, D.C. Mauer, The impact of information technology investment announcements on the market value of the firm, Information Systems Research 4 (1), 1993, pp. 1–23.

[27] A.J. DuBrin, Fundamentals of Organizational Behavior: An Applied Perspective, Pergamon Press, New York, 1978.

[28] J.E. Dutton, Understanding strategic agenda building and its implications for managing change, Scandinavian Journal of Management Studies 3 (1), 1986, pp. 3–24.

[29] D.F. Feeny, B.R. Edwards, K.M. Simpson, Understanding the CEO/CIO relationship, MIS Quarterly 6 (4), 1992, pp. 435–448.

[30] T.W. Ferratt, A.L. Lederer, S.R. Hall, J.M. Krella, Swords and plowshares information technology for collaborative advantage, Information and Management 0 (3), 1996, pp. 131–142.

[31] C. Fornell, D.F. Larcker, Evaluating structural equation models with unobservable variables and measurement error, Journal of Marketing Research 8 (1), 1981, pp. 39–50.

[32] T.L. Griffith, J.E. Sawyer, M.A. Neale, Virtualness and knowledge in teams: managing the love triangle of organizations, individuals, and information technology, MIS Quarterly 27 (2), 2003, pp. 265–287.

[33] V. Grover, M.D. Goslar, The initiation, adoption, and implementation of telecommunications technologies in US organizations, Journal of Management Information Systems 10 (1), 1993, pp. 141–163.

[34] U.C.V. Haley, S.A. Stumpf, Cognitive trials in strategic decision-making: linking theories of personalities and cognitions, Journal of Management Studies 6 (5), 1989, pp. 477–497.

[35] D.C. Hambrick, P.A. Mason, Upper echelons: the organization as a reflection of its top managers, Academy of Management Review 9 (2), 1984, pp. 193–206.

[36] G.R. Hickman, Leadership and the social imperative of organizations in the 21st century, Leading Organizations: Perspectives for a New Era, Sage Publications, Thousand Oaks, CA, 1998 pp. 559–571.

[37] R.J. House, R.N. Aditya, The social scientific study of leadership: quo vadis? Journal of Management 3 (3), 1997, pp. 409–473.

[38] J.M. Howell, C.A. Higgins, Champions of change: identifying, understanding, and supporting champions of technological innovations, Organizational Dynamics 19 (1), 1990, pp. 40–55.

[39] J.G. Hunt, Leadership A New Synthesis, Sage Publications, Inc., Newbury Park, CA, 1991.

[40] R.D. Ireland, M.A. Hitt, Achieving and maintaining strategic competitiveness in the 21st century: the role of strategic leadership, Academy of Management Executive 3 (1), 1999, pp. 43–57.

[41] S.L. Jarvenpaa, B. Ives, Executive involvement and participation in the management of information technology, MIS Quarterly 5 (2), 1991, pp. 205–227.

[42] A. Jeyaraj, J.W. Rottman, M.C. Lacity, A review of the predictors, linkages, and biases in IT innovation adoption research, Journal of Information Technology 21 (1), 2006, pp. 1–23.

[43] E.A. Joachimsthaler, J.L. Lastovicka, Optimal stimulation level-exploratory behavior models, Journal of Consumer Research 1 (3), 1984, pp. 830–835.

[44] K.G. Jöreskog, D. Sörbom, Lisrel 8: User's Reference Guide, Scientific Software, 1996.

[45] K. Kautz, P.A. Nielsen, Understanding the implementation of software process improvement innovations in software organizations, Information Systems Journal 4 (1), 2004, pp. 3–22.

[46] L. Kim, Crisis construction and organizational learning: capability building in catching-up at hyundai motor, Organization Science 9 (4), 1998, pp. 506–521.

[47] J.L. King, V. Gurbaxani, K.L. Kraemer, F.W. McFarlan, K.S. Raman, C.S. Yap, Institutional factors in information technology innovation, Information Systems Research 5 (2), 1994, pp. 139–169.

