Exploring the determinants of IS developers' behavioural intention to learn business skills

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While previous research has emphasised the importance of business skills for information systems (IS) developers in the process of IS development, few studies have investigated the determinants of IS developers' behavioural intention to learn business skills. The current study explores the factors affecting IS developers' intention to learn business skills based on previous theories and research. Data collected from 258 valid respondents are tested against the research model using the partial least-squares approach. The results indicate that both job involvement and career insight have significant positive effects on extrinsic and intrinsic motivations for learning business skills. Additionally, learning self-efficacy is not only found to have a significant influence on learning intention, but is also found to have a moderating effect on the positive relationship between intrinsic motivation and learning intention. The findings of this study provide several important theoretical and practical implications for IS developers' behaviour of learning business skills.

Keywords: IS development; learning business skills; motivation theory; job involvement; career insight

1. Introduction

Information systems development (ISD) involves the analysis, design, and implementation of information technology (IT) systems and applications to support business functions (Xia and Lee 2005). Information systems (IS) developers face basic challenges in terms of assimilating the increasing amount of new technologies and searching for more cost-effective ways to apply IT to solve business problems. In addition to technical and communication skills, IS developers need business functional knowledge. This research aims to investigate what drives IS developers' behavioural intention to learn business skills. Since ISD projects are typically complex, dynamic, and unstructured (Schwalbe 2007), IS specialists need to possess business functional knowledge to be able to re-engineer business processes as well as to interpret business problems and apply the appropriate technical solution (Sullivan-Trainor 1988). The implementation of ISD projects also requires knowledge and expertise from different domains to effectively diagnose problems and design solutions (Tesch *et al.* 2009). Business partners and IT users expect IT professionals to possess some business skills to facilitate the communication of their knowledge and expertise (Luftman and Kempaiah 2008). Moreover, to successfully build an IS, IS developers require knowledge about business needs and workflow from business professionals (Joshi *et al.* 2007), while business professionals need knowledge about the use and technical possibilities of the new IS from IS developers (Rus and Lindvall 2002, Ko *et al.*

2005). However, IS developers' lack of business skills often leads to a 'user-designer communications gap' in the ISD process (Laudon and Laudon 2006). IS researchers have concluded that these gaps in expectations can cause problems during system development (Klein and Jiang 2001) that require IS users and IS developers to organise a cooperative team to analyse and understand the IS specifications. More specifically, ISD must correctly translate users' information needs into IS functions based on communication between IS users and developers. As such, the knowledge-sharing success of an ISD team depends on the extent of overlapped knowledge between IS users and IS developers. There are two ways to enhance the knowledge-sharing success or decrease the communication gap between IS users and IS developers: (1) users acquire IT knowledge and (2) IS developers acquire business knowledge. Since the topic of this study concerns the field of management information systems (MIS), the focus centres on IS developers' acquisition of business knowledge.

As noted above, to achieve a successful ISD, IS developers not only need to know system development techniques (e.g. data flow diagrams and database design), but also need to understand business knowledge (e.g. interpersonal, communication, management, and organisational skills). Albin and Otto (1987) have found that good business communication skills are the most important skills that employers look for in MIS majors. From the perspective of dual IS career paths, an individual has the option of either remaining a

technical specialist or assuming managerial responsibility (Allen and Katz 1992). That is, there are two ladder paths for IT personnel in the MIS department of an organisation: some IT personnel aim to become senior IT specialists by gaining IT expertise, while others aim to become project leaders or chief information officers by learning business skills. In addition, Allen and Katz (1992) also argued that choices related to these two ladder paths are partially based on corporate culture. In parochial-oriented cultures, individuals tend to personally identify with their organisation and exhibit high degrees of loyalty towards the organisations (Hofstede *et al*. 1990). In professional-oriented cultures, individuals tend to identify with their profession and exhibit low degrees of loyalty towards the organisations (Griffith *et al*. 2003). However, if an IT personnel member identifies himself/herself solely as an IT specialist and does not want to understand the process and value of his/her own business, it remains difficult for him/her to improve his/her IS work productivity and effectiveness by leveraging business knowledge. Thus, it is important for MIS academics and practitioners to understand what drives IT personnel to choose a managerial career path by learning business skills.

Organisations need technically competent, business-savvy IT professionals and require more than just traditional technical skills (Luftman *et al*. 2009). In a Society for Information Management study, Luftman and Kempaiah (2008) found that the issue of 'Build Business Skills in IT' improved from third most important to second most important in 2008. They argued that competitive advantage in today's business environment depends on how successful IT professionals are at aligning IT strategies and business strategies. Thus, it is critical for IS developers to possess strong technological and business skills (Lee *et al*. 1995), and to take greater personal responsibility to ensure that their skills are current and/or marketable.

Osterman (2000) suggested that workers need to be willing to learn new skills, to offer new ideas and suggestions based on their knowledge, and to care about quality and productivity. Luftman and Kempaiah (2008) argued that effective business skills are not innate but need to be developed. This also implies the importance of learning business skills for IS developers. As ISD requires both business and IT skills, cross-domain knowledge is critical for the success of ISD projects (Pee *et al*. 2010). Specifically, IS developers need to learn business knowledge outside their area of original expertise in order to successfully develop information systems, whereas all other employees need merely function in the knowledge domains they were trained in. That said, while previous research has emphasised the importance of possessing business skills such as interpersonal/communication skills and management/organisational skills for IS developers in the process of ISD (Joshi 1992, Todd *et al*. 1995, Barki and Hartwick 2001), few studies have explored the factors that affect IS developers' behavioural intention to learn business skills. Furthermore, recent research concerning

IT and learning focuses mainly on learning tools, models, or behaviours in the online learning environment (e.g. Limayem and Cheung 2011, Tsai *et al*. 2011, García-Peñalvo *et al*. 2012, Hsia *et al*. 2012, Milovanoviæ *et al*. 2012, Tang *et al*. 2012), little research has been conducted to investigate IS developers' learning behaviour in the traditional ISD workplace.

