A Moderated Mediation Study: Cohesion Linking Centrifugal and Centripetal Forces to ERP Implementation Performance

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A B S T R A C T

A successful implementation of the enterprise resource planning (ERP) system has become a critical facilitator for efficient operations management in enterprises. Due to the ERP system implementations being managed via the group, project team cohesion is often involved in the process of ERP group implementation (Wang et al., 2006). In this study, the researcher attempted to evaluate the effects of team members' centrifugal and centripetal forces (CCFs) in regard to ERP implementation performance and project team cohesion, which affects the CCFs and successful ERP implementation. The results were investigated from a survey of 305 respondents that was collected from the members of ERP groups in small and medium-sized enterprises (SMEs) in Taiwan. In addition to the centripetal forces being significantly positively related to ERP implementation performance and centrifugal forces not being significantly related to ERP implementation performance, the researcher also found that cohesion moderated the relationships between the CCFs and ERP implementation performance. Moreover, high centrifugal forces through cohesion lead to more successful ERP implementation when there are high centripetal forces than do low centrifugal forces through cohesion. However, the low centrifugal forces through cohesion lead to more successful ERP implementation when there are low centripetal forces than do high centrifugal forces through cohesion. In this study, we suggested that enterprises should use cohesion effectively to improve ERP implementation performance.

1. Introduction

In recent years, the implementation of ERP was used to provide enterprises with a competitive advantage and enhance the quality of the service (Wu et al., 2008; Lopez and Salmeron, 2014). The ERP systems are an integration of the business processes and information systems of an enterprise (Boonstra, 2006). The implementation of the ERP system is typically needed to standardize the business processes that are embedded in the software, while still being based on the previous features of the organizational structure that is transformed into the process-oriented organizational structure (Al-Mashari et al., 2003; Benders et al., 2006; Yeh and Xu, 2013; Chou and Hong, 2013).

In fact, the failure rate of ERP implementations was approximately 40% to 60%, according to the previous study (Umble et al., 2003; Choi et al., 2013). The main factor that led to this failure was the input of resources being beyond the initially expected needs. Therefore, the implementation of ERP is often considered to be a complex, cumbersome, expensive and high-risk process. The implementation of ERP systems requires the effective participation of the entire enterprise. Failures related to the implementation of ERP are often only focused on the system's problems rather than on the enterprise's organizational factors, such as the communication between sectors, the management of the system, the support of the management levels, etc. (Ahmad and Cuenca, 2013; Choi et al., 2013). The implementation of the ERP system has a higher risk of failure than ordinary systems do. Sometimes, this system may also endanger the completion of core tasks within the organization. Thus, the issue of ERP implementation is very important, which contributed to the motivation for this study.

In this study, we used the centripetal and centrifugal forces (CCFs) model that was introduced by Sheremeta (2000) regarding the development of innovative products under time limitations. The CCFs model can explain the increasing success rate of product development by using the contradiction of structural elements and processes. Additionally, Atuahene-Gima (2003) conducted an empirical experiment regarding the influence of the CCFs model on the speed and quality of product development. The above studies indicated that the CCFs model has an effective problem-solving ability that affects performance indirectly.

The implementation of ERP systems usually requires teamwork, so the effects of centripetal and centrifugal forces (CCFs) on the
implementation of ERP are important research topics (Chien et al., 2007). Team management is also considered to be a key factor in ERP implementation (Sammon and Adam, 2010; Tsai et al., 2011; Wang et al., 2008; Wang et al., 2006). The team members have different knowledge sets because the team is usually composed of temporary, task-oriented people, professionals who are usually the key users of the process, information professionals and other interested people from different backgrounds to ensure the team's diversity and representativeness (Tsai et al., 2011; Hsu, 2013).

Regarding the issues of managing the complex project team, individual and team development, as well as psychological issues, are increasingly recognized as being key factors that affect the successful implementation of ERP (Chiocchio and Essiembre, 2009; Edum-Fotwe and McCaffer, 2000; Zika-Viktorsson et al., 2003; Tyssen et al., 2013). Related to this concept, the performances of teams rely on the collaboration and cohesion of the team members (Chiocchio and Essiembre, 2009). In regard to the study of cohesion, researchers have generally agreed that cohesion has a positive influence on team performance, which includes direct and indirect effects (Beal et al., 2003; Chiocchio and Essiembre, 2009; Huntona et al., 2001; Wang et al., 2006; Borrego et al., 2013). Wang et al. (2006) also illustrated that team cohesion has a positive influence on the successful implementation of ERP systems for the enterprises in the study.

The individual impacts of the CCFs and cohesion on the implementation of ERP systems have been discussed, but there is no study that discusses the correlations between CCFs, cohesion and the successful implementation of ERP systems. This study uses CCFs as the theoretical model to explore the effects of centrifugal forces, centripetal forces and cohesion on the successful ERP implementation performance of the project team.

The purposes of this study are as follows: (1) whether centrifugal or centripetal forces have positive or negative effects on successful ERP implementation; (2) how cohesion affects the effects of centrifugal or centripetal forces on successful ERP implementation; (3) whether cohesion has positive or negative effects on centrifugal and centripetal forces; and (4) what the role of cohesion during ERP implementation may be.

