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ABSTRACT

This research investigated gender differences in the characteristics IS managers perceive to be unique to the IS profession. An interpretivist perspective, qualitative data collection (i.e., focus group interviews) and the revealed causal mapping data analysis method were used to evoke and represent mental models (i.e., cognitive structures) of men and women in the IS field regarding the unique characteristics of their profession. By comparing these mental models we uncovered different strategic views of professional identity within our participants. A lack of consistency in how IS professional identity is conceptualized could lead to a fragmented sense of professional community and disengagement at the individual level.

Keywords

Professional identity; IS Workforce; Gender

INTRODUCTION

Research indicates that the genders experience different workplace realities (e.g., Reid, Allen, Armstrong and Riemenschneider, 2010; Trauth, 2002). Given the perceived genderedness of IS work (e.g., von Hellens, Nielsen and Trauth, 2001) and workplaces (e.g., Ahuja, 2002) it is important to look beyond conditions within specific workplaces to investigate issues related to the IS profession and career. A professional identity (also referred to as occupational identity; Magenau and Hunt, 1989) is a type of social identity focused around one's occupation or profession, in which individuals categorize themselves with others based on certain unique characteristics of the profession (Tajfel, 1974; Tajfel and Turner, 1986).

We seek to explore how gender influences IS workers' professional identity through a strategy-oriented lens as evidenced in their perceptions of the unique characteristics of the profession. While we expect some overlap, we also expect that different experiences and expectations may cause men and women to identify with different occupational characteristics, which will in turn indicate different strategic foci. Understanding and embracing these similarities and differences could foster a sense of belonging for individuals of both genders as well as potentially improve coordination efforts within organizations and the professional community. The next section reviews relevant literature pertaining to professional identity, gender, and strategic archetypes, and concludes with our research question.

RELATED RESEARCH

Like other interpretivist research (e.g., Levina and Ross, 2003), rather than beginning with a formal theory and seeking to test hypotheses, we started with a broad definition of the problem which became more focused as we analyzed the literature, engaged in data collection, repeatedly read and analyzed the interview transcripts, and extensively discussed the data during the coding process. We provide a theoretical overview here to preview the findings and provide a context for the study.

Professional Identity

Social identity theory suggests that individuals recognize their own membership in groups by defining “the social boundaries surrounding particular groups, and then self-categorizing themselves as either belonging or not belonging to them” (Gundlach, Zivnuska and Stoner, 2006, p. 1607). To develop a social identity, individuals categorize themselves into an in-group and others into an out-group (Alvesson, Robertson and Swan, 2001), which emphasizes the distinctiveness of the in-group. The boundary perspective of identity (Zerubavel, 1991) offers an appropriate lens for describing the distinctiveness of a group (e.g., profession) because it provides insights on the “mental fences” or boundaries that individuals socially construct to simplify and categorize their membership in a profession. “Professional boundaries ... are constituted by the knowledge domain and by the rules, norms and conventions which socialize individuals into the profession and which differentiate the profession from other groups” (Hotho, 2008, 723-724).

Little work has been done regarding the concept of *IS professional identity*. In the few studies that the authors discovered, findings indicate that while the IS professional identity is malleable (Alvarez, 2008), there is a strong sense of professional identity for workers within the field (e.g., Marks and Scholarios, 2007). In addition, IS workers tend to identify with their profession more strongly than they do with their organization (e.g., Chesebrough and Davis, 1983; Tam, Korczynsk and Frenkel, 2002), potentially leading to fewer pro-social organizational behaviors (Johnson, Morgeson, Ilgen, Meyer and Lloyd, 2006).

Gender is one of the most pervasive ways we can categorize people (Woodfield, 2000). Research finds that many women perceive the work of IS to be unappealing because it requires long hours, leads to a lack of work-life balance, and provides few opportunities for interaction with peers or customers (von Hellens et al., 2001), leading some women to avoid IS based on their construal of the work. Studies demonstrate that IS work has been socially constructed as masculine (e.g., Trauth, 2002), and that when women gain skills in IS, they challenge these conventions (e.g., Adam, Griffiths, Keogh, Moore, Richardson and Tattersall, 2006) calling their legitimacy as IS professionals into question (e.g., Kelan, 2010). Research suggests that women empower themselves to succeed in the IS field by distancing themselves from the IS group or by distancing themselves from their identity as women (Adam et al., 2006).

