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Organization Support as a Moderator in Coping with the Threat of Professional Obsolescence

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ABSTRACT

This study examines how IT professionals cope with the threat of professional obsolescence and how organizations may play a role in helping IT professionals cope with this threat. In answering these questions, this study draws on theories of occupational stress, specifically the theory of conservation of resources (Hobfoll 2002; Hobfoll et al. 1993), to relate the threat of professional obsolescence with IT professionals' coping behaviors. This study extends the theory of conservation of resources by proposing organizational updating climate as a proximal contextual moderating factor in how IT professionals cope with the threat of professional obsolescence. The results obtained from a large sample of IT professionals show that IT professionals are more likely to cope by directly rather than indirectly updating their IT competencies in relation to the threat of professional obsolescence. Organization updating climate supports IT professionals' coping by providing a supportive environment to undertake both direct as well as indirect updating. By contrast, direct updating is preferred over indirect updating in organizations where there is lower updating support. We conclude this study with a discussion of the results and their implications for research and practice.

Keywords

IT Professional Obsolescence, Organizational Updating Climate, IT-Competencies Updating

INTRODUCTION

There has been resurgence in examining how IT professionals cope with the threat of professional obsolescence (Joseph et al. Forthcoming-b; Rong et al. 2009; Tsai et al. 2007). This resurgence attests to IT professionals' enduring concerns about the effects of the threat of professional obsolescence and its consequences. The threat of professional obsolescence is of concern because the half-life of IT-specific human capital is estimated at less than two years (Ang et al. 2000; Dubin 1990). This rate of erosion of IT-specific human capital contrasts sharply with the lower rate of erosion of other non-IT competencies (Dubin 1990; Schambach 1994). Consequently, IT professionals are pressured to remain technologically current so as to remain productive in the IT profession. If not, IT professionals face the prospect of eroded IT competencies and, subsequently, leave IT careers for non-IT jobs that are less arduous (Joseph et al. Forthcoming-a).

The implications of professional obsolescence on organizations are also clear. Professional obsolescence impacts organizations in the quality of IT knowledge and skills available in the external labor market. When IT professionals do not regularly keep up with the latest technologies, organizations seeking to invest in and implement the latest information technologies will find it hard to source for and recruit IT talent. Organizations may have to resort to outsourcing or even recruiting from international spot markets by offshoring IT jobs that require the latest information technologies.

As such, this study adds to a growing body of work directly examining the threat of professional obsolescence, its etiology, structure, or consequences. Specifically, this study empirically examines how IT professionals cope with the threat of professional obsolescence by asking: how do IT professionals cope with the threat of obsolescence? and what role can organizations play in supporting their coping behaviors? To answer these research questions, we draw on theories of occupational work stress (Hobfoll et al. 1993) to examine the relationships between the threat of professional obsolescence and coping; and on organization updating climate (Kozlowski et al. 1987; Potosky et al. 2002) to examine its role in helping IT professionals cope with that threat.

In doing so, this study makes three important contributions to the IT discipline and the broader management literature. One, this study adds to a growing body of literature on IT professional obsolescence by answering calls for testing models of IT professionals' coping with the threat of professional obsolescence (Joseph et al. Forthcoming-b). Two, this study contributes to the extant organizational behavior literature by extending theories of occupational work stress to examine the moderating role of organizational updating climate as a form of social support in the relationship between the threat of professional

obsolescence and coping behaviors. Finally, this study answers Kozlowski and Farr (1988)'s call for research to examine the interaction between individual factors and perceived situational features when examining technical professionals' updating efforts.