The framework of this paper is illustrated as follows: First, the relevant literature regarding centrifugal forces, centripetal forces, cohesion, and successful ERP implementation and the development of these constructs for a research model is reviewed. Then, the research hypotheses are presented, and a research model is proposed. Thirdly, the researching procedures and measurement issues are addressed by using an SPSS macro application for hypothesis testing. Finally, the results of this study and their implications are clarified.

2. Theory and hypotheses

2.1. Successful ERP implementation performance

Successful ERP implementation performance for enterprises often uses multiple parameters, such as time, cost, and functionality, to assess whether the intended objectives are being achieved by the evaluation criteria (Markus et al., 2000; Shaul and Tauber, 2013; Bernroider, 2013; Lima et al., 2013). In this study, successful ERP implementation performance is evaluated by examining the differences between the empirical results and the expected purposes in regard to whether the project is completed within the expected time and the expected budget and whether the appropriate ERP system should be adopted to achieve the necessary level of effectiveness (Chien et al., 2007; Hong and Kim, 2002; Zhang et al., 2003; Ram et al., 2013).

2.2. Cohesion and successful ERP implementation performance

“Cohesion” generally refers to the intentions and tendencies of the group members in regard to building social relationships and promotes close relationships between the members of a team (Evans and Dion, 1991; Gully et al., 1995; Casey-Campbell and Martens, 2009; Chiocchio and Essiembre, 2009; Quintane et al., 2013), which attracts the groups to the members (Evans and Jarvis, 1980). Cohesion is often created by the members of the group when unity, harmony and commitment are elicited within the group (Mudrack, 1989). Cohesion also includes related features, such as links, tightness and cohesiveness (Granovetter, 1973; Widmeyer et al., 1985). Thus, cohesion can be described as a type of lubricant that can minimize the friction between the personnel in the system (Mullen and Copper, 1994). Moreover, several researchers stated that it is more appropriate to emphasize group cohesion between the members in general and learning commitment when the information system is implemented (Beal et al., 2003; Carron and Brawley, 2000; Dion and Evans, 1992; Mudrack, 1989; Wang et al., 2006). In this study, the definition of cohesion refers to the ERP implementation team's interpersonal attraction, including its respect for the views of its members, group consciousness, and goal similarity (Carron et al., 1995; Huntona et al., 2001; Beal et al., 2003; Wang et al., 2006; Castano et al., 2013; Wood et al., 2013).

Successful ERP implementation performance depends on the application of organizational change and innovation to the unique difficulties in implementation that usually need to be addressed by the enterprise's cross-sectorial composition of the team (Wang et al., 2006). However, in regard to the key factors that are related to the failure of ERP implementation performance, certain empirical studies displayed above 31% of the accumulated variation volume due to organizational factors and project management factors (Amid et al., 2012), especially factors related to human resources management and management communication (Boltena and Gomez, 2012). Thus, these are important factors for ERP implementation in regard to the operation and management of the project team.

In regard to the integrated analysis of research, especially related to the cooperation of the communication team, cohesion is an important factor that predicts team performance (Gully et al., 1995). For example, the performance of the research and development team members can be catalyzed, promoted and expressed by cohesion and knowledge sharing, thereby increasing team performance (Huang, 2009; Bercovitz and Feldman, 2011). Additionally, studies have shown that creative thinking is promoted by the restriction of relevant skills is quenched by cohesion, communication, coordination and other quality regulation strategies that affect the team's performance (Hoegl and Parboteeah, 2007). It is worth mentioning that a high degree of self-management competencies and cohesion can enhance the productivity of a diversified team (Millikin et al., 2010). For a team that requires a higher degree of cooperation and communication, cohesion is an important indicator of team performance (Gully et al., 1995; Huang et al., 2011). Cohesion is more influential for high complexity.
the quality of communication and cooperation. This group can derive various information through the use of high centrifugal forces, which leads to successful ERP implementation performance due to integration (similar to situation for sardines). The members will naturally come together in the end and swim towards the same target due to cohesion.

6. Conclusions and future research

When ERP teams were complemented more, they were more concerned about research regarding academia and industry. Most previous studies have focused on discussing the key factors of successful ERP implementation, but the studies rarely mentioned the team members. Thus, this study evaluated the interactive relationships between the team’s centrifugal forces, centripetal forces, cohesion and successful ERP implementation performance, based on the CCFs model. Based on the result that is shown in this empirical study, the team management of the enterprise during ERP implementation is recommended, based on ERP implementation targets, to provide centripetal forces (clearly defined project duration, objectives and recognition of the appropriate project manager) and centrifugal forces (decentralization, free flow of information and connectedness). Furthermore, the cohesion of the project team members effectively lubricates the team dynamics to achieve the best ERP implementation performance.

Several limitations in the current study should be addressed. The generalizability of the findings remains limited because the sample data came from SMEs in Taiwan. Therefore, empirical studies should extend the sampling to different large enterprises. Additionally, the enterprise's organizational culture outside Taiwan may differ from the prevailing culture in Taiwan. Future studies should extend to the United States, European countries, etc. This study was an empirical study on ERP implementation. It is worth noting that longitudinal data from large-scale ERP groups can benefit the examinations of the effects of centrifugal and centripetal forces on ERP implementation success. Future case studies would do well to address these aforementioned issues.

References