Strategic Archetypes

Miles and Snow (1978:29) recognized patterns of strategic behavior within organizations and distilled them into four “archetypes” of organizational forms (prospector, defender, analyzer, and reactor)¹. Prospector organizations continually search for new opportunities, products and technologies, experimenting with potential responses to emerging trends. They are aggressive and flexible in pursuit of exploiting external opportunities (Williams and Narendran, 2000). This continuous change comes at a price: efficiency typically suffers in Prospector organizations. Defender organizations focus on maintaining the status quo (Williams and Narendran, 2000) and tend to work within relatively narrow domains. Because of the limited focus and strong capabilities within that narrow scope, major adjustments are rarely made; instead, they focus on predictability and improving efficiency in the existing operations.

While Miles and Snow’s (1978) original framework describes organizations, it has also been applied to individuals (e.g., Floyd and Wooldridge, 1992; Williams and Narendran, 2000) and groups (e.g., Govindarajan, 1988; Hambric, 2003). We use this framework as our lens because it has been widely supported in the literature due to its strong theoretical orientation and generalizability (e.g., Smith, Guthrie and Chen, 1989; Zahra and Pearce, 1990). We assert that the unique characteristics of the IS profession identified by our participants are informed by their strategic archetype and their sense of self as a woman or a man (Ely and Padavic, 2007). While the themes identified in the literature provide insights, gender’s impact on perceptions of the unique characteristics of the IS profession is currently unknown. Therefore, the research question is:

What are the salient characteristics that male and female IS managers perceive as unique to their profession?

METHOD

Data Source and Procedure

The researchers conducted six single-sex focus groups (3 male, 3 female) with managers working in the IS department at the headquarters of three companies. Focus groups are particularly appropriate because social identities are constructed and replicated through verbal interaction (Denzin and Lincoln, 2000). Participants were asked “What makes your job in IS unique

¹ The analyzer and reactor strategic archetypes are not applicable to this research, so due to space constraints they are omitted from the discussion.

from people who work in other professions?" Such questions simultaneously tap information related to uniqueness and gender perceptions.

The companies selected are similar in that all three have in-house IS departments that are housed at the corporate headquarters, but differ on several organizational dimensions such as industry, geographic location, size and culture. TransCo is one of the largest publicly held transportation logistics companies in North America, FoodCo is one of the world's largest processors and marketers of protein, and BevCo is one of the world's largest family-owned wineries. Admittedly, the context of these firms (very large, in-house IS organizations) might have an influence on how the managers in the sample experience the IS profession. While these three organizations constitute a convenience sample, as this exploratory research is focused on generating insights to further theory development, we believe this sampling approach is appropriate.

The participants were 45 IS managers, which is consistent with sample sizes in other qualitative studies (e.g., Gershon, Gowen, Compian and Hayward, 2004). Eight male managers and nine female managers participated from TransCo, eight males and five females participated from FoodCo, and eight males and seven females participated from BevCo. At each organization, two focus groups were held during working hours in on-site conference rooms.

The managers were asked how long they had been with the company (female average = 10.5 years; male average = 9.4 years) and how long they had worked in IS (female average = 14.9 years; male average 16.5 years). These managers, with an average of 15.7 years working in IS, are viable participants to share their perceptions of the unique characteristics of the IS profession. In addition, 61% of the managers had more years in the IS field than years in the company indicating that the majority of them had worked in IS for more than one organization, giving perhaps a broader view of the profession. Due to topics discussed in the larger study, and to increase interviewee trust in the researchers, a decision was made not to gather more personally sensitive demographic information from the participants.

The focus group interviews, which ranged from 45 to 65 minutes, were tape recorded and transcribed verbatim. Two researchers of the same sex as the participants were present for each focus group to reduce any potential participant gender-based hesitancy. The researchers were trained in group interview techniques to promote consistency and reduce interviewer variance. The interviews were designed to attenuate any differences in the evoked mental models that could be attributed to the different researchers (e.g., the interview guide was strictly adhered to by the researchers).

