Exploring the interaction between vertical and shared leadership in information systems development projects

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Abstract

Leadership is a critical issue in the management of information systems development (ISD) projects. Recently, the importance of shared leadership (SL) has been emphasized alongside traditional vertical leadership (VL). Based on role theory, this study investigates the interactions between VL and SL within ISD project teamwork. We first propose value diversity reduces system quality by preventing a project team from adopting SL strategies. We further hypothesize that interventions by the formally assigned leader will ease the negative impact of value diversity on SL, and provide remedies when the effectiveness of SL is low. We tested these concepts using data collected from 90 ISD teams, and the results aligned well with our expectations (1) that SL partially mediates the negative impact of value diversity on system quality, and (2) that effective VL can both mitigate the adverse impacts of value diversity on SL, and stabilize teamwork when SL is absent.
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1. Introduction

System quality has long been utilized as a critical dependent variable in information systems (IS) studies. For example, DeLone and McLean (1992) identified it as one antecedent of system usage and satisfaction. System quality is still considered a critical factor in levels of satisfaction and whether system usage will continue (Forsgren et al., 2016; Peters et al., 2016). From a two-factor perspective, system quality is a "must-be" condition of contemporary information systems: while high system quality is not associated with satisfaction, low system quality is associated with dissatisfaction and usage reductions (Lee et al., 2009). In addition, many project management studies touching on information systems development (ISD) have employed system quality as a proxy for the product quality of the project outcome (de Araújo et al., 2017). This indicates that *team performance* in ISD contexts now refers not only to accomplishing a project within budget and on schedule, but to developing a system that is reliable and flexible.

The inherent cross-functional nature of ISD projects demands true collaboration among different stakeholders, including team members, user and other involved parties across disciplines, functions, and organizations. Conflicts are unavoidable between stakeholders or even members with diversified backgrounds since their understandings toward client demand and project goal are different. The presence of relational conflict undermines the quality of team outputs (De Wit et al., 2012). Although the impacts of diversity on teamwork have been well recorded in the literature, the impacts of value diversity in ISD context has been under studied. In the ISD context, system quality is context

dependent and defined not only by technical performance specifications but also by the consensus of related parties such as users and developers, etc. (Forsgren et al., 2016). Thus, assuring the quality of the developed system is critical task for ISD project teams with diversified members, and merits considerable scholarly attention.

Leadership is critical to effective teamwork (Yukl, 2002) and is an antecedent of information technology (IT) quality, which includes system quality among other components (Prybutok et al., 2008). The importance of leadership has been increasing as teamwork-based structures replace hierarchical ones within organizations (Avolio et al., 2009). Leadership from formal or designated leaders is a traditional research area in IT project management studies (Sharma and Rai, 2003; Thite, 2000), which generally term it *vertical leadership* (Pearce, 2004). In contrast to vertical leadership, leadership involving emergent leaders is called *distributed* or *shared leadership*. An uncertain and rapidly changing business environment is reshaping contemporary ISD teams in the direction of flatness and agility, making such teams more likely to adopt shared-leadership approaches. Structurally, flatness allows information to flow quickly within a project team, while methodologically, agile approaches allow teams to counter uncertainty effectively through incremental and iterative work cadences. A flat and agile teamwork style also enriches the range of roles that individual members can play in the teamwork process. For example, individual team members may take a leadership role in particular areas or stages of system develop-ment, even though a different leader has been officially designated (Ensley et al., 2003; Pearce and Sims, 2002). The shared-leadership phenomenon and its impact on teamwork outcomes have attracted significant attention from both practi-tioners and researchers (e.g. Sivasubramaniam et al., 2002; Carson et al., 2007).

The complex and knowledge-intensive nature of ISD projects requires that increasing numbers of individuals with diverse backgrounds and knowledge bases collaborate with each other (Xia and Lee, 2005). Partly for this reason, it is becoming difficult for any individual project leader to perform all leadership functions successfully; and shared leadership therefore shows some promise as a strategy for increasing ISD projects' success rates. However, within-team diversity implies that team members may possess different value systems. Team-composition studies have found that high levels of *value diversity* – the extent to which members have divergent understandings of the goals, tasks, and missions of teamwork – can have significantly negative effects on teamwork outcomes (Mathieu et al., 2008), either directly or indirectly (Jehn et al., 1999).

In addition to the benefits of shared leadership, research on project teamwork has focused on factors that drive team members to perform leadership functions, or that block them from doing so. Shared values have been identified as critical antecedents of shared leadership (Carson et al., 2007). Because shared leadership is a process whereby team members who have taken on leadership functions seek to influence other members (Yukl, 2002), it works best in environments where people have similar understandings of their teams' objectives,

and can therefore accept such influences. A lack of mutual understanding of goals, in contrast, introduces barriers to effective shared leadership, which in turn tends to harm final teamwork outcomes (Jehn et al., 1999; Liang et al., 2012; Harrison and Klein, 2007; Lim and Klein, 2006; Klimoski and Mohammed, 1994). Accordingly, our first research question is "*Does value diversity's reduction of teamwork performance operate via an undermining of shared leadership?*"

Since value diversity is both inevitable and may be harmful to project performance, easing its negative impact on shared leadership and final performance is vitally important to ISD professionals. Nishii and Mayer (2009) have pointed out that, though team diversity reduces member satisfaction and viability, strong leadership can suppress this effect. Such a finding implies that vertical leadership may be needed when team members' divergent or conflicting viewpoints threaten its performance. We therefore hypothesize that vertical leadership will, under some circumstances, ease the negative impact of such divergences or conflicts on shared leadership. Prior studies of shared leadership have mostly confirmed its critical role in teamwork processes and outcomes, with some finding that it explained more variance in outcome variables than vertical leadership did (e.g. Hoch and Kozlowski, 2014; Ensley et al., 2006; Pearce and Sims, 2002). Despite its importance, however, shared leadership cannot be maintained continuously, and teamwork outcomes suffer when it is absent or weak. It would therefore be valuable to gain a clear understanding of what actions vertical leaders can take to mitigate the adverse effects of low levels of shared leadership – especially in light of Pearce's (Pearce, 2004) finding that effectively leveraging both these types of leadership is critical to positive teamwork outcomes. Therefore, our second research question is "*Can vertical leadership mitigate the negative impact of value diversity on shared leadership, and/or ease the unwanted impact of low levels of shared leadership on teamwork outcomes?*"

According to role theory, individuals may accept social norm and perform behaviors expected by others (role-taking) and construct new roles for themselves via changing some features of the expected behaviors (role-making). Given our definition of leadership as a process of influencing others to facilitate goal-related efforts (Yukl, 2002), we argue that team members with diverse values go through the role-making and role-taking phases of the ISD process on the way to figuring out their team's expected behaviors and common goals, before taking action to deliver those common goals. We propose that lack of shared purpose/values undermines teamwork performance through inhibiting team members from performing leadership functions efficiently. We propose that vertical leaders of ISD teams seeking to foster a suitable environment for members' exercise of leadership functions will experience more success in doing so if they deal head-on with the issue of value diversity by promoting a shared leadership role to all team members in the role-making process. Additionally, when team members are not able to perform shared-leadership functions well, a vertical leader may be able to serve as a backup in the role-taking process and complete necessary project tasks. As such, the effectiveness of the role-making and role-taking processes within which vertical and shared leadership occur should be reflected in the quality of