MIS Quarterly

BUSINESS COMPETENCE OF INFORMATION TECHNOLOGY PROFESSIONALS: CONCEPTUAL DEVELOPMENT AND INFLUENCE ON IT–BUSINESS PARTNERSHIPS[1]

By: **Geneviève Bassellier**
Faculty of Management
McGill University
Montreal, Quebec H3A 1G5
CANADA
genevieve.bassellier@mcgill.ca

Izak Benbasat
Sauder School of Business
University of British Columbia
Vancouver, British Columbia V6T 1Z2
CANADA
benbasat@sauder.ubc.ca

Abstract

This research aims at improving our understanding of the concept of business competence of information technology professionals and at exploring the contribution of this competence to the development of partnerships between IT professionals and their business clients. Business competence focuses on the areas of knowledge that are not specifically IT-related. At a broad level, it comprises the organization-specific knowledge and the interpersonal and management knowledge possessed by IT professionals. Each of these categories is in turn inclusive of more specific areas of knowledge. Organizational overview, organizational unit, organizational responsibility, and IT–business integration form the organization-specific knowledge, while interpersonal communication, leadership, and knowledge networking form the interpersonal and management knowledge. Such competence is hypothesized to be instrumental in increasing the intentions of IT professionals to develop and strengthen the relationship with their clients.

The first step in the study was to develop a scale to measure business competence of IT professionals. The scale was validated, and then used to test the model that relates competence to intentions to form IT-business partnerships. The results support the suggested structure for business competence and indicate that business competence significantly influences the intentions of IT professionals to develop partnerships with their business clients.

Keywords: Business competence, business knowledge, IT professionals, measurement

Introduction ▮▮▮▮▮▮▮▮▮

IT professionals must adapt to a context where collaboration is the currency of innovation and diversity its enabler (Keen 1999b)

An effective relationship between information technology professionals and their business clients is a primary determinant of success in gaining business advantage through IT (Keen 1999a; Reich and Benbasat 2000). As business innovation relies even more strongly on partnerships between IT and business people, a different perspective of how IT professionals view their organizational contributions is needed for organizations to remain competitive. IT professionals should take on roles that are more entrepreneurial in nature and focus on innovation through IT (Roepke et al. 2000). They should exhibit an ability to develop collaborative partnerships with their business clients in addition to their technical expertise (Preiser-Houy 1999). Thus, the profile of the IT professional is changing from one in which technical skills are paramount to one in which the ability to form business relationships is as important.

The relationship-building ability of IT professionals has become a core capability of organizations (Feeny and Willcocks 1998). Communication and mutual understanding between the parties are important enablers of creating effective relationships. Nelson and Cooprider (1996, p. 411) found that shared knowledge—"the understanding and appreciation among IS and line managers for the technologies and processes that affect their mutual performance"—is related to better performance of the information systems group within their partnerships with line managers. In that sense, the business knowledge of IT professionals plays a key role in the development of closer relationships with business clients by giving IT professionals the language needed to communicate with and understand their clients, therefore enabling participation by IT professionals in important organizational decision-making processes (Bashein and Markus 1997; Feeny and Willcocks 1998; Henderson 1990; Rockart et al. 1996). Broader business knowledge is essential if IT people are to create

linkages with other organizational units and have a wider perspective about business objectives, thus achieving fit between IT and organizational strategies. Organizations have started responding to this challenge by demanding more business acumen in their IT staff. This is evidenced by the steady increase in recent years in the proportion of CIO hires who bring to the firm a general business background rather than solely technical training (York 1999).

The importance of knowledge as a resource and capability for organizations has been increasingly recognized. In the resource-based view of the firm, knowledge is the most strategically significant resource (Conner and Prahalad 1996; Quinn 1992). Knowledge is also an organizational capability that is a source of sustainable competitive advantage (Kogut and Zander 1992; Prahalad and Hamel 1990). In the new knowledge economy, human capital of a firm—its workforce—represents its most important strategic asset. In particular, a firm's IT human capital constitutes a critical capability for IT–business partnerships (Ross et al. 1996). In order to develop such partnerships, IT professionals are required to understand and participate in their business partners' key strategic planning processes (Reich and Benbasat 2000). The need to communicate with people from different functional areas requires IT specialists to develop some commonality of vocabulary and conceptual knowledge, and of working experience with business people. This in turn requires a change in the way IT professionals are educated and trained.

This study looks at the broader expertise in IT professionals that is instrumental in the *development of IT and business partnerships*. Within this particular context, it addresses two research questions:

(1) What are the areas of knowledge that represent business competence of IT professionals?

(2) What is the contribution of business competence in IT professionals to improving their relationships with their business clients?

More specifically, this study articulates the concept of *business competence in IT professionals*, outlines its dimensions, and develops a model of the effect of business competence on partnerships with business people. It then builds and tests an instrument to measure business competence in IT professionals, and investigates the relationship between their business competence and their intentions to develop partnerships with their business clients.

The next section introduces and defines the concept of business competence in IT professionals. The concept of the IT–business partnerships that could be influenced by business competence is then described. The following section first describes the instrument development process for business competence and reports the measurement properties of the instrument, then reports on the test of a model that shows the relationship between business competence and IT–business partnerships. In the following section, the results are discussed, the limitation of this study described, and guidelines for future research provided. The final section offers concluding remarks.

Business Competence in IT Professionals ▪▪▪▪▪▪▪

Definition

> *The perception exists that a successful IS professional blends technical knowledge with a sound understanding of the business while commanding effective interpersonal skills* (Todd et al. 1995, pp. 1-2).

The importance of IT professionals possessing more than technical skills has been recognized since the early days of IS as an academic field. For instance, the ACM Curriculum Committee on Computer Education for Management (Ashenhurst 1972) identified six categories of knowledge and abilities required by IS specialists to work effectively: people, organization, society, systems, computers, and models. The first three categories fall under the generalist profile, focusing more on the system *analysis* activity. The last three are associated with the specialist profile, with their skills closely related to the system *design* activity. When empirically tested, this curriculum was considered too technically focused (Henry et al. 1974), and the need for generalist skills was perceived as more important, regardless of the organization IT maturity levels (Benbasat et al. 1980). An important conclusion of the studies that assessed the ACM curriculum proposal is that more emphasis should be placed on acquiring people, organizational, and society skills rather than specialist skills. It was, therefore, recommended that academic programs should combine the knowledge of IS with that of organizational behavior and development, which is concerned with the introduction of change in organizations.

More recent versions of IS curriculum recommendations also reinforce the importance of non-technical skills for IT professionals to be successful (Davis et al. 1997; Gorgone et al. 2002). In its latest version, the curriculum recognizes that IS professionals must have broad business and real world perspectives, strong analytical and critical thinking skills, and interpersonal communication and team skills, and should be able to design and implement information technology solutions that enhance organizational performance (Gorgone et al. 2002).

In addition to curriculum recommendations, other studies have also investigated the need for IT professionals to develop a range of knowledge and skills beyond the technical in different contexts. For example, some investigated IT knowledge and skills needed by IT people (programmers, analysts, and managers) in order to successfully perform their jobs (Lee et al. 1995; Nelson 1991; Zmud 1983) and in terms of what is demanded by the job market (Todd et al. 1995). In their study of the critical skills and knowledge for the IS profession, Lee et al. (1995) also identified that, among technical, business, and behavioral skills, it is the business and behavioral which were considered the most important for the future of the IS profession.

Although the importance of business knowledge and behavioral knowledge, in addition to technical knowledge, emerges from these studies, what exactly these knowledge requirements should be is not clear, as different frameworks, categorization, coverage, and labeling are used in the different studies investigating or proposing the knowledge requirements for IT professionals. Our goal here is to develop a comprehensive framework to addresses this issue.