Data Analysis

A mental model is an organized cognitive structure of a particular domain comprised of the concepts and relationships between the concepts (Axelrod, 1976). Mental models are created by deriving the relevant concepts from what managers said regarding the unique characteristics of the IS profession. The underlying causal reasoning processes of the IS managers is accessed by using revealed causal mapping (RCM), a multi-step data analysis method previously described in the IS literature (e.g., Riemenschneider, Armstrong, Allen and Reid, 2006). Readers interested in additional information on the method can review Axelrod (1976), Huff (1990), and Narayanan and Armstrong (2005).

The four major steps in RCM are gathering the narratives from the focus groups, identifying the causal statements through the use of keywords (e.g., because, so, if-then) (Axelrod, 1976), separating the statements into the 'effect' and 'cause', and developing a coding scheme. In the coding process, frequently mentioned words in the statements are grouped together (Narayanan and Fahey, 1990), and a word or word group (i.e., concept label) summarizes the statements. The researchers assign the concept labels; however the concepts themselves emerge from the participants through the phrases captured in the language of the participants. Any disagreements among the researchers regarding identification of a statement or the coding of those statements are resolved through discussion leading to a 100% level of agreement. The maps are drawn by replacing the participants' phrases with the concept labels. The six maps (one for each focus group) are then aggregated (Axelrod, 1976; Bougon, Weick and Binkhorst, 1977) into one composite map for each gender. Descriptions of each concept that emerged from the participants are included in Table 1.

Once the maps are drawn, measures for the analysis and comparison of the maps are developed: adjacency, which represents the strength of the direct linkage (relationship) between two concepts and contained values between 0 and 11, indicating the frequency (number) of mentions of this relationship; reachability, which includes both the direct and indirect effects of one concept on another; and centrality, which is the ratio of the direct linkages involving the concept divided by the total number of linkages in the map (Knoke and Kuklinski, 1982). While the adjacency matrix provides the foundation, the reachability matrix allows a more holistic picture of the causal relationships and thus the reachability numbers are reported on the line between the concepts on the causal map.

Concept Label	Descriptive Phrases From Participants
Change / Volatility	Not letting that change out from under us; constant change
Generic Challenges	That [matrix organizational structure] can be a challenge itself
Information Systems (IS)	The nature of IS; when IS is functioning properly
IS Unique	IS is unique
Knowledge, Skills, & Abilities	If you have somebody that has transferable skills; it's a position that requires a very detail oriented kind of mind
Continuous Learning	There's new ways of performing your job; you are always having to learn new stuff
Development Entails Creativity and Logic	It's more of an art than a science; IS isn't the exact science that construction is or engineering is
Need for Variety	I wouldn't want to go into that job and do the same thing day in and day out for my entire career
Non-IS	Fields other than information systems; individuals not in the IS field
Organizational Structure	Matrix organization; we have more than one customer
Outsourcing	Not only could your job be outsourced
Role Conflict	You're trying to please folks sometimes working at opposing goals.
Stress	The stressors can come from a lot of different angles; stress from keeping systems running
Knowledge of Technology & the Business Domain	To have at least some level of the technology side of things and some understanding of the business side
Time Pressures	IS has become a 24/7 field