[48] G.B. Kish, G.V. Donnenwerth, Interests and stimulus seeking, Journal of Counseling Psychology 6 (6), 1969, pp. 551–556.

[49] K.K. Kuan, P.Y. Chau, A perception-based model for EDI adoption in small businesses using a technology–organization–environment framework, Information & Management 38 (8), 2001, pp. 507–521.

[50] C.C. Law, E.W. Ngai, ERP systems adoption: an exploratory study of the organizational factors and impacts of ERP success, Information & Management 44 (4), 2007, pp. 418–432.

[51] A.L. Lederer, D.J. Maupin, M.P. Sena, Y. Zhuang, The technology acceptance model and the world wide web, Decision Support Systems 9 (3), 2000, pp. 269–282.

[52] Y. Li, C.H. Tan, H.H. Teo, B.C.Y. Tan, Innovative usage of information technology in Singapore organizations: do CIO characteristics make a difference? IEEE Transactions on Engineering Management 3 (2), 2006, pp. 177–190.

[53] H. Liang, N. Saraf, Q. Hu, Y. Xue, Assimilation of enterprise systems: the effect of institutional pressures and the mediating role of top management, MIS Quarterly 1 (1), 2007, pp. 59–87.

[54] H.F. Lin, Interorganizational and organizational determinants of planning effectiveness for internet-based interorganizational systems, Information & Management 43 (4), 2006, pp. 423–433.

[55] M. Lockett, The Factors Behind Successful IT Innovation, Oxford Institute of Information Management, Templeton College, 1987.

[56] C. Loebbecke, P. Powell, Competitive advantage from IT in logistics: the integrated transport tracking system, International Journal of Information Management 8 (1), 1998, pp. 17–27.

[57] D.P. MacKinnon, Analysis of mediating variables in prevention and intervention research, in: A. Cazares, L.A. Beatty (Eds.), Scientific Methods for Prevention Intervention Research, NIDA Research Monograph 139. DHHS Pub., Washington, DC, 1994, pp. 127–153.

[58] S.R. Maddi, Personality Theories: a Comparative Analysis, Brooks/Cole Pub. Co., Pacific Grove, CA, 1996.

[59] P. Mahatanankoon, The effects of personality traits and optimum stimulation level on text-messaging activities and m-commerce intention, International Journal of Electronic Commerce 2 (1), 2007, pp. 7–30.

[60] G.M. Marakas, M.Y. Yi, R.D. Johnson, The multilevel and multifaceted character of computer self-efficacy: toward clarification of the construct and an integrative framework for research, Information Systems Research 9 (2), 1998, pp. 126–163.

[61] C.R. McClure, Network literacy: a role for libraries? Information Technology and libraries 3 (2), 1994, pp. 115–125.

[62] R.R. McCrae, P.T. Costa Jr., Personality trait structure as a human universal, American Psychologist 2 (5), 1997, pp. 509–516.

[63] J.C. McElroy, A.R. Hendrickson, A.M. Townsend, S.M. DeMarie, Dispositional factors in Internet use: personality versus cognitive style, MIS Quarterly 1 (4), 2007, pp. 809–820.

[64] K.E. McHenry, J.T. Stewart, J.L. Wu, Teaching resource-based learning and diversity, New Directions for Higher Education 992 (78), 1992, pp. 55–62.

[65] B.C. McNurlin, R.H. Sprague, Information Systems Management in Practice, Prentice Hall PTR, Upper Saddle River, 2001.

[66] S.L. McShane, M.A. Von Glinow, Organizational Behavior Emerging Realities for the Workplace Revolution, The MacGraw Hill Companies, Inc., Boston, MA, 2005.

[67] R.E. Miles, C.C. Snow, A.D. Meyer, H.J. Coleman Jr., Organizational strategy, structure, and process, Academy of Management Review 3 (3), 1978, pp. 546–562.

[68] R.A. Mittelstaedt, S.L. Grossbart, W.W. Curtis, S.P. Devere, Optimal stimulation level and the adoption decision process, Journal of Consumer Research 3 (2), 1976, pp. 84–94.