THEORETICAL FOUNDATION AND HYPOTHESES DEVELOPMENT

Coping with the Threat of Professional Obsolescence

Professional obsolescence is defined as the erosion of professional competencies required for successful performance (Dubin 1990; Glass 2000). It is essential that IT professionals possess up-to-date IT competencies because it affects their employability, compensation and career development. Therefore, the erosion of IT competencies constitutes a potential threat to IT professionals, i.e., the threat of not being up-to-date with the rapidly changing technology environment (Schambach 1994; Tsai et al. 2007). It has been argued and shown that IT professionals perceive professional obsolescence as a threat (Joseph et al. Forthcoming-b; Pazy 1990; Tsai et al. 2007). As a threat, professional obsolescence is argued to be an occupational work stressor as IT professionals constantly feel the pressure to update their IT competencies (Tsai et al. 2007); failing which, IT professionals face curtailed careers in the IT profession (Joseph et al. Forthcoming-a).

To explain how IT professionals respond to the threat of professional obsolescence, we draw on the theory of conservation of resources (Hobfoll 2002; Hobfoll et al. 1993). Resources, in this theory, are defined as "those entities that are centrally valued in their own right (e.g., self-esteem, close attachments, health, and inner peace) or act as a means to obtain centrally valued ends (e.g., money, social support, and credit)" (Hobfoll 2002, p. 307). Within this theoretical framework, IT competencies are viewed as a resource as it acts as a means to obtain centrally valued ends such as employability (Joseph et al. Forthcoming-a) and compensation (Mithas et al. 2008). Moreover, IT professionals expend cognitive, emotional and physical energies in learning new information technologies; in taking risks and making errors playing with these new technologies; and in applying these technologies to specific domains.

The theory of conservation of resources proposes that individuals respond to threats to resource loss by seeking to obtain, retain and protect their resources (Hobfoll et al. 1993). The acquisition of new resources and maintenance of current resources are salient motivators in this theory. Individuals are argued to expend cognitive, emotional and physical energies to gain resources and to prevent loss of currently held resources (Hobfoll et al. 1993). The theory goes on to argue that individuals make choices about resource allocations and investments. This implies that the notion of what constitutes centrally valued resources is fluid and allows for threatened resources to be substituted to the extent that such resources are substitutable and centrally valued by individuals (Hobfoll 1998).

When threatened with professional obsolescence, IT professionals have been shown to respond by either updating IT competencies directly through professional activities or through indirect, vicarious means by learning from others (Rong et al. 2009). In the first response, individuals may take direct action to "do something" to alter the threat by dealing directly with it (Davey 1993, p. 535). This approach is primarily task-oriented with IT professionals directly updating their IT competencies by developing knowledge and skills in new information technologies (Glass 2000; Pazy 2004; Rong et al. 2009) and by implementing it through work assignments or experimentation (O'Mahony et al. 2006). The immediate outcomes of direct updating are state-of-the-art of knowledge, skills, and experiences (Pazy 2004; Tesluk et al. 1998). Research also shows that direct updating typically leads to positive outcomes such as a reduction of stress (Herman et al. 2009) and continued progression in the IT labor market (O'Mahony et al. 2006).

In the second response, IT professionals may indirectly update by vicarious means such as delegating the responsibility of updating to others (Pazy 1994; Rong et al. 2009; Tsai et al. 2007) and obtaining a general overview of the new information technologies from them (Gino et al. 2010). The underlying assumption of indirect updating is that updating is necessary but is less important that any one individual masters a new information technology (Pazy 1996). The responsibility of ensuring that at least one person in the work group keeps abreast with the latest technologies is typically delegated to supervisors (Pazy 1994). In essence, indirect updating sees resource acquisition and maintenance as a collective issue rather than as an individual one; and that the collective should ensure that resources are obtained, retained and protected (Pazy 1994).

Indirect updating "represents a deliberate resource allocation" (Pazy 1994, p. 1175), substituting individual IT competencies with transactive knowledge (Wegner et al. 1991). Tranactive knowledge is information possessed by each individual in a group context recognizing the location of distributed expertise (Hollingshead 2001; Wegner et al. 1991). In essence, an individual's transactive knowledge is an information directory about "who knows what and who knows whom" (Ho et al. 2009). Indirect updating reduces the stress arising from threat of professional obsolescence because the "pressure (to update) is delegated to (or shared with) other members in the unit" (Pazy 1994, p. 1179). By delegating the updating to others and

maintaining a directory of expertise, individuals benefit by being able to access knowledge and expertise of others when needed (Wegner et al. 1991).