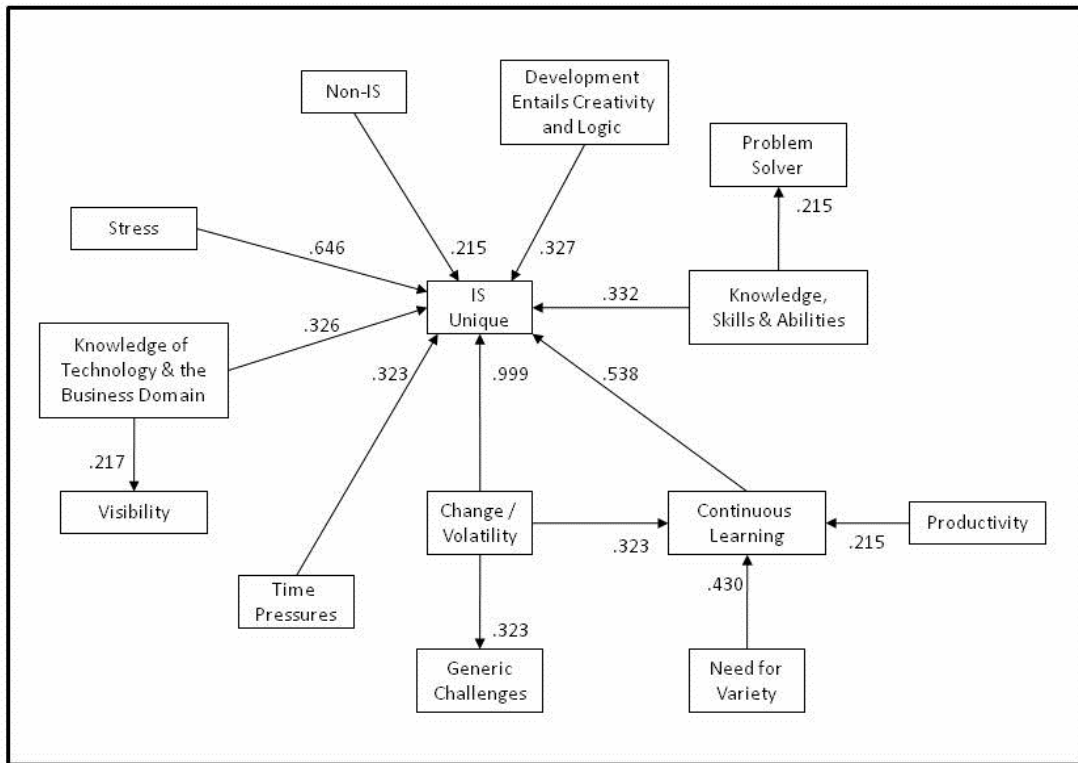
Table 1. Concept Descriptions

RESULTS AND DISCUSSION

To address the research question, the men's and women's mental models are compared via their causal maps to identify similarities and differences in their cognitions. Figure 1a shows a causal map that reveals 13 concepts that the male managers identified as characteristics unique to the IS profession, and eight are directly linked with the *IS Unique* concept. Note that only those concepts directly linked in each map to the *IS Unique* concept are discussed. The concepts with the highest reachability for men are between the *IS Unique* concept and *Change/Volatility* (.999), *Stress* (.646), and *Continuous Learning* (.538). The reachability numbers are found on the lines connecting the concepts on the maps in Figure 1. Figure 1b shows the causal map that reveals a total of eight concepts that the female managers perceived as characteristics unique to the IS profession. Of the concepts in the map, only three are directly linked with the *IS Unique* concept: *Knowledge, Skills & Abilities*; *Continuous Learning*; and *Stress*. The concepts with the highest reachability for the women are between *Organizational Structure* and *Role Conflict* (.999) and between *Outsourcing* and *Stress* (.999).

Regarding centrality, the men's map is more concentrated with *Continuous Learning* as a central characteristic. *Change/Volatility*, *Knowledge, Skills, and Abilities*, and *Knowledge of Technology & the Business Domain* are focal concepts, and the remaining nine concepts are the least central. The women's map has two layers of centrality; there are five concepts that comprise the inner core (centrality = 0.125) and three on the periphery (.063). The centrality data is provided in Table 2.