The focus of this study is on the knowledge that is beyond that of the IT professional's own domain of expertise. Therefore, technical areas of knowledge, such as hardware and software, all of which are closely associated with IT skills, are not discussed in this paper. This is not to say that such knowledge is not important. Clearly technical knowledge is part of the IT professional's overall expertise, but this study is about the business competence of the IT professionals, and is therefore interested in what enables IT professionals to apply their technical knowledge in ways that are beneficial to the organization and to act cooperatively with their business partners.

In this study, business competence in IT professionals is defined as the set of business and interpersonal knowledge and skills possessed by IT professionals that enable them to understand the business domain, speak the language of business, and interact with their business partners. This competence reflects an understanding of the business in all its dimensions; it describes the business acumen of IT professionals which will influence their approach in delivering IT solutions.

A Brief Note on Types of Knowledge and Skills

As a key indicator of competence, knowledge can be explicit or tacit in nature (Polanyi 1967). Our conceptualization of competence includes both. Explicit knowledge is the formal knowledge that can be clearly transmitted using systematic language. It is the knowledge we are aware of possessing, the "actual" or declarative knowledge

(Anderson 1983). This type of knowledge is often seen as domain-specific; it is a set of usable information organized around a specific content area (Klemp 1979).

The literature recognizes that domain-specific knowledge is not sufficient to reflect competence (Tan and Libby 1997). Knowledge is also developed by the understanding of how something operates, and not solely that it exists (Ryle 1949). We learn not only through language, but also through practice and experience. When an individual modifies his actions based on the results of previous actions, competence is built through the enrichment of tacit knowledge (Ryle 1949). Tacit knowledge is the experience-based knowledge as well as the underlying abilities and potential that supports the acquisition and use of that knowledge (Sternberg et al. 2000). Tacit knowledge focuses on behaviors and can be linked to other concepts such as know-how and skills (Nass 1994; Nonaka 1994). Skill is the ability to demonstrate a set of related behaviors and processes (Klemp 1979), and reflects information-processing abilities (Nass 1994).

Therefore, explicit and tacit knowledge cover the range of concepts that are commonly found in studies looking at the competencies of IT professionals, including knowledge, skills, and abilities (Lee et al. 1995; Sawyer et al. 1998). These three factors are intimately related in the context of competence. The Management Charter Initiative (MCI) proposed a model of competence for managers that "consists of a number of elements of competences, which are intended to reflect the skills, knowledge and abilities which experienced competent managers should possess" (Henderson 1993, p. 15). In the context of IT, Lee et al. (1995) mentioned the difficulty of distinguishing at the empirical level between different concepts such as knowledge and skills:

> We found no simple way of mapping these constructs to the relationships among a list of empirically generated knowledge/skills requirements that are couched in the context of specific IS jobs or functions, i.e., many IS tasks require a

combination of knowledge and skills, and the perceptual relationships among the knowledge/skill items do not correspond neatly to these theoretical constructs (p. 321).

Since knowledge is closely related to skills and abilities, in this paper we develop a framework that is inclusive of these different aspects of competence.

Scope of the Competence Construct

The IT literature develops different conceptualizations of competence, varying in scope from narrowly focused on current tasks requirements to broader requirements of the profession (see Schambach 1994). Here, we develop a framework that reflects the general population of IT professionals (i.e., not tied to a particular category or organization). As IT professionals are often assigned to projects involving different functional areas of the organization, it is important to develop a broad professional competence framework, not one designed for a specific set of tasks. In that sense, competence is considered here as non-routine, and embodies the ability to cope with complex and changing environments. It is not necessarily directly linked to a specific task but relates to the ability to transfer knowledge across tasks (Brown 1994). In addition, Roepke et al. (2000) call for a collaborative effort in general from all IT professionals, regardless of their position in the organizational hierarchy. IT professionals at all levels need to interact and work with their functional area peers in finding ways of linking business and IT objectives.

Developing a Framework for Business Competence

Our focus is on identifying the set of knowledge and skills that forms the business competence which, in turn, enables IT professionals to *develop better collaboration with their business partners*.

There is agreement in the literature that higher business acumen is needed for IT professionals to develop more effective partnerships with their business clients. However, what comprises this business competence and the structure of this construct is not clearly identified. As mentioned earlier, two broad categories of knowledge emerge from the literature: (1) knowledge related to the organization or the business and (2) interpersonal and management knowledge and skills.

These two broad categories of knowledge forming the overall business competence are themselves inclusive of other categories of knowledge. Our proposed taxonomy is based on an integration and reorganization of the recommendations of different studies that have investigated knowledge of IT professionals and is represented on the left side in Table 1. As mentioned above, different studies have offered different frameworks, categories, coverage, and labeling as shown on the right side in Table 1. However, the literature does not include any study that investigates the entire set of components of business and interpersonal and management knowledge as shown in Table 1. Thus, based on the elements of business, of interpersonal and management knowledge, and of skills identified in earlier studies, we develop a more comprehensive taxonomy of business competence in IT professionals that adopts and reorganizes the different components previously identified. This taxonomy could be considered as a superset of the earlier work in the area, but also one that also brings a new organization and structure to the competence items previously proposed. We made an effort to include all of the competencies suggested in prior literature that are relevant to the creation of IT–business partnerships, and to some extent constrain our taxonomy to the competence categories mentioned in the literature. Our proposed taxonomy includes seven specific areas of knowledge grouped in two broad categories: *organization-specific* knowledge and *interpersonal and management* knowledge. These two categories make logical sense in that to collaborate successfully with another party, one has to have some understanding of what the other party does plus have the ability to effectively work and communicate with the other party. Empirical

Table 1. Proposed Taxonomy of Business Competence and Review of Studies on Knowledge of IT Professionals

Our Proposed Taxonomy of Business Competence for it Professionals		Gorgone et al. (2002)	Todd et al. (1995)	Lee et al. (1995); Sawyer et al. (1998)	Nelson (1991)	Avital and Vandenbosch (2000)	Joseph et al. (1996)
Organization-specific	*Organizational overview*		Business	Business functional	Organizational overview	Business orientation	—
	Organizational units	Functional business area			Organizational unit		
	Organizational responsibility	—				Business responsibility	
	IT–business integration	Organizational problem solving	Problem solving	—	—	—	
Interpersonal and management	*Interpersonal communication*	Communications	Social	Interpersonal and Management	Organizational skills		Managing others
	Leadership	Team work and leadership	Management			—	
	Knowledge Networking	—	—		—		Managing tasks

support for including these categories is also found in the empirical study of Nevo et al. (2003), which was influenced by the work of Sussman and Siegal (2003). Both studies were conducted in a knowledge management context. Using conjoint analysis, Nevo et al. identified the attributes of the source (of knowledge) that affect information usefulness. Among the attributes of the source, they include extent of knowledge, experience, communication skills, and awareness of other resources indicating that both the knowledge and communication skill of an individual should be taken into account when measuring competence. These areas were taken into account in this study: the organization-specific knowledge mainly covers the knowledge and experience attributes, and the interpersonal and management knowledge category represents the communication skills and awareness of other resources as specified by Nevo et al. The components of the taxonomy are discussed next.