[69] G. Moorhead, R.W. Griffin, G.E. Burton, Organizational Behavior, Houghton Mifflin, Boston, 2001.

[70] M.K. Mount, M.R. Barrick, The big five personality dimensions: implications for research and practice in human resources management, Research in Personnel and Human Resources Management 3 (3), 1995, pp. 153–200.

[71] S. Nambisan, R. Agarwal, M. Tanniru, Organizational mechanisms for enhancing user innovation in information technology, MIS Quarterly 3 (3), 1999, pp. 365–395.

[72] J.H. Park, H.J. Suh, H.D. Yang, Perceived absorptive capacity of individual users in performance of enterprise resource planning (ERP) usage: the case for Korean firms, Information & Management 44 (3), 2007, pp. 300–312.

[73] G. Pervan, How chief executive officers in large organizations view the management of their information systems, Journal of Information Technology 3 (2), 1998, pp. 95–109.

[74] P.M. Podsakoff, S.B. MacKenzie, J.Y. Lee, N.P. Podsakoff, Common method biases in behavioral research: a critical review of the literature and recommended remedies, Journal of Applied Psychology 8 (5), 2003, pp. 879–903.

[75] G. Premkumar, K. Ramamurthy, The role of interorganizational and organizational factors on the decision mode for adoption of interorganizational systems, Decision Sciences 6 (3), 1995, pp. 303–336.

[76] G. Premkumar, K. Ramamurthy, S. Nilakanta, Implementation of electronic data interchange: an innovation diffusion perspective, Journal of Management Information Systems 1 (2), 1994, pp. 157–186.

[77] G. Premkumar, M. Roberts, Adoption of new information technologies in rural small businesses, Omega 7 (4), 1999, pp. 467–484.

[78] R.L. Purvis, V. Sambamurthy, R.W. Zmud, The assimilation of knowledge platforms in organizations: an empirical investigation, Organization Science 2 (2), 2001, pp. 117–135.

[79] P.S. Raju, Optimum stimulation level: its relationship to personality, demographics, and exploratory behavior, Journal of Consumer Research 7 (3), 1980, pp. 272–282.

[80] R. Reagans, B. McEvily, Network structure and knowledge transfer: the effects of cohesion and range, Administrative Science Quarterly 8 (2), 2003, pp. 240–267.

[81] B.H. Reich, I. Benbasat, An empirical investigation of factors influencing the success of customer-oriented strategic systems, Information Systems Research 1 (3), 1990, pp. 325–347.

[82] C.M. Ringle, S. Wende, A. Will, SmartPLS 2.0 (M3) Beta, Hamburg, 2005 available in http://www.smartpls.de.

[83] J.F. Rockart, M.J. Earl, J.W. Ross, Eight imperatives for the new it organization, Sloan Management Review 8 (1), 1996, pp. 43–55.

[84] W.P. Rockwell, MIS: a view from the top, Dun's Review 92 (4), 1968, pp. 20–22.

[85] E.M. Rogers, Diffusion of Innovations, 4th ed., Free Press, New York, 1995.

[86] D.A. Runge, Winning with Telecommunocations: An Approach for Cortporate Strategy, Intl Center for Information, 1988.

[87] R. Sabherwal, A. Jeyaraj, C. Chowa, Information system success: individual and organizational determinants, Management Science 2 (12), 2006, pp. 1849–1864.

[88] G.L. Sanders, J.F. Courtney, A field study of organizational factors influencing DSS success, MIS Quarterly 9 (1), 1985, pp. 77–93.

[89] H. Singh, F. Harianto, Top management tenure, corporate ownership structure and the magnitude of golden parachutes, Strategic Management Journal 10 (S1), 1989, pp. 143–156.

[90] M.G. Sobol, G. Klein, Relation of CIO background, IT infrastructure, and economic performance, Information & Management 46 (5), 2009, pp. 271–278.