The primary focus of the current study is determining what factors drive IS developers' intention to learn business skills. Based on motivation theory, social cognitive theory (SCT), and the literature, this study proposes a research model to explore how career insight, job involvement, and learning self-efficacy influence behavioural intention to learn business skills directly or indirectly through the mediation of extrinsic and intrinsic motivations. This study also investigates the moderating effect of learning self-efficacy on the relationship between motivation and learning intention. The findings will be useful to researchers when developing and testing theories related to IS developers' learning behaviours and to practitioners in promoting IS developers' learning of business skills.

The remainder of this paper is organised as follows. The next section reviews the theoretical literature. A research model and a set of hypotheses are then proposed based on the relevant theories and literature. This is followed by descriptions of the construct measures and data collection methods employed. Next, the results of the data analysis and hypotheses tests are presented. Finally, theoretical and practical implications of the findings for IS developers' business skill learning behaviour are discussed.

2. Theoretical background and research model

Based on the Motivation Opportunity Ability framework (Ramaswami *et al*. 1998), an individual's behaviour is expected to be influenced by three factors: motivation, opportunity, and ability. Thus, this study explores whether extrinsic and intrinsic motivations drive IS developers' behavioural intention to learn business skills. Additionally, based on SCT, learning self-efficacy is used to represent the perception of an employees' ability to learn business skills. For the opportunity, as long as an employee has the motivation to learn, he or she can easily obtain the relevant business and management knowledge via online or offline resources such as Wikipedia, Google, or other knowledge-sharing functions on social networking sites. Furthermore, qualitative interviews with some IS developers suggest that opportunity is not a critical factor affecting their intention to learn business skills. Thus, this study attempts to understand what drives IS developers' intention to learn business skills by focusing on the perspectives of ability and motivation. Moreover, based on motivation theory, perceptions and beliefs may affect motivations. Previous literature has suggested that job involvement and career insight are two critical beliefs that may enhance an individual's motivation to be involved in learning activities (e.g. Maurer *et al*.
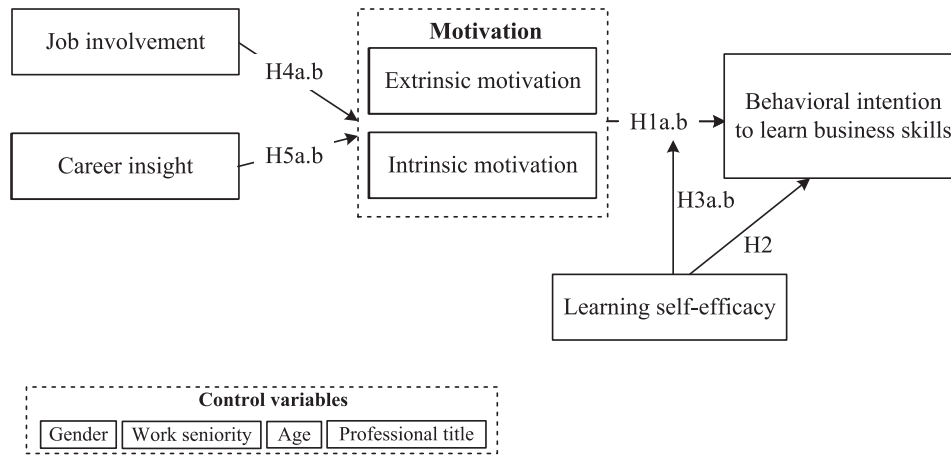
Figure 1.   Research model.

2003). As such, this study adopts job involvement and career insight to represent the belief antecedents of extrinsic and intrinsic motivations.

Based on the aforementioned reasoning, the model used to guide this study is shown in Figure 1. This model suggests that job involvement, career insight, and learning self-efficacy influence behavioural intention to learn business skills directly or indirectly through the mediation of extrinsic motivation and intrinsic motivation. Further, learning self-efficacy is hypothesised to moderate the effect of extrinsic motivation and intrinsic motivation on behavioural intention to learn business skills. It is worth noting that the focus of this study is on investigating how both intrinsic motivation and extrinsic motivation influence IS developers' intention to learn business skills from the perspective of the motivation theory, not on integrating all the potential behaviour theories, such as theory of planned behaviour (TPB) to explain IS developers' business skill learning behaviour. Further, Venkatesh *et al*. (2003) found that the relationship between subjective norm and behaviour intention is insignificant in voluntary settings. Considering that learning business skills is a quasi-voluntary behaviour and that the focus of this study is exploratory, this study does not incorporate TPB's subjective norms to the research model. However, this does not mean that developing an integrated model of the motivation theory and potential behaviour theories (e.g. TPB) to enhance our understanding of IS developers' business skill learning behaviour is not worth being addressed in future studies. The following subsections discuss the relevant literature and posit the hypotheses.

2.1.   Behavioural intention to learn business skills

Previous studies have suggested a growing need for IS personnel to have functional expertise (e.g. Benbasat *et al*. 1980, Bartol and Martin 1982). Business skill requirements for most IS employees involve skills related to specific functional areas (Connelly *et al*. 2000, Zaccaro 2001). Todd *et al*. (1995) suggested that business knowledge/skills include

knowledge of industries and functional areas, management and organisational skills, and interpersonal/communication skills. In addition, business skills also involve the specific skills for management of personnel resources as well as financial resources for the organisational unit (Luthans *et al*. 1988). Thus, business skills refer to knowledge that both directly (e.g. marketing, accounting, finance) and indirectly (e.g. psychology, sociology, public relations) pertains to businesses (Murphy and Poist 1998).