Organization-Specific Knowledge

This category refers to the understanding by IT professionals of the specific organizational context in which information technologies are deployed and of the connections between IT and the business. This knowledge enables IT professionals to see the "big picture" of IT in their current organization, to make linkages between different organizational units, and ensures focus on a larger perspective needed to benefit from the potential fit between the IT and the organizational context. It represents a holistic view of the organization and its current activities. This knowledge represents the capability for business understanding of IT professionals (Feeny and Willcocks 1998). From the previous literature, we identified four areas of knowledge that cover the business knowledge domain:

- Organizational overview
- Organizational units
- Organizational responsibility
- IT–business integration

Organizational Overview. In a business environment where IT is used to gain business value, IT professionals must have an understanding of what their organization is about, that is, the business context in which technologies are developed, deployed, and used. At the broad overview level, knowledge of the organization implies knowing the organization's goals and objectives, its core capabilities, and its critical success factors. Knowledge about the organization also includes knowledge about its environment and the constraints imposed on it by its suppliers, buyers, the government, and competitors.

Some of the previous studies discussed the importance of an *overall knowledge of the organization* (e.g., Avital and Vandenbosch 2000). According to Nelson (1991), organizational overview focuses on the organization at a broad level, and includes knowledge of objectives, purpose, opportunities, constraints, and internal and external functioning. Lee et al. (1995) used a single dimension to describe the knowledge of the organization that includes general business knowledge and is related to the *specific* organization where the IT professional works. An exception to the organizational specificity of business knowledge is found in Todd et al. (1995). In their investigation of the knowledge and skills required by employers (as specified in job advertisements), Todd et al. identified a business knowledge category that includes functional expertise and industry expertise. This was not defined as organization-specific, explained by the fact that their categories were derived from job ads that do not usually ask for knowledge specific to an organization prior to recruiting.

Organizational Units. IT professionals need to understand what the functional areas of their organization are, including their objectives and problems and the language they speak (Lee et al. 1995; Todd et al. 1995; York 1999). This internal view of the organization is concerned with an understanding of the business processes supported by IT (Avital and Vandenbosh 2000), as well as an understanding of the connections and interdependencies among different organizational units. Nelson (1991) referred to *organizational unit*

knowledge, which covers the internal unit functioning of the organization, including objectives, purpose, functions, resources, problems, and links with other internal and external units.

Organizational Responsibility. Avital and Vandenbosch (2000) identified *business ownership* by IT professionals as an important component of an organization's IT-driven value efforts. Business ownership includes the overall business responsibility of IT professionals, created when IT professionals feel responsible for business processes and outcomes beyond their specific responsibilities for the direct performance of IS. Business responsibility is linked to the specific organization, as it not only refers to a more active role taken by IT professionals, but also to a sense of commitment, empowerment, personal involvement, and organizational pride.

IT professionals can develop a stronger understanding of the organization by feeling responsible for organizational performance that is beyond the direct impact of their specific area of work (Avital and Vandenbosch 2000). This means that they need to think about and understand the development of the business as a functional area member would, and participate in making functional areas successful in the same way. There is an active component associated with this responsibility that refers the ability of IT professionals to learn about their business. This active role is taken by IT professionals in learning about their organization adds to the more static knowledge of the organization identified in other studies, and increases their general business knowledge specific to their organization (Lee et al. 1995).

Knowledge of IT–Business Integration. This area of knowledge addresses the need for IT professionals to act as business problem solvers (Bashein and Markus 1997) and to integrate business development with IT capability. It refers to their ability to visualize the ways in which IT can contribute to organizational performance and to look for synergies between IT and business activities (Brown and Sambamurthy 1999). It is the analytical thinking skills that enable an IT professional to understand clients' issues and

needs, to see problems within a big-picture framework, and to conceptualize how parts and functions fit together (Sawyer et al. 1998). This understanding of the tight coupling between IT and business is implemented in the different phases of projects, from the initial analysis to the assessment of success.

This knowledge of how IT and business could be integrated is similar to the definition of *business systems thinkers* provided by Feeny and Willcocks (1998). Such individuals understand the connections and interdependencies between activities, and can communicate how existing processes work; they use that base to catalyze understanding of processes that technology can enable in the future.

Interpersonal and Management Knowledge

The partnering capability of IT professionals is also enabled by their interpersonal and management knowledge and skills. IT professionals have to participate in social interactions and deal with group dynamics more than ever before (Sawyer et al. 1998). They are increasingly asked to be team players and effective, jargon-free communicators (Bashein and Markus 1997; Markus and Benjamin 1997). Therefore, their business competence also includes their ability to interact with and manage others. Interpersonal and management knowledge and skills include:

*   knowledge networking
*   interpersonal communication skills
*   leadership skills

Knowledge Networking. An individual's competence includes knowing where knowledge resides within and outside the organization. IT professionals who develop a personal social network have a greater level of business competence than their uninformed counterparts because of their increased ability to access information and knowledge when needed (Sawyer et al. 1998). Their ability to develop such a network, or their networking skills, allows them to expand their own knowledge by leveraging the knowledge of others.

The "managing task" category developed by Joseph et al. (1996) includes the need for IT professionals to maintain a directory of "who knows what" (in their environment). Although knowing what others know enhances a group's overall capacity, this competence resides in individuals, not in groups (Grant 1996; Kogut and Zander 1992).

Interpersonal Communication. In cross-functional environments, the team orientation of IT professionals and their ability to develop and maintain relationships with others is crucial. IT professionals are expected to be able to put away their specialized vocabulary to communicate effectively with their partners (Reich and Benbasat 2000). Joseph et al. propose a category called "managing others" that refers to strategies for interacting and working with other people in the workplace (i.e., the interpersonal skills of IT professionals). Lee et al. include skills such as ability to communicate, manage projects, and work cooperatively in this category. Nelson's (1991) category of organizational skills contains interpersonal behavior and group dynamics skills. Using the framework developed by Lee et al. to examine the current and future IT skills needs in one organization, Sawyer et al. (1998) also include in the interpersonal skills category the ability to develop a personal social network.

Leadership. A key element of the knowledge of IT professionals is their ability to manage projects (Nelson 1991; Schambach 1994; York 1999). Project management is an umbrella term that includes direct activities such as managing the scope, time, and cost of projects, as well as general management and interpersonal activities, such as leading, communicating, negotiating, and managing risk and change (Sawyer et al. 1998). Todd et al.'s *management* category is made up of general management skills, including leadership, project management, planning, controlling, training, and organization. These skills help IT professionals serve as effective managers and enable them to interact and work with their business peers in order to find ways of combining business processes with IT. Joseph et al. focus on the non-technical skills of IT professionals, mainly

managerial competencies defined as intrapersonal and interpersonal strategies for managing tasks, self, career, and others within the IS work context.

Therefore our model suggests that the business competence of IT professionals comprises knowledge of and skill in two broad categories: organization-specific and interpersonal and management. In turn, each of these categories is formed by more specific areas of knowledge. Organizational overview, organizational unit, organizational responsibility, and IT–business integration are said to form the organization-specific knowledge, while interpersonal communication skills, leadership skills, and knowledge networking form the interpersonal and management knowledge, suggesting a third-order model for business competence.

Influence on IT–Business Partnerships

Feeny and Willcocks (1998) noted that for organizations to effectively develop core IT capabilities, such as forming IT–business partnerships, IT professionals must possess strong business and interpersonal knowledge and skills, in addition to their technical skills. However, no empirical study has as yet investigated the relationship between these areas of knowledge and the development of IT–business partnerships. This study aims at assessing the impact of business competence in IT professionals on their partnerships with their business clients. As a core IT capability, relationship building between IT and business groups within an organization enables the business to constructively engage in IT issues. Building relationships with another department in an organization depends on the ability of IT professionals to convince their business partners that they understand their goals, concerns, language, and processes and are trying to help them achieve those goals. It is a measure of their capacity for business understanding (Feeny and Willcocks 1998).