(a) Men



(b) Women

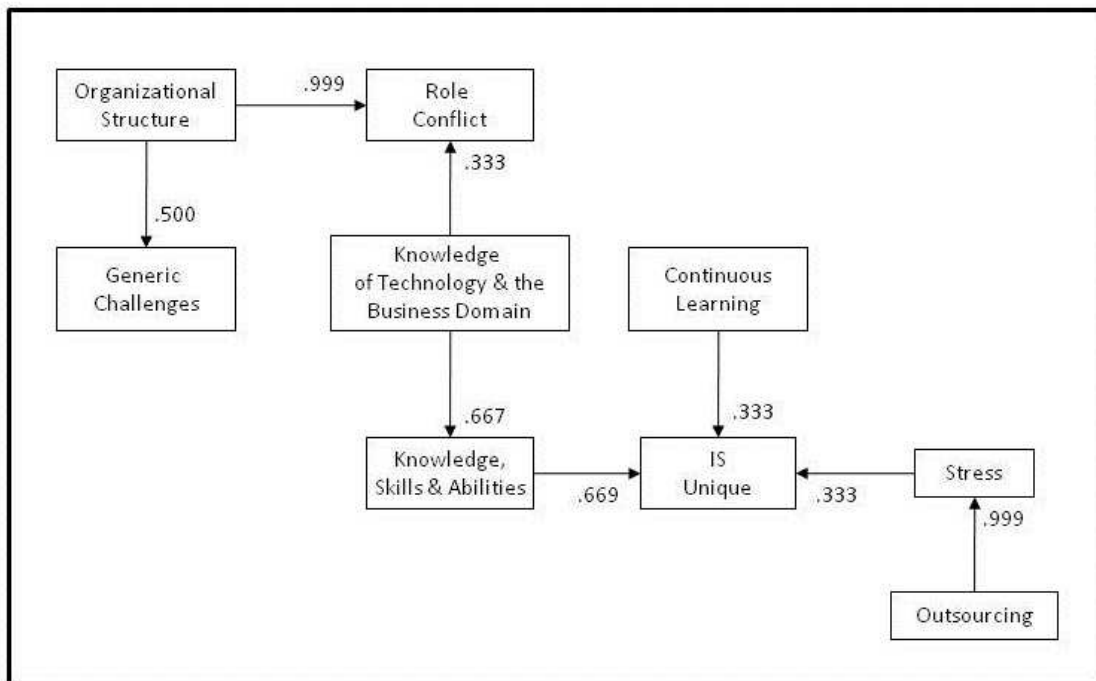


Figure 1. Revealed Causal Maps (a) Men, (b) Women

Concept	Men	Concept	Women
Continuous Learning	0.143	Knowledge, Skills & Abilities	0.125
Change / Volatility	0.107	Knowledge of Technology & the Business	0.125
Knowledge, Skills & Abilities	0.071	Stress	0.125
Knowledge of Technology & the Business	0.071	Organizational Structure	0.125
Generic Challenges	0.036	Role Conflict	0.125
Development Entails Creativity and Logic	0.036	Continuous Learning	0.063
Need For Variety	0.036	Generic Challenges	0.063
Non-IS	0.036	Outsourcing	0.063
Productivity	0.036		
Problem Solver	0.036		
Stress	0.036		
Time Pressures	0.036		
Visibility	0.036		

Table 2. Gender Map Centrality Comparison

While men and women express a base level of shared knowledge about the unique characteristics of the profession (i.e., common concepts on the causal maps), they do not articulate a shared meaning of the concept interactions and relationships with the IS Unique concept as indicated by the different relative linkage measures and the quotes from the men and women on the concepts as detailed below.

Male IS managers appear to adopt a prospector-oriented strategic view with respect to their profession (e.g., focus on new opportunities). The men in our sample perceive that the boundary of IS is more outwardly focused, suggesting that because they touch all aspects of the business they have more *Visibility* (good and bad) within the organization. One male manager stated, “We deal with every single portion of the business. It’s not like finance the problems that IT has, affects directly the business itself so they get magnified more” (TransCo, Male 6).

Consistent with the Prospector strategy, the men are focused on developing themselves so that they are ready to take advantage of opportunities in/from the environment as they occur. *Continuous Learning* is central to their perception of the uniqueness of IS professionals. It is not just a requirement, but an aspect of the IS profession that men identify with, commenting that they learn for personal gain. They see the tools, methods and technologies frequently changing (*Change/Volatility*), which often calls for retraining (*Continuous Learning*). One male manager stated, “I think this [working in IS] requires a level of flexibility for change and just be able to adapt very quickly to be successful” (FoodCo, Male4).

Men’s focus on *Continuous Learning* in response to both internally (*Need for Variety*) and externally (*Change / Volatility*) motivated change is also consistent with the Prospector strategy and the continuous search for new opportunities. As a manager stated, “I think there’s a challenge from a technology perspective to keep up with the technology, as well as try to move careerwise and keep both in sync” (FoodCo, Male3). Another manager stated, “I’ve reinvented my career four times at this company, without ever leaving IT. And that’s been really cool and it’s been a lot of fun and it’s been a great opportunity that I don’t see in other industries” (BevCo, Male5).

Female IS managers appear to adopt a Defender-oriented strategic view regarding their profession (e.g., maintain status quo). Women see the fact that they need to know both the technology and the business (*Knowledge of Technology & the Business Domain*) as a reason they need a complex skill set (*Knowledge, Skills & Abilities*). This complex skill set, in turn, makes the IS profession unique. The women stated that they need to know what is going on in the business and keep their skills “tuned up.”