MIS researchers have suggested that IS developers need to possess interpersonal skills that facilitate cooperative or purposeful interactions with users (e.g. Joshi 1992). Further, organisational skills have also been found to be essential for IS personnel (Zmud 1979). Given that business skills are necessary for ISD, if IS developers acquire relevant business skills, they will be able to improve communication and cooperation with team members and IS users, maintain good interpersonal relationships, achieve mutual understanding with stakeholders, and meet user needs. As such, when IS developers believe that business skills can help them enhance ISD performance, they become more likely to want to learn these skills. However, the formation of IS developers' learning behaviour is complex and has rarely been addressed in the existing literature. Therefore, this study explores the factors that affect IS developers' intention to learn business skills.

2.2.   Extrinsic and intrinsic motivation

In the context of ISD, motivational factors have largely been conceptualised in terms of intrinsic and extrinsic motivations (e.g. Ko *et al*. 2005). Motivation is concerned with the direction, arousal, amplitude, and persistence of an individual's behaviour (Campbell and Pritchard 1976). Self-determination theory (Deci and Ryan 1985) distinguishes between different types of motivations based on the different reasons or goals that give rise to an action (Deci and Ryan 2000) and places the types of regulations on a continuum between self-determined (intrinsic) and

controlled (extrinsic) forms (Deci and Ryan 1985). In this respect, over three decades of research has shown that the quality of experience and performance can be very different when one's behaviour is based on intrinsic versus extrinsic reasons (Deci and Ryan 2000).

Intrinsic motivation refers to motivation that comes from inside an individual rather than from any external or outside rewards, such as money or grades. This type of motivation is associated with an individual doing an activity because it is enjoyable and they find it inherently interesting, engaging, or in some way satisfying (Deci and Ryan 1980, Lee *et al.* 2005). Other researchers also contend that elements of intrinsic motivation include enthusiastic task involvement, desire to experience adventure and novelty, striving for excellence in one's work, trying to understand something and wishing to improve, and goal direction (Fredricks *et al.* 2004, Reeve *et al.* 2004, McInerney and McInerney 2010). On the other hand, extrinsic motivation refers to motivation induced by rewards or punishments dependent upon success or failure in the task where the primary elements include concern for tangible rewards, sanctions, praise, feedback, and grades (Ryan and Deci 2000). Extrinsic motivation is associated with promotions at work, as well as increased pay or job security, and can be used to coordinate resources and motivate employees by linking employees' monetary motive to the goal of the organisation (Osterloh and Frey 2000).

The general understanding of extrinsic motivation is that the goal providing satisfaction is independent of the activity, whereas intrinsic motivation is related to finding satisfaction within the activity itself (Calder and Staw 1975, Covington and Dray 2002). Motivation-relevant theories can be used to explain and predict IS developers' learning behaviours. Liao and Tai (2006) have suggested that motivation to learn plays a dominant role in improving employee behaviour and effectiveness. In the motivation to learn model used by Colquitt *et al.* (2000), learning outcomes, such as declarative knowledge, skill acquisition, and reactions to training, are treated as immediate training effectiveness, while job performance is treated as post-training effectiveness. Thus, IS developers may be willing to learn business skills due to extrinsic motivational factors, such as improving job effectiveness. Previous research has contended that in a training programme, motivation can influence the willingness of an employee to participate in the training in the first place (Noe and Wilk 1993, Maurer and Tarulli 1994). That is, motivation is a key factor in the prediction of actual learning behaviour (Spinath *et al.* 2006). In addition to extrinsic motivations, IS developers may also be willing to learn business knowledge owing to intrinsic motivations, such as the desire to experience adventure or novelty. In sum, IS developers learn business skills because this leads to an outcome external to the task, such as gaining rewards or feedback, or because they consider learning business skills to have value for its own sake, such as being enjoyable or satisfying in itself.

Thus, both extrinsic and intrinsic motivations are expected to affect IS developers' behavioural intention to learn business skills. As such, based on the above discussion, the following hypotheses are proposed:

H1a: Extrinsic motivation is positively related to behavioural intention to learn business skills.
H1b: Intrinsic motivation is positively related to behavioural intention to learn business skills.

2.3. *Learning self-efficacy*

Self-efficacy provides explicit guidelines on how to develop and enhance the quality of human functioning regarding motivation and attainments (Bandura 1995). Positive psychological and emotional states in the aftermath of the successful execution of certain behaviours naturally leads to a sense of competence and subsequently results in an enhanced sense of efficacy (Shea and Bidjerano 2010). Bandura (1986) initially described the connection between a learner's ability to control the learning environment and self-regulation; later research indicated that self-regulated learners are effective information processors because they are motivated to monitor and direct their own learning (e.g. Walczyk 1994, Wolters 2004).

Learning self-efficacy has been demonstrated to influence how individuals approach learning (Brown 2001). Bandura's (1986) SCT has been expanded to include academic performance and reconfigured as social cognitive career theory (SCCT) (Lent *et al.* 1996). According to SCCT, self-efficacy influences an individual's choice behaviour, effort to overcome obstacles, feelings of stress and anxiety, and performance and coping behaviours; it also has a direct bearing on occupational aspirations (Bandura *et al.* 2001).

Individuals with high self-efficacy tend to be actively involved in development and learning activities (Pan *et al.* 2010). According to goal-setting theory, individuals with higher self-efficacy set more challenging goals than those with lower self-efficacy (McKee *et al.* 2006). High self-efficacy expectations regarding performance in a specific behavioural setting lead individuals to seek out that type of setting, whereas low self-efficacy expectations lead individuals to avoid that type of setting (Wood and Bandura 1989). As such, individuals with high self-efficacy tend to believe that they have the necessary capabilities to successfully accomplish a given task (Bandura and Cervone 1983, Schunk and Gunn 1986). Pan *et al.* (2010) also argued that high self-efficacy individuals are better able to cope with the stress involved in personal learning because they assume that they are able to influence the learning process even when they are faced with obstacles, things despite the obstacles met in the learning process, while low self-efficacious people may give up quickly if the stress of personal learning is overwhelming. Thus, when IS developers have high learning self-efficacy, they are also likely to possess the confidence necessary to face the challenges

involved in learning business skills. Previous research has also found that self-efficacy plays an important role in determining a person's behaviour (e.g. Hill *et al*. 1987, Yi and Hwang 2003, Vijayasarathy 2004). Therefore, learning self-efficacy should be positively related to behavioural intention to learn business skills, suggesting the following hypothesis:

> *H*2: Learning self-efficacy is positively related to behavioural intention to learn business skills.