In this study, the contribution of the IT professionals to their partnerships with their business

clients is examined through their intentions to engage and maintain such partnerships. The business competence of IT professionals will influence such beliefs, i.e., increase their awareness of the potential contributions of IT to business objectives hence providing the reason for partnering with business partners to put IT into effective use. Compeau et al. (1999), in a study based on social cognitive theory, posit and empirically show that self-efficacy (i.e., higher business competence in our study) influences one's favorable outcome expectations and actual technology utilization. The theory of planned behavior, among other things, posits that perceived behavioral control, of which self-efficacy is an antecedent, will positively impact an individual's attitudes, as well directly influencing his/her intention to engage in a behavior (Taylor and Todd 1995). Hence, with higher levels of business competence, IT professionals would be more likely to intend to engage in partnerships with their business clients.

Although partnerships can be mandatory, with an organizational structure that supports such partnerships, the actual willingness of the partners to engage in such relationships will increase its effectiveness. The knowledge and understanding IT professionals have of the business may be a key determinant in the tact they will take in dealing with their business clients. Indeed, when lacking competence in their business clients' domain, the quality of services offered by IS professionals is likely to be lower (Nelson and Cooprider 1996). This business competence provides them with the vocabulary and understanding needed to interact with business people. In that sense, the overall business competence of IT professionals is expected to influence their collaboration with business clients (Lee et al. 1995; Preiser-Houy 1999).

Method

The first step in this study was to develop the business competence construct and generate its measures (i.e., developing sub-constructs and

items). Next, using the structural equation modeling method, the effect of having business competence on the partnership of IT professionals with business people was investigated. By considering the tangible expected outcomes of business competence, we expect to be able to assess the nomological and predictive validities of the business competence construct (Carmines and Zeller 1979).

Item and Scale Development

The first phase of this research consisted of the development of a measuring instrument to assess the level of business competence in IT professionals. In developing this measure, the focus was to capture the assessment by IT professionals of their own knowledge. We believe that this is a reasonable approach since others' assessments of one's competence is fraught with difficulties, the main among them being the difficulty of someone to figure out how much a person truly knows (more than the person can assess on their own). The starting point for item development was the previous empirical and theoretical literature (summarized in Table 1). The taxonomy shown in Table 1 builds on this literature. To generate a sample of items, first as many items as possible were identified from existing scales that fit the construct definitions of the current study. Additional items were added to improve the quality of the scales. Then the instrument was submitted to a panel of IS and business managers, as well as IS academics, to obtain their views on which items are appropriate to include.

A card sorting exercise (Moore and Benbasat 1991) was next used in the scale development process. Two rounds of this exercise were executed, with a different goal for each one. In the first round, five master's and doctoral students who were unfamiliar with the study were asked to sort the items into separate categories, based on the similarities and differences among the items, and then to label the underlying constructs represented by each category. In the second round, three of

Table 2. Items for the *Organization-Specific* Knowledge (Items Dropped Are Shown in Italics)		
Dimension	**Variable Name**	**Question**
Organizational overview	OVR1	Rate your level of knowledge of the organization's external environment (e.g., government, competitors, suppliers, and customers)
	OVR2	Rate your level of knowledge of the goals and objectives of the organization as a whole
	OVR3	Rate your level of knowledge of the core capabilities of the organization
	OVR4	Rate your level of knowledge of the key factors that must go right for the organization to succeed
Organizational units	UNT1	Rate your level of knowledge of the main challenges that different divisions in the organization face in achieving their objectives
	UNT2	Rate your level of knowledge of the language (e.g., key concepts, jargon, etc.) of the different divisions in the organization.
	UNT3	How well do you understand the work processes of the different divisions in your organization?
	UNT4	Rate your level of knowledge of the connections and interdependencies between the various divisions in the organization
Organizational responsibility	RES1	To what extent do you take actions to stay informed about business developments not directly related to IT?
	RES2	How much do you participate in business activities that are *not* directly related to IT?
	RES3	To what extent are you concerned by the overall performance of your business organization?
	RES4	*To what extent does your work have an impact on the performance of the organization?*
IT–business integration	ITG1	How experienced are you at recognizing potential ways to exploit new business opportunities using IT?
	ITG2	How experienced are you at analyzing business problems in order to identify IT-based solutions (understand situations, getting the "big picture", identifying underlying root problems, etc.)?
	ITG3	How experienced are you at evaluating the organizational impacts of IT solutions?
	ITG4	*Rate your level of knowledge of the alignment between business goals and information systems goals in the organization as a whole*
	ITG5	*Rate your level of knowledge of the way IT contributes to the value of the organization*

	Variable	
Dimension	**Name**	**Question**
Knowledge Networking	NET1	If you have a business question or problem that you cannot solve alone, how confident are you about finding the right person to contact in your organization?
	NET2	If you have a business question or problem that you cannot solve alone, how confident are you about finding the right contacts outside your organization (consultants, vendors)?
	NET3	If you have a business question or problem that you cannot solve alone, how confident are you about finding other relevant sources of business information including Internet site, magazines, trade journals, and conferences?
Interpersonal communication	COM1	In general, how effective do you think you are at communicating with people at different levels of the organization (e.g., with your subordinates, peers, superiors)?
	COM2	How effective are you at working in a team environment?
	COM3	How well can you communicate about IT matters in non-technical language and within a business context to non-IT specialists?
Leadership	LEA1	In general, how effective do you think you are at managing projects (planning, managing resources, evaluating, etc.)?
	LEA2	In general, how effective do you think you are at acting in a leadership role (e.g., establishing direction, directing people, motivating and inspiring, etc.)
	LEA3	Rate your level of knowledge of the existing practices for the management of change in the organization
	LEA4	Rate your level of knowledge of the risk management practices that can be applied in the organization

Table 3. Items for *Interpersonal and Management* Knowledge

the initial five students were asked to classify items in predetermined categories. This exercise helped establish the discriminant validity of the items. It also facilitated refinement of the wording of ambiguous items and elimination of redundant or confusing ones. This version of the business competence measure contained 27 items: 17 for the different dimensions of organization-specific knowledge and 10 for the dimensions of interpersonal and management knowledge. Tables 2 and 3 contain the items grouped within the specific dimensions. A five-point Likert-type scale was used for all of the items.

The same procedure was followed for the partnerships scale. Because this study was cross-sectional in design and therefore could not measure future behavior at the time the study was conducted, we measured intentions for forming partnerships. This approach is supported by the theory of reasoned action (Fishbein and Ajzen 1975), according to which *intentions* (of the individual) are the most important determinant of behavior. The scale for the intentions to develop partnerships contained three items (Table 4). A five-point Likert-type scale was used with all the items.

Table 4. Items for Intentions to Develop Partnership	
Variable Name	**Question**
INT1	To what extent are you willing to commit to the sharing of responsibilities with your business clients for the development and implementation of future projects?
INT2	How comfortable would you be to getting involved with your business clients in projects that may require more innovative technologies, with the risk it may imply?
INT3	In the future, to what extent do you intend to develop strong partnerships with business clients?

Sample Demographics

The study was conducted with the cooperation of two organizations, both insurance companies in North America. Organization A sells car and home insurance ($3.22 billion CAD in revenues and 5,144 employees); organization B insures workers against loss of employment income ($1.6 billion CAD in revenues and 2,500 employees). Target respondents were IT professionals at all hierarchical levels. The questionnaires were distributed by each organization. The respondents mailed the surveys directly back to the researchers.

A total of 166 questionnaires out of the 326 distributed were returned, giving response rate of 51 percent (organization A: 29/46 = 63%; organization B: 137/280 = 49%). The questionnaire consisted of two sections: the first section contained the different items assessing business competence and was followed by the items assessing their relationship with their business clients. To answer the second section, respondents were asked to refer to their business client with whom they have worked most frequently in the past six months. A total of 50 respondents reported not having done work with any business clients in the last six months hence did not answer the questions in the second section. After removing these questionnaires as well as those with a high number of missing values, the final dataset used for the analysis of the business competence measurement is of 109.

