The Effects of Social Capital on Individual Adaptation to New ICT

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***Abstract*—This study examines how the social capital derived from social networks influences individual adaptation to a new information and communication technology system and its related performance levels. On the basis of social capital theory, we establish a research model that combines social network variables with psychometric ones. The proposed research model was empirically tested using the Partial Least Squares method. The results reveal that individuals' adaptation mechanisms can be explained in terms of their positions within social networks. We conclude by discussing the implications of the research findings.**

Keywords-social networks; social capital; adaptation; ICT

I. INTRODUCTION

Most of today's organizations have used Information and Communication Technology (ICT) to achieve their competitive advantage as well as to operate daily work practices, which makes the effective use of ICT by organization members a necessary condition for successful business. As a consequence, a primary challenge facing organizations with the intent of introducing a new ICT for the business purposes is how to adapt organization members to the major technological changes that have an impact on their business operations and strategy.

Despite the growing attention to the effective utilization of the ICT system in the workplace, however, there is an accumulation of evidence from the literature indicating that organizations do not utilize newly introduced ICT systems to their full functional potential and a number of new implementations continue to fail [2][4]. We explore the reasons for the underutilization of new ICT by focusing on the two barriers related to individual's coping process for adapting to ICT-induced changes. On one hand, from the technical perspective, today's ICT is complex and raises significant challenges for organization members, particularly by overwhelming them with numerous features and the accompanying learning requirements [5]. Users thus face knowledge barriers to system adaptation even after a formal introduction of the system [3]. On the other hand, from the organizational and social perspective, the introduction of new ICT tends to bring a disruptive workplace change, for example, a new way of order fulfillment process induced by a new ERP (Enterprise Resource Planning) system, which might lead to a sense of anxiety and uncertainty about the future among organization members. Users thus face emotion barriers to system adaptation even though they are knowledgeable about the system. Therefore, understanding the effective use of ICT with a focus on an individual's coping mechanism towards knowledge and emotion barriers will help us in devising ways to manage individual adaptation processes and thereby achieve the enhanced performance.

With the aforementioned motivation and background, this paper has the following research objectives: First, this study develops a research model of system adaptation and how it affects performance and reflects on individual coping mechanisms. Second, this paper introduces key social network constructs into the research model, thereby extending the applicability of social network research into the information systems field. Third, the proposed research model demonstrates a role of social network perspective in explaining system adaptation by combining traditional psychometric constructs with ones from social network domain and empirically validating the model.

The rest of the paper is structured as follows. In Section 2, we present the research model and hypotheses. In Section 3, we describe the research methodology. Section 4 presents the analysis and results. Finally, we conclude the work in Section 5.

II. RESEARCH MODEL AND HYPOTHESES

We developed a research model to explain the coping mechanism towards ICT-induced changes based on the perspectives of social capital theory. We propose the following hypotheses.

H1a. Supportive network position has a positive effect on self-efficacy.
H1b. Supportive network position has a positive effect on absorptive capacity.
H2a. Informational network position has a positive effect on self-efficacy.
H2b. Informational network position has a positive effect on absorptive capacity.
H3. Self-efficacy has a positive effect on absorptive capacity.
H4. Self-efficacy has a positive effect on individual adaptation.
H5. Absorptive capacity has a positive effect on individual adaptation.

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H6. Individual adaptation has a positive effect on individual performance.

III. RESEARCH METHODOLOGY

The questionnaire administered in this study largely consisted of two parts, which investigated social network constructs and traditional psychometric constructs. We collected social network data using a two-step name generator/name interpreter method that elicits and then characterizes respondents' (egos') relationships with others (alters). In this study, a social network is seen as a set of individuals and the relationships between them in which the relationships represent communication or interaction directed towards exchanging task-related information (informational networks) or gaining emotional support (supportive networks). Traditional social network studies have devised various measures to assess the extent to which individuals have such kinds of relationships [6][7]. Based on those studies, we propose that individuals' social network positions are determined by size, closeness, frequency, and density derived from individuals' social networks. The items used to operationalize the psychometric constructs included in this study were adopted and modified primarily from previous studies, with necessary changes for the research context. All question items except for the performance measurement were measured using a seven-point Likert-type scale with anchors ranging from strongly disagree (=1) to strongly agree (=7).

IV. ANALYSIS AND RESULTS

The proposed hypotheses were tested using PLS (Partial Least Squares) [1]. We selected PLS for the following reasons. First, PLS simultaneously explains the theoretical relationships between latent variables and indicators. Second, PLS does not assign the same weight to all indicators of a latent variable; it assigns different weights according to the indicators' degrees of contribution to the latent variable [8]. Third, PLS does not impose strong constraints on sample size compared with other structural equation modeling techniques, such as LISREL [1].

According to the two-step analytical procedure, we first conducted confirmatory factor analysis in order to evaluate the measurement model, and then we examined the structural model. The results of the structural model analysis are described with standardized path coefficients and t-values. The significance values of all the paths in this model were generated using the bootstrap resampling procedure. Self-efficacy was significantly influenced by supportive network position ($\beta = 0.263$; $t = 4.176$) but not informational network position ($\beta = 0.021$; $t = 0.284$), which accounted for 7.4 percent of the variance in self-efficacy. Absorptive capacity was significantly related to informational network position ($\beta = 0.227$; $t = 4.274$) and self-efficacy ($\beta = 0.801$; $t = 26.302$) but not supportive network position ($\beta = -0.013$; $t = 0.367$), which explained 72.8 percent of the variance in absorptive capacity. Self-efficacy ($\beta = 0.193$; $t = 2.071$) and absorptive capacity ($\beta = 0.693$; $t = 8.027$) were significantly related to individual adaptation, and accounted for 73.8 percent of the variance in individual adaptation. Finally, individual adaptation was significantly related to individual performance ($\beta = 0.601$; $t = 13.500$), explaining 36.2 percent of the variance in individual performance.

V. CONCLUSION

This research has shown that the social capital derived from organization members' social network positions aids in our understanding of coping processes toward the introduction of a new ICT system. The proposed research model suggests that emotion-focused coping processes are associated with individuals' positions within supportive networks, while problem-focused coping processes are related to individuals' positions within informational networks. The empirical results show that individual adaptation is enhanced by organization members' self-efficacy and absorptive capacity, which in turn are influenced by their supportive and informational network positions, respectively. The results of this study also revealed that the social network perspective might play an important role in investigating various IS (Information Systems)-related issues by integrating with the traditional research perspective. Such an approach would provide an alternative lens through which to view the domain of IS research, as well as an alternative instrument for managerial intervention.

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