Self-efficacy has been used as a motivating tool to create and sustain self-learning and development and has been shown to be related to a variety of organisational outcomes including job performance and career development (Stajkovic and Luthans 1998). Bandura (2000) also argued that perceived efficacy plays a key role in human functioning because it affects behaviour not only directly, but by its impact on other determinants such as goals and aspirations, outcome expectations, affective proclivities, and perceptions of impediments and opportunities within the social environment. Due to the theoretical link between goal orientation and individuals' views of the nature of ability, several studies have examined the influence of perceived ability on the effects of goal orientation (e.g. Miller *et al*. 1993, Kaplan and Midgley 1997). The results suggest that as employees become more committed to their career goals, they are more likely to develop a plan for performance attainment or success related to their career endeavours, and to strengthen their self-confidence and belief in their abilities to acquire personal qualities such as skills and competencies (Ballout 2009). Similarly, if IS developers desire to learn business skills to achieve their goals, they have to strengthen their self-confidence and learning motivation, regardless of whether that motivation is intrinsic or extrinsic in nature.

Gravill and Compeau (2008) also suggested that confidence in ability plays a key role in the learning process. Several studies have found that self-efficacy functions as a moderating variable for the effect of training method on training outcomes. For example, Saks (1995) examined the moderating effects of self-efficacy on the relationship between training and the adjustment of newcomers during their first year of employment and found that newcomers with lower self-efficacy had a higher intention to quit the profession. Moreover, individuals who lack confidence tend to have difficulty focusing on learning tasks. These results imply that learning self-efficacy may interact with learning motivation to affect behavioural intention to learn business skills. Generally speaking, individuals with low self-efficacy tend to exert less effort and terminate the learning of business skills sooner than their high self-efficacy counterparts. It is thus reasonable to infer that IS developers who have high learning self-efficacy are likely to have stronger perceptions regarding the positive effects of learning motivation on learning intention than those who have low learning self-efficacy. That is, learning self-efficacy may moderate the positive influence of learning motivations

on behavioural intention to learn. Based on the above, the following hypotheses are proposed:

> *H*3*a*: When learning self-efficacy is higher, the positive relationship between extrinsic motivation and behavioural intention to learn business skills is stronger.
> *H*3*b*: When learning self-efficacy is higher, the positive relationship between intrinsic motivation and behavioural intention to learn business skills is stronger.

2.4. *Job involvement*

Allport (1943) proposed job involvement as a way to measure the degree to which employees participate in their jobs such that it meets their needs regarding prestige, self-respect, autonomy, and self-regard. Lawler and Hall (1970) defined job involvement as the degree to which employees perceive their total work situation to be an important part of their lives and to be central to their identities, due to the opportunities it affords them to satisfy important needs (Kanungo 1982). Along the same lines, Lodahl and Kejner (1965) defined job involvement as the extent to which people are involved in their job or career. Guion (1958) also proposed that job involvement is characterised by employee perceptions of the job as being of extreme importance, while Brown (1996) argued that job involvement is the degree to which employees identify with their work.

Further, perceptions regarding the benefits and importance of a job have a significant effect on employees' career/skill development activities (Rowold and Schilling 2006). Researchers have suggested that people who are highly involved with their jobs are more likely to be motivated because participation in job training can increase skill levels, improve job performance, and increase feelings of self-worth (e.g. Mathieu *et al*. 1993, Martineau 1996). Therefore, job involvement is related to training motivation since job-involved trainees have personal goals that are very much tied to work success (Colquitt *et al*. 2000). As such, the more employees care about their job and are aware of the importance of the job, the more they are motivated to develop their skills and enhance their job performance, leading to the following hypotheses:

> *H*4*a*: Job involvement is positively related to extrinsic motivation.
> *H*4*b*: Job involvement is positively related to intrinsic motivation.

2.5. *Career insight*

Career insight is the extent to which one has realistic career expectations, as well as knowledge of one's strengths and weaknesses, career plans, current work situation, specific career goals, and where one stands in a career (London 1983, Noe *et al*. 1990, Day and Allen 2004). This concept is conceptually similar to goal clarity, social perceptiveness, future orientation, and realism of expectations (London 1983, Noe *et al*. 1990). Individuals who know their personal strengths and limitations (i.e. have career insight) are more

likely to thrive in an unstable and ever-changing work environment (Mirvis and Hall 1994).

Career insight has been found to be significantly related to employees' developmental activities and positively related to employees' intention to participate in learning (Maurer and Tarulli 1994, Maurer *et al.* 2003). Given that career insight helps individuals identify their strengths, weaknesses, and interests, individuals who exhibit high levels of career exploration are likely to have high training motivation because they can clearly see the link between learning and the development of their strengths and weaknesses (e.g. Noe and Wilk 1993, Facteau *et al.* 1995). Based on the above reasoning, the following hypotheses are posited:

> *H5a*: Career insight is positively related to extrinsic motivation.
> *H5b*: Career insight is positively related to intrinsic motivation.

3. Methods

3.1. *Measures of the constructs*

Selected measurement items must represent the concept about which generalisations are to be made to ensure the content validity of the measurement (Bohmstedt 1970). Therefore, measurement items in this study were primarily adapted from previous studies to ensure their content validity. Specifically, the measures for intrinsic motivation were adapted from Nordhaug (1989). Further, 13 items were developed to measure extrinsic motivation based on the operationalisation of this construct by Nordhaug (1989) and the outcome expectation measures of Compeau and Higgins (1995), Compeau *et al.* (1999), and Venkatesh *et al.* (2003). The scale for learning self-efficacy was modified from Bandura (1977), while the scale for job involvement was adapted from Reeve and Smith (2001). The measures for career insight were developed according to London's (1983) definition of this construct. Finally, measures of the behavioural intention to learn were modified from Venkatesh *et al.* (2003). Likert scales (1–7) with anchors ranging from 'strongly disagree' to 'strongly agree' were used for all construct items. The survey items were pretested by a small number of ISD experts and modified to fit to the ISD context studied. The survey items are listed in the appendix.