In the final sample, 63 percent of the respondents were male; 79 percent were in the 35 to 50 age group. Average tenure in the current organization was about nine years. Means of different variables were compared for IT professionals with and without partnerships, as well as for respondents from both organizations. No significant differences were found. Although only two organizations participated, and not wanting to downplay the effects of organizational variables, it appears that the full range of levels of competence can occur within a given organizational context. Therefore, conducting a study within one or two given contexts should still provide valuable insights about business competence and its contribution to the development of partnerships.

Results

The model of business competence and its influence on IT–business partnerships is analyzed using partial least squares (PLS), a component-based approach that is suitable with smaller datasets. PLS allows the testing of the measurement model (psychometric properties of the scales used to measure a variable) and the estimation of the structural model (the strength and direction of the relationships between the variables). The model to be tested is a third-order factor model with reflective measures for the first-order factors and formative measures for the

second- and third-order factors. The distinction between formative and reflective items is not always clear-cut. For the first-order level, we have modeled the items as reflective of their specific area of knowledge since they are highly correlated among themselves (the correlation table is available upon request), supporting the fact that they are a representation of the underlying construct (Gefen et al. 2000). On the other hand, the higher order factors are modeled as formative, meaning that they are formed by or are the sum of the areas of knowledge at the lower level. PLS supports the testing of higher-order models, using the hierarchical component model (Lohmöller 1989; Wold 1982). PLS-Graph version 3.00 was used to perform the analysis.

Assessment of Measurement Properties

The assessment of item loadings, reliability, and discriminant validity is performed for the reflective constructs through a confirmatory factor analysis (CFA) using the procedure described in Agarwal and Karahanna (2000). Reflective items should be unidimensional in their representation of the latent variable, and therefore correlated with each other. Items loadings should be above .707, showing that more than half of the variance is captured by the constructs. The results for the initial set of 30 items showed that two items have loadings below the recommended value of .707 (RES4 with a loading of .509 and ITG5 with a loading of .652). These items are discarded from the analysis. Results for the remaining 28 items are presented in Table 5. All items have significant loadings above .707.

Discriminant validity is assessed by determining if (1) the indicators load more strongly on their own constructs than on other constructs in the model and (2) the constructs share more variance with their own measures than they share with the other constructs in the model. Results from the CFA in Table 5 show that all indicators have higher loadings on their own construct than on any other

construct. The percent of variance captured by a construct is given by its average variance extracted (AVE). To show discriminant validity, each construct square root of the AVE has to be larger than its correlation with other factors (Gefen et al. 2000). All constructs meet this requirement (Table 6). Finally, the values for reliability (Table 6) are all above the suggested minimum of .70 (Hair et al. 1998). Thus, all constructs display adequate reliability and discriminant validity.

Results for the measurement model support the validity and reliability of the 25-item instrument for business competence and the 3-item scale for intentions. Therefore, this conceptualization of business competence can be used to test the contribution of business competence to the development of partnerships in the organization.

Test of the Structural Model

A bootstrapping procedure was used to generate t-statistics and standard errors (Chin 1998). With the hypotheses being unidirectional, statistical tests were assessed at the 1 percent level of significance using a one-tailed t-test. A test of the structural model is used to assess (1) the structure of business competence and (2) the influence of business competence on the intentions of IT professionals to develop partnerships with their business clients. The structure of business competence hypothesized is a third-order factor (business competence) formed by two factors (organization-specific knowledge and interpersonal and management skills). Organization-specific knowledge is itself formed by four factors (organizational overview, organizational unit, organizational responsibility, and IT–business integration), while interpersonal and management skills is formed by three factors (knowledge networking, interpersonal communication skills, and leadership skills). As mentioned earlier, the higher-order factors in the model are estimated using the hierarchical component model (Löhmoller 1989; Wold 1982). 1996). The higher-order factors are created using the indicators of its lower-order factors. This approach, which repeats the indicators, allows the

Table 5. Factor Analysis

	Intentions for Partnerships	Organizational Overview	Organizational Unit	Organizational Responsibility	IT–Business Integration	Knowledge Networking	Interpersonal Communication	Leadership
INT1	0.75	0.24	0.17	0.33	0.28	0.13	0.26	0.25
INT2	0.72	0.25	0.26	0.34	0.44	0.29	0.32	0.38
INT3	0.59	0.46	0.39	0.53	0.51	0.25	0.35	0.40
OVR1	0.35	0.88	0.73	0.55	0.54	0.36	0.37	0.53
OVR2	0.39	0.86	0.64	0.49	0.52	0.41	0.42	0.49
OVR3	0.30	0.85	0.70	0.43	0.42	0.42	0.43	0.44
OVR4	0.32	0.79	0.61	0.54	0.60	0.31	0.39	0.49
UNT1	0.31	0.75	0.86	0.62	0.54	0.28	0.39	0.57
UNT2	0.31	0.65	0.82	0.62	0.59	0.29	0.32	0.47
UNT3	0.31	0.60	0.81	0.53	0.38	0.35	0.28	0.42
UNT4	0.22	0.67	0.88	0.46	0.42	0.43	0.28	0.53
RES1	0.40	0.56	0.65	0.88	0.54	0.30	0.34	0.49
RES2	0.33	0.37	0.49	0.75	0.33	0.09	0.17	0.29
RES3	0.48	0.48	0.46	0.76	0.54	0.33	0.30	0.43
ITG1	0.45	0.36	0.36	0.45	0.79	0.26	0.28	0.51
ITG2	0.48	0.42	0.37	0.37	0.79	0.30	0.38	0.50
ITG3	0.40	0.49	0.44	0.50	0.84	0.22	0.47	0.51
ITG4	0.33	0.67	0.65	0.54	0.76	0.30	0.37	0.54
NET1	0.29	0.51	0.47	0.30	0.27	0.77	0.45	0.39
NET2	0.19	0.27	0.25	0.28	0.28	0.86	0.38	0.47
NET3	0.23	0.35	0.30	0.19	0.31	0.85	0.35	0.41
COM1	0.23	0.42	0.38	0.25	0.33	0.42	0.83	0.60
COM2	0.39	0.34	0.22	0.23	0.31	0.29	0.85	0.37
COM3	0.30	0.38	0.29	0.34	0.49	0.40	0.83	0.37
LEA1	0.32	0.31	0.32	0.25	0.49	0.38	0.47	0.85
LEA2	0.37	0.39	0.37	0.40	0.55	0.50	0.55	0.80
LEA3	0.32	0.61	0.58	0.46	0.45	0.42	0.37	0.79
LEA4	0.31	0.55	0.63	0.50	0.54	0.29	0.40	0.77

Table 6. Intercorrelation among Reflective Constructs										
Construct	# Items	Composite Reliability	1	2	3	4	5	6	7	8
1. Intentions for partnerships	3	.864	**.824**							
2. Organizational overview	4	.900	.406	**.831**						
3. Organizational unit	4	.897	.352	.809	**.829**					
4. Organizational responsibility	3	.840	.504	.601	.676	**.798**				
5. IT–business integration	4	.873	.516	.628	.589	.595	**.795**			
6. Knowledge networking	3	.867	.283	.453	.405	.308	.341	**.828**		
7. Interpersonal communication skills	3	.832	.381	.485	.386	.345	.478	.474	**.789**	
8. Leadership skills	4	.858	.427	.589	.600	.516	.652	.517	.582	**.776**

Diagonal elements are the square roots of average variance extracted

model to be estimated using the standard PLS algorithm (Chin et al. 1996). This method allows the examination of the relative path weights of the factors forming higher order constructs. The results for the structure of business competence show that the two dimensions forming business competence have significant paths (see Figure 1). The higher path coefficient for organization-specific knowledge suggests a greater importance of this category of knowledge over that of interpersonal and management skills in forming business competence. The correlation between the two second-order factors is of .684, supporting that they are related in creating business competence. All four first-order factors forming organization-specific knowledge also have significant paths. Their relative importance from the most to the least important is (1) organizational overview, (2) organizational unit, (3) IT–business integration, and (4) organizational responsibility. Similarly, all three first-order factors forming interpersonal and management skills also all have significant paths. Their relative importance from

the most to the least important is (1) leadership skills, (2) knowledge networking, and (3) interpersonal communication skills.