Applying the conservation of resources theory to the threat of IT professional obsolescence, we posit that argue that IT professionals perceive professional obsolescence as a threat because it erodes their IT competencies. In response, IT professionals will either directly or indirectly update their IT competencies. While both direct and indirect updating resolve occupational stress (Pazy 2004; Tsai et al. 2007), IT professionals would more likely respond to the threat of professional obsolescence through direct updating rather than by indirect updating because "(direct) updating is the most direct way of coping with the (professional) obsolescence threat, as it literally reduces (subsequent professional) obsolescence" (Pazy 1996 p. 261). The assertion that direct updating is the most direct approach to obtain, retain and protect their resources, i.e. IT competencies, is consistent with the theory of conservation of resources.

Indirect updating is utilized when IT professionals assess that professional obsolescence is an unchangeable situation and "when they believe that nothing constructive can be done about the stressor and that the problem is something that they must endure" (Tsai et al. 2007 p. 403). Indirect updating, in contrast, does not directly address the threat to one's competencies (Pazy 1994) because indirect updating leads to further erosion of IT professionals' IT competencies (Tsai et al. 2007). Indirect updating entrusts the responsibility of resource acquisition and facilitation to others and, realistically, to no one in particular. In the IT context, IT professionals emphasizing indirect updating more than direct updating have been shown to respond to the threat of professional obsolescence by looking to others for updated IT competencies (Pazy 1994) and by defeatism (Tsai et al. 2007). Hence,

> *Hypothesis 1a: The threat of professional obsolescence is positively related to direct updating.*

> *Hypothesis 1b: The threat of professional obsolescence is negatively related to indirect updating.*

Moderating Role of Organization Updating Climate

IT research is in consensus that organization support plays a crucial role in developing IT professionals' competencies (Ferratt et al. 2005; Joseph et al. 2007). Organization updating climate represents individuals' socially influenced perception of technologies, management policies, supervisor practices, peer relationships and other salient work environment features (Kozlowski et al. 1987; Potosky et al. 2002). It is conceptualized as a psychological climate where individuals interpret and assign meaning to the salient features in the organizational context (Wingreen et al. 2007). In essence, organization updating climate provides IT professionals with psychological support to acquire new and up-to-date IT competencies (Schambach 1994). Accordingly, we propose organization updating climate as a proximal moderator influencing the relationship between the threat of professional obsolescence and coping behaviors.

Research on organizational updating climate has yet to examine its role in coping with professional obsolescence. The literature on learning cognitions shows that situational cues supporting learning are strongly associated with acquisition of new knowledge and skills (Potosky et al. 2002). Organization updating climate, as a situational cue, motivates technical professionals towards behaviors congruent with competency maintenance and acquisition (Kozlowski et al. 1987). It follows, then, that the relationship between the threat of professional obsolescence and updating behaviors would be influenced when the organization climate supports updating. A positive organization updating climate would be consistent with IT professionals' direct updating beliefs and efforts to acquire new IT competencies and conserve those currently held (Wingreen et al. 2007).

A positive organization updating climate, by providing a supportive work environment within which IT professionals may further develop their skills, would strengthen the positive relationship between the threat of professional obsolescence and direct updating. In turn, a positive organization updating climate would strengthen the negative relationship between threat of professional obsolescence and indirect updating. It would do so because a positive organization updating climate motivates updating of IT competencies in IT professionals who would otherwise delegate that responsibility to others. Hence,

> *Hypothesis 2a:*   *The relationship between threat of professional obsolescence and direct updating is moderated by organization updating climate such that organization updating climate strengthens this positive relationship.*

> *Hypothesis 2b:*   *The relationship between threat of professional obsolescence and indirect updating is moderated by organization updating climate such that organization updating climate strengthens this negative relationship.*

METHOD

Data Collection

Data for this study was gathered via a web-based survey. Email invitations were sent to members of a national IT association inviting them to participate in the study. A total of 1,449 IT professionals completed the survey, representing a response rate of about 24.15%, based on total membership figures provided by the national IT association.