[91] J.B.E.M. Steenkamp, H. Baumgartner, The role of optimum stimulation level in exploratory consumer behavior, Journal of Consumer Research 9 (3), 1992, pp. 434–448.

[92] J.B.E.M. Steenkamp, H. Baumgartner, E. Van der Wulp, The relationships among arousal potential, arousal and stimulus evaluation, and the moderating role of need for stimulation, International Journal of Research in Marketing 13 (4), 1996, pp. 319–329.

[93] J.B.E. Steenkamp, S.M. Burgess, Optimum stimulation level and exploratory consumer behavior in an emerging consumer market, International Journal of Research in Marketing 9 (2), 2002, pp. 131–150.

[94] H.H. Teo, W. Wan, X.W. Wang, K.K. Wei, Effects of absorptive capacity on organizational predisposition toward information systems, Proceedings of the 24th International Conference on Information Systems, Seattle, WA 2003.

[95] J.Y. Thong, An integrated model of information systems adoption in small businesses, Journal of Management Information Systems 5 (4), 1999, pp. 187–214.

[96] L.G. Tornatzky, M. Fleischer, A.K. Chakrabarti, The Process of Technology Innovation, Lexington Books, Lexington, MA, 1990.

[97] V. Venkatesh, M.G. Morris, G.B. Davis, F.D. Davis, User acceptance of information technology: toward a unified view, MIS Quarterly 7 (3), 2003, pp. 425–478.

[98] M.P. Venkatraman, L.L. Price, Differentiating between cognitive and sensory innovativeness: concepts, measurement, and implications, Journal of Business Research 20 (4), 1990, pp. 293–315.

[99] J.C. Wang, K.H. Tsai, Factors in Taiwanese firms' decisions to adopt electronic commerce: an empirical study, The World Economy 5 (8), 2002, pp. 1145–1167.

[100] A.B. Woszczynski, P.L. Roth, A.H. Segars, Exploring the theoretical foundations of playfulness in computer interactions, Computers in Human Behavior 8 (4), 2002, pp. 369–388.

[101] S.J. Zaccaro, R.J. Klimoski, The nature of organizational leadership: understanding the performance imperatives confronting today's leaders, in: S.J. Zaccaro, R.J. Klimoski (Eds.), The Nature of Organizational Leadership, Jossey-Bass, San Francisco, 2001, pp. 3–14.

Tung-Ching Lin is a Professor of Information Management and associate dean of college of management at National Sun Yat-Sen University in Taiwan. He is editor-in-chief of Sun Yet-Sen Management Review. He received his Ph.D in MIS from University of Wisconsin-Milwaukee. He has published two books (Management Information Systems: The Strategic Core Competence of e-Business and Knowledge Management) and numerous papers in professional journals such as *Decision Sciences, Information System Journal, Decision Support Systems, Information & Management, Electronic Commerce Research and Applications, Computers & Education, Behavior and Information Technology, Journal of Information Science, Expert Systems with Applications, International Journal of Innovation and Learning*, and others. His current research interests include knowledge management, Web2.0, electronic commerce and management of information systems

Yi-Cheng Ku is an Associate Professor of Department of Computer Science and Information Management at Providence University in Taiwan. He received his Ph.D. in Information Management from National Sun Yat-sen University. In 2009-2010, he was a Fulbright visiting scholar at the Scheller College of Business, Georgia Institute of Technology. His research interests include recommendation systems, information system adoption and diffusion, and service science. His papers have appeared in *Journal of Management Information Systems (JMIS), Decision Support Systems (DSS), Information & Management (I&M), Computers in Human Behavior, International Journal of Business, International Journal of Medical Informatics, Journal of Electronic Commerce Research*, and various conference proceedings

Yu-Shan Huang is a software project manager and system analyst at Taiwan Semiconductor Manufacturing Company in Taiwan. She received her MBA in Information Management from National Sun Yat-sen University and the certification of global MBA program of University of Victoria and Johannes Kepler University of Linz. Her research interests include knowledge management, IT project management and user experience (UX).