The path linking business competence to partnerships (see Figure 1) represents the impact of competence on these variables and provides evidence for the nomological validity of the business competence construct. The estimate of .529 (p < .01) for this path provides good support for the impact of competence on the dependent variable. Intentions to develop partnerships ($R^2 = .28$) of IT professionals are influenced by their business competence. The positive and significant path coefficients as well as the value of the R^2 all provide support for the model linking business competence to partnerships.

In summary, we hypothesize that business competence in IT professionals influences their partnerships with their business clients. Results show that business competence explains 28 percent of the variance in the intentions of IT professionals to
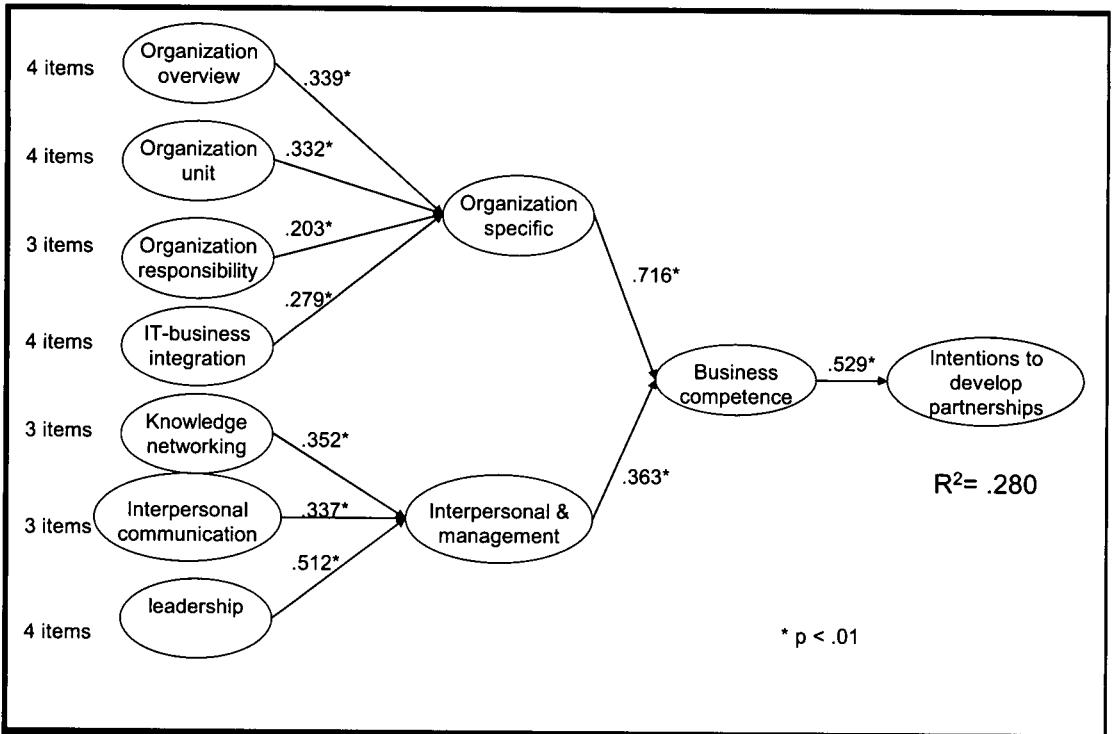
Figure 1. Business Competence and its Influence on IT–Business Partnerships

develop partnerships. We also propose that business competence in IT professionals is a third-order multidimensional latent construct formed by the definitional properties of organization-specific knowledge and interpersonal and management knowledge. The results support this structure, with significant paths linking all first-order factors to the second-order factors, and linking these second-order factors to the third-order factor: business competence.[2]

---

[2]A model with the two second-order factors directly influencing the intentions to develop partnerships was also tested. Although this model also explained 28 percent of the variance in partnerships intentions, only the path linking organization-specific knowledge to the intentions to develop partnerships was significant. These results provide additional support for including the third-order factor in the model. Also, the third-order model is more informative, since it shows the direct impact of business competence, which is the core construct of interest in this study and indicates the relative importance of organization-specific versus interpersonal and management knowledge to the formation of business competence.

Discussion, Limitations, and Future Research

For the last three decades, the academic IT literature has stressed the importance of IT people having business knowledge and on the potential of this knowledge for increasing the contribution of IT to organizational goals. To perform a test of this proposition, in this paper we proposed a model of business competence in IT professionals, defined its constructs, developed measures of these constructs, tested their validity and the reliability of the measures, and measured the relationship between business competence and intentions to form partnerships. The model of business competence proposed, including the third-order construct "business competence," is well supported by the data, and both components of business knowledge, namely organization-specific knowledge and interpersonal and management knowledge, were found to be influential in contributing to overall business competence.

Organizations need to educate and train their IT professionals to be more business oriented, given that they invest substantial amounts of money in IT and often depend on IT to gain competitive advantage, to avoid a competitive disadvantage, and to ensure the survival of the business. This study aims at improving such education by giving managers insights into the best areas for further development of the competence of IT professionals. Identifying a generic set of knowledge that enables IT professionals to understand the business reality will provide guidance to organizations regarding the kind of training to be provided to IT people. This guidance will also be of help to educators for the development of the academic programs addressing IT professionals. This study found that overall business competence influences partnership intentions and that business competence is created through the organization-specific knowledge and the interpersonal and management knowledge of IT professionals. The model identifies specific areas of knowledge on which to focus. Organizational overview, organization unit, organizational responsibility, and IT–business integration form the organization-specific knowledge. Leadership, interpersonal communication, and knowledge networking form the interpersonal and management knowledge. The formative representation used in this study means that different individuals can achieve the same level of knowledge in each of the higher-order factors through different combinations of levels of the same first-order factors.

The model tested in this study needs to be expanded by further development of the dependent variables investigated. The use of intentions to form partnerships in the model serves in testing the nomological validity of the business competence measure, but does not fully inform in terms of understanding the full set of outcomes that are affected by business competence in IT professionals. Although intentions have been shown to be good predictors of behavior, it would be interesting to understand the relationship between business competence and actual partnerships with business clients, along with IT deployment in support of organizational activities and business

strategies. Further understanding of how business competence in IT professionals can be instrumental in enabling competitive positioning, be it through the appropriateness of new, IT-enabled organizational forms or through new IT-based process structures, can also be investigated in future research.

At the conceptual level, this study focused on the contribution by IT professionals to their partnerships with their business clients. Future research should investigate the contribution of not only the IT professionals but also the business client. By enhancing their respective understanding of each other's domain, the development and effectiveness of their partnerships can be improved. The instrument developed and validated with this study, and the one in earlier work on IT knowledge for business people (Bassellier, Reich, and Benbasat 2001), should facilitate the investigation of a broader model. The expertise of IT professionals in their own domain can also be included to compare the relative contribution of their functional and cross-functional expertise to the development of partnerships. Future research should also test the applicability of the instrument to industries other than insurance and to different sizes of organizations.