Sample

The median age of respondents in this study was between 31 to 35 years old with an average working experience of 12.83 years (SD = 8.62 years). Their average organization tenure was 6.02 years (SD = 6.50 years). The sample comprised of 71.70% males and 28.30% females. Of the 1,449 IT professionals in the sample, 81.44% attained at least a bachelor's degree and the remaining 18.56% possessed less than a bachelor's degree. The IT professionals surveyed held job roles in both IT management (e.g. chief information officers, applications development managers and project managers), systems development (e.g. systems analyst, and programmers) as well as IT infrastructure (e.g. data center operatives, network administrators, and database administrators).

Measures

The questionnaire completed by the respondents contained multiple measurement items relating to each of the constructs in the model. Wherever possible, we used scales validated in previous studies. For the remaining constructs, we used sets of items generated based on reviews of prior relevant literature. For all items, respondents were asked to indicate the extent to which they agreed or disagreed with the statements on a seven-point Likert-type scale, anchored by "1" = "Strongly disagree" and "7" = "Strongly agree."

The dependent variables in this model are *Direct Updating* and *Indirect Updating*. We developed the five items of *Direct Updating* from O'Mahony and Bechky (2006)'s seminal paper on the stretchwork of IT professionals. Items for *Indirect Updating* were developed from Pazy's (1990; 1994; 1996) qualitative study on cognitive coping schemata of professional obsolescence. The independent variable in the model is *Threat of Professional Obsolescence*. The *Threat of Professional Obsolescence* was measured with two items based on research by Pazy (1990; 1994; 1996).

The four items for the moderating variable, *Organization Updating Climate*, were adapted from Kozlowski and Hults (1987).

The covariates in the model were *Sex*, *Educational Level* and *Work Experience* as these factors are shown to influence choice of coping mechanisms (Wells et al. 1999). *Sex* was measured with a dichotomous variable indicate Male as "0" and Female as "1". *Educational Level* was measured with a polytomous ordinal variable with "1" indicating High School Diploma, "2" indicating Associate degree, "3" indicating Bachelors degree and "4" indicating Postgraduate Degree. Finally, *IT Experience* was measured with a continuous variable indicating the total IT work experience held by an individual.

Data Analysis

We tested our hypotheses with structural equations modeling using LISREL 8.80 (Jöreskog et al. 2006). Structural equations modeling (SEM) is suited for this study because it enables researchers to "answer a set of interrelated research questions in a single, systematic and comprehensive analysis" (Gefen et al. 2000, p. 3). SEM also allows researchers to: (a) model relationships among multiple dependent and independent variables; (b) to construct and assess the viability of unobservable latent variables; (c) model measurement errors for observed variables; and (d) statistically test a priori substantive/theoretical and measurement assumptions against empirical data with the use of a confirmatory analysis (Chin 1998).

Following recommended practice, we used a two-step analytic approach (Anderson et al. 1988), where we first evaluated the measurement model to assess the validity and reliability of the measures, before testing the structural model to assess the strength of the hypothesized links among the variables.

RESULTS

Measurement Model

The acceptability of the measurement model is assessed by the model's convergent and discriminant validities. Convergent validity was supported as all items loaded on respective constructs and were statistically significant (minimum t = 8.43, $p <$ 0.001). In addition, all composite reliability estimates were close to or greater than 0.80 (Bagozzi et al. 1988). Discriminant validity was supported by all constructs as each construct's average variance extracted (AVE) was greater than 0.50, and the

square root of the AVE was greater than the correlations among the constructs (Fornell et al. 1981). Discrimimant validity was also assessed through confirmatory factor analysis (Anderson et al. 1991). Results of the proposed four-factor structure (threat of professional obsolescence, direct updating, indirect updating and organizational updating climate) demonstrated good fit with the data (χ^2 = 44.30, df = 98, p < 0.001; $RMSEA$ = 0.049; $SRMR$ = 0.045; $NNFI$ = 0.98; CFI = 0.98) with all fit indices above recommended values (Hu et al. 1995).