3.2. *Data collection*

Since this study explored the determinants of behavioural intention to learn business skills in the context of ISD, participants included individuals who had experience with system development. Data used to test the research model were gathered from the employees of organisational IS departments in Taiwan. Volunteers were first asked whether they had any experience with ISD projects. If they replied in the affirmative, they were invited to participate in the survey. For each question, respondents were asked to choose the response that best described their degree of agreement. A total of 750 questionnaires were distributed to 33 companies and 258 valid responses (a valid response rate of 34.4%) were received from a variety of respondents with various demographic backgrounds. Basic characteristics of the respondents are shown in Table 1.

Table 1. Respondent characteristics.

Characteristic	Number	Percentage
Gender		
Female	72	27.9
Male	186	72.1
Age		
21–25	13	5.0
26–30	60	23.3
31–35	99	38.4
36–40	61	23.6
41–45	20	7.8
46–50	3	1.1
> 50	2	0.8
Education		
High school	1	0.4
Junior college	12	4.7
Bachelor's degree	161	62.4
Master's degree or PhD	84	32.5
Work seniority		
< 1	11	4.3
1–3	30	11.6
4–6	66	25.6
7–10	79	30.6
11–15	52	20.2
16–20	14	5.4
21–30	6	2.3
Professional title		
Programmer	128	49.6
System analyst	56	21.7
Project leader	22	8.5
Network administrator	7	2.7
Database administrator	12	4.7
IS maintainer	12	4.7
Other	21	8.1
Industry		
Manufacturing	121	46.9
Service	38	14.7
Science and technology	61	23.6
Education	6	2.3
Financial institution	12	4.7
Transport service	4	1.6
Retail business	1	0.4
Software	3	1.2
Telecommunications	7	2.7
Medical	3	1.2
Other	2	0.8
Number of employees		
< 20	74	28.7
20–100	64	24.8
> 100	120	46.5

4. Results

The empirical data were analysed using the partial least-squares (PLS) approach rather than the variance-covariance-based structural equation modelling (SEM) approach, because compared with SEM, PLS does not require the data to have a multivariate normal distribution and is less demanding in terms of sample size (Chin 1998). Further, PLS is appropriate when the research model is in an early stage of development and has not been tested extensively (e.g. Zhu and Kraemer 2005, Zhu *et al.* 2006). SmartPLS software was used for the two-stage data analysis: first, all measurement models were examined for their psychometric properties; then the research model and hypotheses were tested. The PLS approach is a convenient method for simultaneously analysing the measurement model, the structural model, and the interaction relationships. In order to increase the interpretability of the interactions between the variables, this study centred the predictor variables based on the recommendations of previous researchers (e.g. Judd and McClelland 1989, Aiken *et al.* 1991).

4.1. Measurement model

Assessment of the measurement model involved evaluations of the reliability, convergent validity, and discriminant validity of the construct measures. Reliability was examined using Cronbach's α and composite reliability. As shown in Tables 2 and 3, reliability exceeded .8 for each construct. Convergent validity of the construct measures was examined using factor loadings and average variance extracted (AVE). Following the suggestions of Hair *et al.* (2010), factor loadings greater than .50 were considered to be significant. All of the factor loadings of the items in the research model exceeded .60 (Table 2). Moreover, as shown in Table 3, the AVE for each construct exceeded the recommended level of .50, which meant that more than one-half of the variances observed in the items were accounted for by their hypothesised constructs. To examine discriminant validity, this study compared the shared variances between factors with the AVE of the individual factors (Fornell and Larcker 1981). This analysis indicated that the shared variances between factors were lower than the AVE of the individual factors, confirming discriminant validity (Table 3). Thus, the measurement model demonstrated adequate reliability, convergent validity, and discriminant validity.

4.2. Structural model

This study proceeded to test the path significances using a bootstrapping resampling technique with 500 sub-samples and assigned 4 demographic variables (i.e. gender, age, work seniority, and professional title) as control variables to focus on how the independent variables affected the dependent variables. Statistical results for the structural

Table 2. Cronbach's α and factor loadings.

Construct	Item	Factor loading	Cronbach's α
Extrinsic motivation	EM1	.634	.921
	EM2	.634	
	EM3	.641	
	EM4	.634	
	EM5	.760	
	EM6	.752	
	EM7	.768	
	EM8	.809	
	EM9	.706	
	EM10	.787	
	EM11	.727	
	EM12	.704	
	EM13	.745	
Intrinsic motivation	IM1	.783	.931
	IM2	.798	
	IM3	.820	
	IM4	.861	
	IM5	.896	
	IM6	.842	
	IM7	.884	
Learning self-efficacy	LSE1	.817	.887
	LSE2	.842	
	LSE3	.872	
	LSE4	.710	
	LSE5	.676	
	LSE6	.704	
	LSE7	.753	
Behavioural intention to learn	ITL1	.962	.958
	ITL2	.954	
	ITL3	.966	
Job involvement	JI1	.832	.886
	JI2	.879	
	JI3	.829	
	JI4	.836	
	JI5	.756	
Career insight	CI1	.829	.930
	CI2	.904	
	CI3	.916	
	CI4	.850	
	CI5	.916	

Table 3. Composite reliability, AVE, and discriminant validity.