This study, while recommending higher business competence for IT professionals and empirically demonstrating that such competence leads to intentions to form partnerships with business people, has not investigated the issue of the cost versus benefits of acquiring such competence. For example, what kind of salary premium should an organization provide for hiring a computer science graduate who has obtained an MBA versus one that has not? What level of resources should be invested in providing business competence to an organization's IT professionals via training programs? To answer such relevant questions there is a need to come up with complex performance measures, such as the impact of an organization's overall business competence in its IT people on organizational productivity, or other such performance measures, gained through IT utilization. While from an empirical point of view

this is not an easy task, since it will require that the individual competence measures developed in this research be adapted to measure an organizational level of competence, it is nevertheless important to be able to design a cost effective training and hiring scheme for IT professionals.[3]

Common method variance is a potential area of concern when the same individual, the IT professional, answers both the competence and the intention question. For intentions measures, we would argue that the individual is the best source for answers. As far as the competencies are concerned, as we noted earlier, we believe that this is a reasonable approach since others' assessments of one's competence is fraught with difficulties, the main among them being the difficulty of someone to figure out how much a person truly knows (more than the person can assess themself). Thus, no matter how competencies are measured, by the individual or by someone else, it is not possible to alleviate measurement concerns completely. However, future research on this topic could adopt some approaches to minimize the problems associated with common method variance. One strategy is to adopt a longitudinal approach where the competence and the partnerships are assessed at two different points of time. Another option is to have the business partners assess the partnerships. A third strategy is to have the competence of the IT professionals rated by their supervisors.[4]

Finally, it is worth noting that 50 out of 166 IT professionals in our sample did not have contact with business clients during the past six months. This could indicate that some IT professionals would, in general, have little contact with business clients, thus little reason to utilize their business competence. This is plausible for some professionals working on programming tasks. Alternatively, they might have been using their business knowledge, but simply communicating indirectly with their business clients.[5] This issue warrants further examination in future research to identify the set of IT professionals who are more likely to interact with business clients, thus benefiting most from having business competencies.

Conclusions

The nature of work for IT professionals is changing; interaction with people from other functional areas is now part of their work. IT professionals need to apply their technical knowledge in a way that is beneficial to the organization, and act cooperatively with their business partners. To succeed in this endeavor, IT professionals need a growing range of non-IT skills. The conclusion we draw from this study stands out clearly: the knowledge that IT professionals have in the general business domain, and in the interpersonal and management domain, does matter in the development of partnerships with their business clients.

Our work adds to the body of studies on the knowledge and skills of IT professionals. We have developed a framework inclusive of the different areas of cross-functional knowledge, and represented business competence as a higher-order construct, formed by organization-specific knowledge and by interpersonal and management knowledge and skills. This study also adds to the literature on partnerships between IT and business people. With higher levels of business knowledge, IT professionals also have higher intentions of developing further or strengthening their partnerships with their clients.

Acknowledgements

---

[3]We thank the anonymous reviewer who brought this issue to our attention.

[4]We thank the associate editor for these suggestions.

---

[5]We thank the anonymous reviewer who brought this issue to our attention.

References

Agarwal, R., and Karahanna, K. "Time Flies When You're Having Fun: Cognitive Absorption and Beliefs About Information Technology Usage," *MIS Quarterly* (24:4), 2000, pp. 665-694.

Anderson, J. R. *The Architecture of Cognition*, Harvard University Press, Cambridge, MA, 1983.

Ashenhurst, R. R. "Curriculum Recommendations for Graduate Professional Programs in Information Systems," *Communications of the ACM* (15:5), 1972, pp. 363-398.

Avital, M., and Vandenbosch, B. "IT-Business Ownership: The Missing Link for IT-Driven Value," in *Proceedings of the 2000 Annual Conference of the Administrative Sciences Association of Canada, IS Division,* Y Chan and A.-M. Croteau (Eds.), Montreal, Quebec, Canada, 2000, pp. 116-125.

Bashein, B. J., and Markus, M. L. "A Credibility Equation for IT Specialists," *Sloan Management Review* (38:4), Summer 1997, pp. 35-44.

Bassellier, G., Reich, B. H., and Benbasat, I. "Information Technology Competence of Business Managers: A Definition and Research Model," *Journal of Management Information Systems* (17:4), 2001, pp.159-182.

Benbasat, I., Dexter, A. S., and Mantha, R. W. "Impact of Organizational Maturity on Information Skill Needs," *MIS Quarterly* (4:1), 1980, pp. 21-34.

Brown, C. V., and Sambamurthy, V. *Repositioning the IT Organization to Facilitate Business Transformation*, Pinnaflex Educational Resources, Inc., Cincinnati, OH, 1999.

Brown, R. B. "Reframing the Competency Debate," *Management Learning* (25:2), 1994, pp. 289-299.

Carmines, E. G., and Zeller, R. A. *Reliability and Validity Assessment*, Sage Publications, Beverly Hills, CA, 1979.

Chin, W. W. "Issues and Opinions on Structural Equation Modeling," *MIS Quarterly* (21:1), 1998, pp. vii-xvi.

Chin, W. W., Marcolin, B. L., and Newsted, P. R. "A Partial Least Squares Latent Variable Modeling Approach for Measuring Interaction Effects: Results from a Monte Carlo Simulation Study and Voice Mail Emotion/Adoption Study," in *Proceedings of the Seventeenth International Conference on Information Systems,* J. I. DeGross, S. Jarvenpaa, and A. Srinivasan (Eds.), Cleveland, OH, 1996, pp.21-41.

Compeau, D. R., Higgins, C. A., and Huff, S. "Social Cognitive Theory and Individual Reactions to Computing Technology: A Longitudinal Study" *MIS Quarterly* (23:2), June 1999, pp. 145-158.

Conner K. R., and Prahalad, C. K. "A Resource-Based Theory of the Firm: Knowledge versus Opportunism," *Organization Science* (7:5) 1996, pp. 477-501

Davis, G. B., Gorgone, J. T., Couger, J. D., Feinstein, D. L., and Longenecker, Jr., H. E. *IS '97: Model Curriculum and Guidelines for Undergraduate Degree Programs in Information Systems*, Association for Computing Machinery, New York, Association for Information Systems, Atlanta, GA, and Association for Information Technology Professionals, Park Ridge, IL, 1997.

Feeny, D. F., and Willcocks, L. P. "Core IS Capabilities for Exploiting Information Technology," *Sloan Management Review* (39:3), 1998, pp. 9-21.

Fishbein, M., and Ajzen, I. *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research*, Addison Wesley, Reading, MA, 1975.

Gefen, D., Straub, D. W., and Boudreau, M.-C. "Structural Equation Modeling and Regression: Guidelines for Research Practice," *Communications of the Association for Information Systems* (4:7), 2000.

Gorgone, J. T., Davis, G. B., Valacich, J. S., Topi, H., Feinstein, D. L., and Longenecker, Jr., H. E.,

"IS 2002: Model Curriculum and Guideliens for Undergraduate Degree Programs in Information Systems," Association for Computing Machinery, New York, Association for Information Systems, Atlanta, GA, and Association for Information Technology Professionals, Park Ridge, IL, 2002.

Grant, R. "Prospering in Dynamically-Competitive Environments: Organizational Capability as Knowledge Integration. *Organization Science* (7:4), 1996, pp. 375-387.

Hair, J. F. J., Anderson, R. E., Tatham, R. L., and Black, W. C. *Multivariate Data Analysis with Readings*, Prentice-Hall, Englewood Cliffs, NJ, 1998.