Analysis of the Structural Model

The model fit statistics (χ^2 = 529.03, df = 146, p < 0.001; $RMSEA$ = 0.043; $SRMR$ = 0.038; GFI = 0.96; CFI = 0.98) indicate an acceptable model following the established standards (Hu et al. 1995; Steiger et al. 1980). The results below, i.e. the path coefficients, from the structural model are interpreted as standardized betas. In addition, the predictive strength of a hypothesized model can be assessed with its total explained variance. The model explained 9.0% of the total variance in direct updating and 3.0% of the total variance in indirect updating.

Threat of Professional Obsolescence and Coping Behaviors

Hypothesis 1a posited that the threat of professional obsolescence is positively related to direct updating. Supportive of Hypothesis 1a, we find that the threat of professional obsolescence is positively related to direct updating (β = 0.180, t = 6.23, p < 0.001). The results indicate that a standard deviation increase in the threat of professional obsolescence results in an 18% increase in direct updating.

Hypothesis 1b posited that the threat of professional obsolescence is negatively related to indirect updating. Supportive of this hypothesis, the threat of professional obsolescence is negatively related to indirect updating (β = -0.090, t = 2.94, p < 0.001). This result indicates that a standard deviation increase in the threat of professional obsolescence results in a 9% decrease in indirect updating.

Moderating Role of Organization Updating Climate

Hypothesis 2a concerns the moderating role of organization updating climate in the relationship between threat of professional obsolescence and direct updating. Supportive of Hypothesis 2a, we find that organization updating climate strengthens the positive relationship between threat of professional obsolescence and direct updating (β = 0.080, t = 3.23, p < 0.001). Specifically, we find that the positive relationship between threat of professional obsolescence and direct updating is strengthened for IT professionals in organizations with higher levels of organization updating climate compared to IT professionals in organizations with lower levels of organization updating climate.

Hypothesis 2b concerns the moderating role of organization updating climate in the relationship between threat of professional obsolescence and indirect updating. We find that the interaction of organization updating climate with the threat of professional obsolescence is negatively related to indirect updating (β = -0.070, t = 2.300, p < 0.001). We find that at low levels of threat, IT professionals in organizations with higher levels of organization updating climate participate in lower levels of indirect updating compared to IT professionals in organizations with lower levels of updating climate. Yet at high levels of threat, IT professionals in organizations with higher levels of organization updating climate participate in *higher* levels of indirect updating compared to IT professionals in organizations with lower levels of updating climate.

DISCUSSION

We undertook this study to examine the broad research question of how IT professionals cope with the threat of professional obsolescence and to examine the role organizations play in moderating their coping behaviors. In doing so, this study contributes to the IT discipline and the broader management literature in two important ways. This study extends literature examining issues relating to the professional obsolescence of IT professionals (Joseph et al. Forthcoming-b; Rong et al. 2009; Tsai et al. 2007) by empirically testing a moderated model of coping and of organizational support in managing the threat of professional obsolescence. Although prior research (e.g. Joseph et al. Forthcoming-b; Rong et al. 2009; Tsai et al. 2007) has consistently found that IT professionals under the threat of professional obsolescence update their IT competencies by direct as well as indirect means, the boundary conditions remained unknown. A disparate stream of studies showed the importance of a supportive organizational support in updating activities (e.g. Kozlowski et al. 1987; Potosky et al. 2002). Yet, little is known about the differential effects of updating under varying levels of threat of professional obsolescence and of organization updating support. This study, thus, begins to unify these two streams of disparate research. Two, this study answers Kozlowski and Farr (1988)'s call for research to examine the interaction between individual factors and perceived situational features when examining technical professionals' voluntary updating efforts. Answering this call, we contribute to

the IT and management literature by extending the theory of conservation of resources (Hobfoll et al. 1993) by including the role of situational cues in this theory (Hobfoll 2002).