Construct	CR	EM	IM	LSE	BITL	JI	CI
EM	.932	.515					
IM	.944	.384	.708				
LSE	.910	.128	.204	.592			
BITL	.973	.123	.277	.150	.925		
JI	.915	.097	.081	.062	.201	.684	
CI	.947	.151	.148	.154	.188	.120	.781

Notes: (1) CR, composite reliability. (2) EM, extrinsic motivation; IM, intrinsic motivation; LSE, learning self-efficacy; BITL, behavioural intention to learn; JI, job involvement; CI, career insight. (3) Diagonal elements show the AVE; off-diagonal elements show the shared variance.
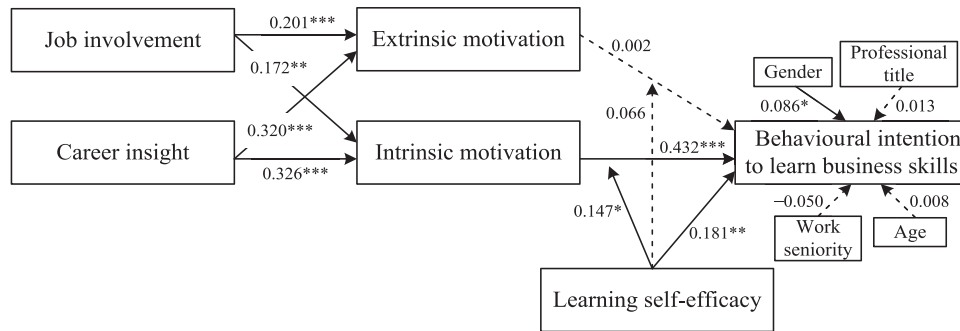
Figure 2. Standardised path coefficients. $*p < .05$; $**p < .01$; $***p < .001$. —, Significant; - - -, not significant.

Table 4. Statistical results of the structural model.

Dependent variable	Independent variable	Path coefficient	t-Value	R^2
BITL	(H1a) EM	.002	0.038	.356
	(H1b) IM	.432	6.111***	
	(H2) LSE	.181	3.193**	
	(H3a) EM × LES	.066	0.749	
	(H3b) IM × LES	.147	1.821*	
EM	(H4a) JI	.201	3.303***	.188
	(H5a) CI	.320	4.630***	
IM	(H4b) JI	.172	3.060**	.175
	(H5b) CI	.326	5.219***	

Notes: EM, extrinsic motivation; IM, intrinsic motivation; LSE, learning self-efficacy; BITL, behavioural intention to learn; JI, job involvement; CI, career insight.
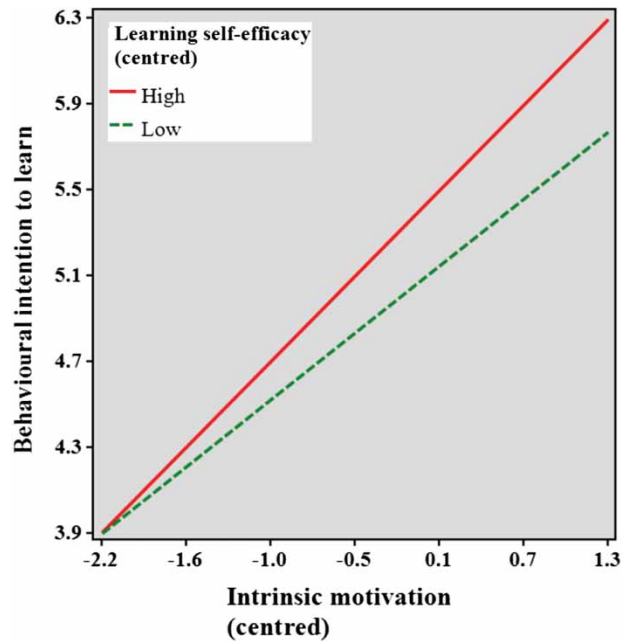$*p < .05$.
$**p < .01$.
$***p < .001$.

Figure 3. Moderating effect of learning self-efficacy on the relationship between intrinsic motivation and behavioural intention to learn business skills.

model, including path coefficients, t-values, p-values, and R^2 are shown in Figure 2 and Table 4. As expected, intrinsic motivation had a significant and positive relationship on behavioural intention to learn ($\beta = .432$). Thus, H1b was supported. However, the effect of extrinsic motivation on behavioural intention to learn was not significant ($\beta = .002$), meaning that H1a was not supported. Learning self-efficacy was found to have a significant and positive relationship on behavioural intention to learn ($\beta = .181$), supporting H2. Additionally, job involvement had a significant and positive relationship on both extrinsic and intrinsic motivation ($\beta = .201$ and $.172$, respectively), thereby supporting H4a and H4b. Similarly, career insight had a significant and positive association on both extrinsic and intrinsic motivation ($\beta = .320$ and $.326$, respectively), meaning that H5a and H5b were supported.

Among the moderating relationships, learning self-efficacy was observed to moderate the relationship between intrinsic motivation and behavioural intention to learn, with higher learning self-efficacy leading to a higher positive relationship between intrinsic motivation and behavioural intention to learn ($\beta = .147$). Therefore, H3b

was supported. Figure 3 shows how learning self-efficacy moderates this relationship between intrinsic motivation and behavioural intention to learn. However, learning self-efficacy was unexpectedly found not to moderate the relationship between extrinsic motivation and behavioural intention to learn ($\beta = .066$). Thus, H3a was not supported.

Altogether, about 35.6% of the variance in behavioural intention to learn was accounted for by the research model, with intrinsic motivation having the strongest relationship with behavioural intention to learn among the explanatory variables. In addition, about 18.8% of the variance in extrinsic motivation and 17.5% of the variance in intrinsic motivation were accounted for by the research model, with career insight having a stronger effect on both extrinsic motivation and intrinsic motivation than job involvement.