They expressed that since you have to know both the technology and understand various business customers (*Knowledge of Technology & the Business Domain*), you are often faced with trying to reconcile multiple goals (*Role Conflict*). “We have customers and then we have management... so you’re trying to please a lot of people,” (FoodCo, Female10). The women at all three organizations talked about the matrix-like reporting structure within their departments (*Organizational Structure*) and how it leads to shifting roles (*Role Conflict*). “The fact that you have... two or three bosses that are giving directions and that can be a challenge of itself” (FoodCo, Female1).

The concepts and meanings identified by the women revolve around the impact of the various boundary concepts on themselves as IS managers. The women’s focus is on meeting their current needs and maintaining their position, as evidenced by the influence of the threat of *Outsourcing* on *Stress*, as well as keeping their skills up to date (*Knowledge, Skills &*

Abilities and Continuous Learning). This attention concentrates their efforts on improving the current environment, which is consistent with the Defender's emphasis on improving efficiencies in existing areas. As a manager stated,

You have responsibility for your whole area even if, you know, someone else is on call, you still feel the responsibility for the whole area. So maybe you take more of that responsibility that might be unique to our industry. (TransCo, Female3)

The men and women have a partially shared mental model, but also have different understandings of the concepts and the relationships between these concepts. We conclude that the deeper meaning of the three overlapping concepts (*Knowledge, Skills, & Abilities; Continuous Learning; Stress*), the interplay of the concepts, and their impact on the uniqueness of IS professional identity is influenced by the gendered experiences of our participants. We see that men and women approach the concept of being an IS professional from very different strategic footings. The men view the unique characteristics of the IS profession through a Prospector-oriented lens, in which the IS profession provides constant change which creates opportunities for growth for the men. The women view the unique characteristics of the IS profession through a Defender-oriented lens, in which the profession presents challenges that must be responded to and overcome.

This study makes two main contributions to research. First, the findings illustrate some of the cognitive gaps and areas of cognitive overlap in the gendered perspectives of the uniqueness of the IS profession as evoked from IS managers. The findings suggest that if researchers fail to recognize the underlying differences in men's and women's cognitions regarding their IS professional identity, created largely by their gendered work experiences, this may result in erroneous conclusions regarding IS professional identity. Second, this research demonstrates that RCM can be used to evoke subtle differences that aid in the exploration of IS phenomenon. The maps developed here can be used as the basis for further exploratory work, theory development, and ultimately confirmatory empirical testing.

This research also makes important contributions to practice. First, we found that while men and women have some cognitive overlap regarding their perceptions of the unique characteristics of the profession, this overlap occurs only at a surface level. In addition differences in the strategic focus regarding their professional identity of men and women in IS were found, and these differences may be further amplified as managers articulate the norms, beliefs and values of the profession. So these gendered differences in the meaning of professional identity for IS professionals may become larger as they are perpetuated throughout the profession.

LIMITATIONS AND FUTURE RESEARCH

The design choices and methodology of this study create limitations which should be addressed. Qualitative research often relies on small convenience samples and researchers may infuse their own biases into the research process, which limits traditional generalizability (e.g., Hamel, Dufour, and Fortin, 1993). However, Altheide and Johnson (1994) tell us that providing a map that helps readers understand similar situations constitutes a dimension of generalizability within qualitative studies. This research is designed to provide such a map when exploring the influence of gender on IS workers professional identity.

Further, the research method selected and the constraints faced prevented fully investigating the contextual factors shaping our respondents' experiences. Additionally, using different researchers to conduct the focus group sessions could influence the outcomes; however, anomalies due to facilitator differences were negligible. Although we acknowledge these limitations, we believe that the complexity of the relationships and criticality of understanding the subject justify the design decisions made. The results should be viewed not as creating an ultimate theory that is demonstrable in all settings, but as providing a foundation worthy of further exploration.

CONCLUSION

We used social identity theory and a strategic archetype perspective to investigate gender differences in the characteristics IS managers perceive to be unique to the profession. Gender differences emerged in both the characteristics and the cognitive linkages between the characteristics. This is one of the first studies to empirically investigate gender differences in the characteristics IS managers perceive to be unique to the profession. We employed a robust data analysis technique and a strong theoretical foundation to develop a strong theoretical framework which may be used as a foundation for further exploration of IS professional identity. In addition, insights from this study may be used to inform management in their development of appropriate policies on training and development, stress management and career management programs.

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