Henderson, I. "Action Learning: A Missing Link in Management Development?," *Personnel Review* (22:6), 1993, pp. 14-24.

Henderson, J. C. "Plugging into Strategic Partnerships: The Critical IS Connection," *Sloan Management Review* (31:3), 1990, pp. 7-18.

Henry, R. M., Dickson, G. B., and LaSalle, J. "Human Resources for MIS: A Report of Research," MISRC Working Paper 74-01, MIS Research Center, University of Minnesota, Minneapolis, MN, 1974.

Joseph, D., Ang, S., and Tan, H. T. "The Nature of Soft Skills of Information Systems Professionals," in *Proceedings of the Americas Conference on Information Systems*, 1996.

Keen, P. G. W. "Middle-Out Ideas," *Computerworld* (56), April 12, 1999a.

Keen, P. G. W. "The Monsters Among Us," *Computerworld* (41), November 8, 1999b.

Klemp, G. O. "Identifying, Measuring, and Integrating Competence," in *New Directions for Experiential Learning: Defining and Measuring Competence*, P. S. Pottinger and J. Goldsmith (Eds.), Jossey-Bass, San Francisco, 1979, pp. 41-52.

Kogut, B., and Zander, U. "Knowledge of the Firm, Combinative Capabilities, and the Replication of Technology," *Organization Science* (3:3), 1992, pp. 383-397.

Lee, D., Trauth, E., and Farwell, D. "Critical Skills and Knowledge Requirements of IS Professionals: A Joint Academic/Industry Investigation," *MIS Quarterly* (19:3), 1995, pp. 313-340.

Lohmöller, J.-B. *Latent Variable Path Modeling with Partial Least Squares*, Physica-Verlag, Heidelberg, 1989.

Markus, M. L., and Benjamin, R. "IT-Enabled Organizational Change: New Developments for IT Specialists," in *Steps to the Future: Fresh Thinking on the Management of IT-Based Organizational Transformation*, C. Sauer, P. W. Yetton and Associates (Eds.), Jossey-Bass, San Francisco, 1997, pp. 115-142.

Moore, G. C., and Benbasat, I. "Development of an Instrument to Measure the Perception of Adopting an Information Technology Innovation," *Information Systems Research* (2:3), 1991, pp. 192-222.

Nass, C. "Knowledge of Skills: Which Do Administrators Learn from Experience?," *Organization Science* (5:1), 1994, pp. 38-51.

Nelson, K. M., and Cooprider, J. G. "The Contribution of Shared Knowledge to IS Group Performance," *MIS Quarterly* (20:4), 1996, pp. 409-432.

Nelson, R. R. "Educational Needs as Perceived by IS and End-User Personnel: A Survey of Knowledge and Skill Requirements," *MIS Quarterly* (15:4), 1991, pp. 503-525.

Nevo, D., Benbasat, I., and Wand, Y. "The Role of Knowledge and Source Attributes in the Knowledge Adoption Decision of Individuals," Working Paper, Sauder School of Business, University of British Columbia, 2003.

Nonaka, I. "A Dynamic Theory of Organizational Knowledge Creation," *Organization Science* (5:1), 1994, pp. 14-37.

Polanyi, M. *Tacit Dimension*, Routledge & Keegan Paul, London, 1967.

Prahalad, C. K., and Hamel, G. "The Core Competence of the Corporation," *Harvard Business Review* (68:3), 1990, pp. 79-92.

Preiser-Houy, L. *Building High-Quality Working Relationships between Information Systems Specialists and Business Clients: The Impacts of IS Role, Tactics and Institutional Context*, Unpublished Ph.D. Dissertation, Claremont Graduate University, Claremont, CA, 1999.

Quinn, J. B. *Intelligent Enterprise: A Knowledge and Service Based Paradigm for Industry,* The Free Press, New York, 1992.

Reich, B. H., and Benbasat, I. "Factors that Influence the Social Dimension of Alignment between Business and Information Technology Objectives," *MIS Quarterly* (24:1), March 2000, pp. 81-111.

Rockart, J. F., Earl, M. J., and Ross, J. W. "Eight Imperatives for the New IT Organization," *Sloan Management Review* (38:1), Fall 1996, pp. 43-55.

Roepke, R. P., Agarwal, R., and Ferratt, T. W. "Aligning the IT Human Resource with Business Vision: The Leadership Initiative at 3M," *MIS Quarterly* (24:2), June 2000, pp. 327-353

Ross, J. W., Beath, C. M., and Goodhue, D. L. "Develop Long-Term Competitiveness Through IT Assets," *Sloan Management Review* (38:1), 1996, pp. 31-42.

Ryle, G. *The Concept of Mind*, Hutchinson & Co, London, 1949.

Sawyer, S., Eschenfelder, K. R., Diekema, A., and McClure, C. R. "IT Skills in the Context of BigCo.," in *Proceedings of the 1998 SIGCPR Conference on Computer Personnel Research*, R. Agarwal (Ed.), ACM Press, New York, 1998, pp. 9-18.

Schambach, T. P. *Maintaining Professional Competence: An Evaluation of Factors Affecting Professional Obsolescence of Information Technology Professionals*, Unpublished Ph.D. Dissertation, University of South Florida, 1994.

Sternberg, R. J., Forsythe, G. B., Hedlund, J., Horvath, J. A., Wagner, R. K., Williams, W. M., Snook, S. A., and Grigorenko, E. L. *Practical Intelligence in Everyday Life*, Cambridge University Press, Cambridge, UK, 2000.

Sussman, S. W., and Siegal, W. S. "Information Influence in Organizations: An Integrated Approach to Knowledge Adoption" *Information Systems Research* (14:1), 2003, pp. 47-65.

Tan, H., and Libby R. "Tacit Managerial versus Technical Knowledge as Determinants of Audit Expertise in the Field," *Journal of Accounting Research* (35:1), Spring 1997, pp. 97-113.

Taylor, S., and Todd, P. A. "Understanding Information Technology Usage: A Test of Competing Models," *Information Systems Research* (6:2), June 1995, pp. 144-176.

Todd, P. A., McKeen, J. D., and Gallupe, R. B. "The Evolution of IS Skills: A Content Analysis of IS Job Advertisements from 1979 to 1990," *MIS Quarterly* (19:1), 1995, pp. 1-27.

Wold, H. "Soft Modeling: The basic Design and Some Extensions," in *Systems Under Indirect Observation: Causality, Structure, Prediction (Volume 2)*, K. G. Jöreskog and H. Wold (Eds.), North-Holland, Amsterdam, 1982, pp. 1-54.

York, T. "Shift in IT Roles Ahead," *InfoWorld* (21:3), January 18, 1999, pp. 75-76.

Zmud, R. "The Effectiveness of External Information Channels in Facilitating Innovation in a Software Development Group," *MIS Quarterly* (7:2), 1983, pp. 43-58.

About the Authors

Geneviève Bassellier is an assistant professor at the Faculty of Management at McGill University, Canada. She received her Ph.D. from the University of British Columbia, Canada. Her current research interests include competence in business managers and IS professionals, trust and partnership between IS professionals and business people, and the role of top management in IT deployment. Her work has been published in *Information Systems Research* and *Journal of Management Information Systems*.

Izak Benbasat is CANADA Research Chair in Information Technology Management at the Sauder School of Business, University of British Columbia, Canada. He received his Ph.D. (1974) in Management Information Systems from the University of Minnesota. He serves as a senior editor of the *Journal of AIS*. His current research interests are evaluating human-computer interfaces for e-business and measuring information systems competence in line managers and business competence in information systems professionals.