5. Discussion of results

The results indicate that intrinsic motivation has a significant positive relationship with behavioural intention to learn business skills. This means that IS developers who have strong intrinsic motivation are more likely to have stronger behavioural intentions to learn business skills than those who have low intrinsic motivation. However, in contrast to previous research that noted a positive relationship between extrinsic motivation and behavioural intention (e.g. Lee *et al*. 2005, Wu *et al*. 2007), extrinsic motivation in this study was unexpectedly found not to exert any significant influence on behavioural intention to learn business skills. This means that IS developers associated with high extrinsic motivation do not have higher behavioural intention to learn business skills as compared to those with low extrinsic motivation. Individuals are often said to have a natural tendency to focus on intrinsic and growth-oriented goals rather than extrinsic and outward-oriented goals, since the former are theorised to be more directly linked to satisfaction of the basic psychological needs for competence, relatedness, and autonomy (Vansteenkiste *et al*. 2006). Our finding also implies that IS developers would like to learn business skills for the sake of internal satisfaction rather than for external rewards or benefits. Thus, this insignificant result regarding extrinsic motivation may be the result of a strong influence of intrinsic motivation on learning intention weakening the influence of extrinsic motivation. This finding is also similar to that of Roberts *et al*. (2006), who found that higher levels of intrinsic motivation reduce open source software developers' sensitivity to extrinsic incentives.

As expected, learning self-efficacy was found to have a significant positive effect on behavioural intention and have a moderating effect on the relationship between intrinsic motivation and behavioural intention, with higher learning self-efficacy leading to a higher positive relationship between intrinsic motivation and learning intention. This result implies that in the context of ISD, IS developers associated with high learning self-efficacy tend to have higher learning intentions and generate stronger perceptions concerning the positive effect of intrinsic motivation on learning intention than those associated with low learning self-efficacy. This represents a new finding, since the main and moderate effects of learning self-efficacy on intention to learn have rarely been explored in previous research.

Finally, both job involvement and career insight were found to have significant and positive relationships with extrinsic and intrinsic motivation. This means that IS developers who perceive that their job has high importance are more likely to have higher extrinsic and intrinsic motivations to learn business skills as compared with those who have low job involvement. Our findings also indicate that both extrinsic and intrinsic motivations are positively affected by career insight. This in turn implies that IS developers who have a clear career plan and career goals or are

more aware of their strengths and weaknesses tend to have higher extrinsic and intrinsic motivation to learn business skills than those who do not possess these types of career insight.

6. Implications for research

Considering that IS developers' business skills learning is important for the success of organisational ISD, this study investigates the relationship between job involvement, career insight, extrinsic motivation, intrinsic motivation, learning self-efficacy, and behavioural intention to learn business skills. The findings provide several important theoretical implications for IS developers' behavioural intention to learn business skills. First, this study represents a pioneering effort to adopt the Motivation Opportunity Ability framework to explore IS developers' cross-disciplinary learning behaviour (i.e. behavioural intention to learn business skills). The finding of this study indicated that intrinsic motivation had a positive effect on learning intention. This finding is consistent with that of Lee *et al*. (2005) who also found that intrinsic motivator had a significant positive influence on students' intention to use an Internet-based learning medium. However, different from previous research which found extrinsic motivation positively influenced behavioural intention (e.g. Lee *et al*. 2005), the current research found that extrinsic motivation had an insignificant influence on behavioural intention, implying that IS developers' learning behaviour was mainly affected by intrinsic motivation. This is a new finding of this study. Future research could also validate this finding in different cultural areas.

Besides, based on the SCT, learning self-efficacy was used to represent the perception of IS developers' ability to learn business skills. This study explored the main effect of learning self-efficacy on behavioural intention and its moderating effect on the relationship between motivations and behavioural intention. This study found that learning self-efficacy had a significant positive effect on behavioural intention. This finding is consistent with previous research (e.g. Vijayasarathy 2004, Chiu *et al*. 2008) which also found that self-efficacy had a significant positive effect on behavioural intention. Additionally, the current research also found that learning self-efficacy had a moderating effect on the relationship between intrinsic motivation and behavioural intention. This represents a new finding of this study. Future research efforts could retest this finding in different learning environments and/or in different countries.

Finally, both career insight and job involvement were found to have significant and positive relationships with extrinsic motivation and intrinsic motivation. Further, intrinsic motivation had a significant effect on behavioural intention. These findings are partially consistent with the

notion of Maurer *et al*. (2003) who suggest that employees will perceive their job involvement and career insight before motivational variables and subsequent behavioural intention (e.g. intention to participate in development activities). The nomological structure of the proposed model of IS developers' learning behaviour can serve as a reference framework for future researchers in studying IT personnel's cross-disciplinary learning behaviour.

7. Implications for business practice

Since the IT industry has a short product life cycle and exhibits high uncertainty in the external environment, enterprises must continuously develop and make use of innovative IT to maintain their competitive advantage in uncertain market environments. However, for each firm, a steady stream of IT innovation depends on the performance of IS developers. Therefore, the competitiveness of IS personnel is a major prerequisite for gaining sustainable organisational competitive advantage. Previous studies have emphasised the importance of business skills for IS developers in the process of organisational innovative IT development. As such, this study investigates the determinants of IT developers' behavioural intention to learn business skills within an organisational ISD context. The findings of this study provide several critical implications for the practice of promoting IS developer learning of business skills.

The significant positive relationship between intrinsic motivation and learning intention suggests that IS developers' intention to learn business skills is mainly driven by intrinsic motivation, rather than extrinsic motivation. Thus, businesses should

- pay greater attention to providing suitable career paths to motivate workers by matching their needs with organisational needs (Petroni 2000);
- help IS developers understand the importance of learning business skills for their future work and internal self-growth, rather than focusing solely on extrinsic benefits such as money; and
- strengthen parochial-oriented cultures instead of professional-oriented cultures to enhance IS developers' intrinsic motivation to learn business skills.