This study finds that IT professionals who perceive the threat of professional obsolescence respond by more likely enacting direct updating activities rather than indirect updating activities. These findings are consistent with the theory of conservation of resources (Hobfoll 2002). The theory of conservation of resources proposes that individuals will seek to protect their resources when these resources are threatened by professional obsolescence. We find that IT professionals protect their recourses by directly updating rather than indirectly updating their IT competencies.

Interestingly, we find new evidence of differential updating varying by levels of threat or professional obsolescence and organization updating support. The findings indicate that IT professionals in organizations with higher updating support, irrespective of the levels of threat of professional obsolescence, directly update more than IT professionals in organizations with lower levels of updating support. Yet, at high levels of threat, IT professionals who receive higher levels of updating support from their organizations are more likely to undertake more of both direct and indirect updating compared to IT professionals in organizations with lower levels of updating support. At low levels of threat, IT professionals in organizations with higher levels of updating support report less indirect updating compared to IT professionals in organizations with lower levels of organization updating support.

Therefore, at higher levels of threat of professional obsolescence, it could be that IT professionals in organizations with higher levels of updating support are complementing direct updating with indirect updating to stay up-to-date with the latest information technologies. At lower levels of threat, IT professionals in these organizations may substitute direct updating for indirect updating, suggesting a substitutability of coping approaches. As this finding is new to the literature on coping in the face of professional obsolescence, future research should examine the complementarity of coping mechanisms. Such research adds to a rare set of studies examining the conditions under which coping mechanisms are enacted (Jex et al. 2008). The practical implication of this finding is clear – organizations should consider supporting the professional updating of their IT professionals. Organization updating climate appears to maximize the benefits derived from both direct and indirect updating to protect and acquire IT competencies (Kozlowski et al. 1987; Potosky et al. 2002). By not supporting their updating efforts, organizations risk not having the necessary up-to-date IT competencies to implement the latest information technologies.

Finally, future research examine whether there are differential individual level outcomes with varying magnitudes of threat of professional obsolescence (Pazy 1990). As noted by Pazy, if the threat of professional obsolescence is too low, it may have a numbing effect on IT professionals who are unlikely to be motivated to update their IT competencies. Thus, future research could adopt an experimental approach to study the relationship between the magnitudes of threat and their consequences.

Extending the focus on the threat of professional obsolescence construct, future research could examine the antecedents of the threat perception. One line of inquiry may seek to examine the role played by organizations' technology investments or changes in the operating environment as triggers of the threat perception. It could be that changes in the broader technology environment and the nearer organization technology environment exert different magnitudes of pressure to update.[1]

CONCLUSION

In conclusion, this study examines a critical issue confronting IT professionals – how IT professionals cope with the threat of professional obsolescence and how organizations may support IT professionals' updating activities. As there is limited theoretical and empirical IT research examining the threat of professional obsolescence, its etiology, structure, or consequences, we heed the call made by prior research to examine how IT professionals cope with this threat of professional obsolescence (Pazy 1990; Tsai et al. 2007) and examine the outcomes of coping with such threats (Jex et al. 2008). In doing so, this study establishes the basic tenets of the theories employed and also raises interesting directions for future research.

This study also has clear implications for IT practice. This study finds strong support for the moderating role of organizational updating climate in facilitating coping mechanisms in the presence of a threat of professional obsolescence. Particularly, higher levels of organization updating support helps IT professionals learn about new information technologies by directly as well as indirectly experiencing them. Learning from both approaches have been shown to significantly improve task performance by developing a deeper and broader understanding of the issues at hand (Gino et al. 2010). By contrast, IT professionals in organizations providing less updating support are left to emphasize vicarious updating.

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[1] We thank a reviewer for this suggested call for future research, i.e. to examine the antecedents of the threat of professional obsolescence.

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