Both job involvement and career insight were found to have significant positive relationships with both extrinsic and intrinsic motivation. As noted by London (1983) and Noe *et al*. (1990), organisational human resource management departments need to offer a thorough employee orientation where IS developers can participate in various training and development activities in order to learn new business skills, extend existing skills, or grow their careers (Bertolino *et al*. 2011). According to Noe *et al*. (1990) and Elloy *et al*. (1991), work redesign efforts, including temporary projects and committee assignments, can help to enhance employees' career insight and job involvement, as both career motivation and job involvement have been empirically linked to job characteristics. Specifically, in order to cultivate IS developers' job involvement and career insight, business should

- focus on enhancing IS developers' knowledge of the strengths and weaknesses of their current work situations;
- help IS developers form realistic career expectations;
- provide IS developers with career plans that meet their needs;
- help IS developers realise that their job is an important part of their life;
- pay greater attention to building a learning culture and providing organisational support for IS developers; and
- apply organisational resources to encourage IS developers' self-growth, enhance their career insight, and support their career planning and skill learning activities as well as their involvement at work (London 1986).

The results of this study also show that learning self-efficacy has a significant and positive effect on learning intention and a moderating effect on the relationship between intrinsic motivation and learning intention. Specifically, learning self-efficacy can enhance an IS developer's learning intention and enlarge the positive effect of intrinsic motivation on behavioural intention. Previous research has suggested that mastery experiences, verbal persuasion (e.g. strategy self-verbalisation), social comparison (e.g. goals and comparative information), performance feedback, and role modelling are important ways to enhance learning self-efficacy (Bandura 1977, Schunk 1985, Gist and Mitchell 1992, Marakas *et al*. 1998). Organisations can also make use of these strategies to enhance IS developer's learning self-confidence and beliefs, which will in turn increase their learning intention and also enhance their perception regarding the positive impact of intrinsic motivation on learning intention.

8. Conclusions and limitations

This study contributes to a more thorough understanding of the determinants of IS developers' behavioural intention to learn business skills. This research investigates the impact of job involvement, career insight, learning self-efficacy, extrinsic motivation, and intrinsic motivation on behavioural intention to learn business skills. The contributions of this study to the theoretical development of IS developers' learning behaviours are fourfold. First, this study successfully integrates SCT and motivation theory to explain IS developers' behavioural intention to learn business skills, which has rarely been explored in the

existing literature. As such, this study represents a pioneering effort in developing a framework for research into employee learning behaviours within the context of ISD. Second, the results show that intrinsic motivation is positively related to the intention to learn business skills, which also represents a new finding in the research area of ISD. However, extrinsic motivation is found to have no significant relationship with intention to learn business skills. This finding differs from the majority of previous research, which generally supports the relationship between extrinsic motivation and behavioural intention (e.g. Lee *et al.* 2005, Wu *et al.* 2007). Therefore, additional empirical studies are needed to address this issue in the future. Third, the empirical results of this study indicate that learning self-efficacy is not only positively related to behavioural intention to learn business skills, but also that learning self-efficacy strengthens the positive relationship between intrinsic motivation and behavioural intention to learn. This is an additional new finding, since the main and moderating effects of learning self-efficacy on behavioural intention to learn business skills have rarely been explored in previous research. Finally, both work environment factors (i.e. job involvement and career insight) are first tested and found to have significant and positive relationships with IS developers' extrinsic and intrinsic motivations to learn.

While this study was conducted with methodological rigour, there are several limitations that could be addressed in future studies. First, the findings and their implications are based on a convenience sample in Taiwan. Future research is needed to generalise the findings of this study and extend the discussion to other national or cultural groups. Second, this study does not incorporate all potential determinants of learning intention into the model. Future research could enhance the explanatory power of our proposed model by integrating potential behaviour theories (e.g. TPB) to the research model. Additional determinants of learning intention may include attitude, subjective norms, perceived need, organisational support, job characteristics, and work stress. Future research may also examine how these factors interact with different types of motivation and environmental variables in terms of affecting IS developers' behavioural intention to learn business skills. Finally, this study employs a snapshot research approach. Additional research efforts are needed to evaluate the validity of the proposed model and findings. Longitudinal evidence might enhance our current understanding of the relationships among job involvement, career insight, motivation, learning self-efficacy, and behavioural intention to learn business skills.

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Appendix. Measurement items used in this study

Business skills refer to interpersonal skills, communication skills, management and organisational skills, and professional knowledge.

Extrinsic motivation (Learning business skills can…)

EM1: increase my chances of promotion;
EM2: make sure I keep my job;
EM3: help me get a higher salary;
EM4: help me reduce conflicts with users;
EM5: enable me to obtain more accurate user requirements;
EM6: help me communicate better with users;
EM7: help me have a greater say in the team;
EM8: enhance user acceptance of systems;
EM9: help me reduce the probability of system re-development;
EM10: enhance my status in the users' minds;
EM11: help me have better teamwork;
EM12: help me be more creative in project system analysis;
EM13: improve the performance of my team.

Intrinsic motivation

IM1: Learning business skills can improve my personal development.
IM2: The process of learning business skills is interesting.
IM3: Learning business skills can make my skill set more comprehensive.
IM4: I feel that the process of learning business skills is challenging.
IM5: Learning business skills will enrich me.
IM6: Learning business skills can help to develop my potential.
IM7: Learning business skills can help with personal growth.

Learning self-efficacy

LSE1: Learning business skills is easy for me.
LSE2: Learning business skills is easy for me to absorb.
LSE3: Learning business skills is not difficult for me.
LSE4: I do not think I lack the ability to learn business skills.
LSE5: I do not think I lack the foundation for business skill learning.
LSE6: I am not afraid to learn business skills.
LSE7: I have enough intelligence to learn business skills.

Behavioural intention to learn business skills

BITL1: I intend to learn relevant business skills.
BITL2: I think that I will learn relevant business skills.
BITL3: I plan to learn business skills in the future.

Job involvement

JI1: Most of my satisfaction in my life comes from my work.
JI2: Work-related matters are most important to me.
JI3: Nothing else is more important than my job.
JI4: I think about my work all the time.
JI5: I am deeply involved in my work.

Career insight

CI1: I am aware of the strengths and weaknesses of my occupational skills.
CI2: I intimately know my career goals.
CI3: I am well aware of my career development plan.
CI4: I am aware of my current situation in the workplace.
CI5: Overall, I am aware of my current career orientation.