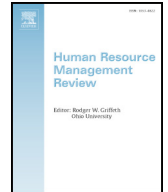


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## Cross-boundary teaming for innovation: Integrating research on teams and knowledge in organizations

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### ABSTRACT

Cross-boundary teaming, within and across organizations, is an increasingly popular strategy for innovation. Knowledge diversity is seen to expand the range of views and ideas that teams can draw upon to innovate. Yet, case studies reveal that teaming across knowledge boundaries can be difficult in practice, and innovation is not always realized. Two streams of research are particularly relevant for understanding the challenges inherent in cross-boundary teaming: research on team effectiveness and research on knowledge in organizations. They offer complementary insights: the former stream focuses on group dynamics and measures team inputs, processes, emergent states, and outcomes, while the latter closely investigates dialog and objects in recurrent social practices. Drawing from both streams, this paper seeks to shed light on the complexity of cross-boundary teaming, while highlighting factors that may enhance its effectiveness. We develop an integrative model to provide greater explanatory power than previous approaches to assess cross-boundary teaming efforts and their innovation performance.

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### 1. Introduction

Cross-boundary teaming, within and across organizations, is an increasingly popular strategy for innovation. In a growing number of cases, teams span organizational boundaries, not just functional ones, to pursue innovation. For example, professionals from IT services giant Fujitsu worked with specialists from TechShop, a chain of makerspaces that provide individual customers access to professional equipment, software, and other materials, to develop the first ever mobile makerspace for schools and other community members (Edmondson & Harvey, 2016a). In the economic development context, specialists in agriculture, economics, finance, marketing, supply chain management and project management from Coca-Cola, the United States Agency for International Development, the Inter-American Development Bank, and the nonprofit organization TechnoServe teamed up on an ambitious project to improve Haitian mango farmers' business practices and incomes (Edmondson & Harvey, 2016b). Meanwhile, individuals from several multinational corporations, local government agencies, and startups formed a consortium to develop a run-down Paris suburb into an ecologically and technologically "smart" neighborhood (Edmondson, Moingeon, Bai, & Harvey, 2016). In each of these cases of innovation, individual participants had to work across knowledge boundaries – boundaries associated with differences in expertise and organization in novel settings. They had joined a newly formed temporary group, with fluid membership, which needed to develop rapidly into a high-performing unit to take on an unfamiliar project. This

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phenomenon is what we call “cross-boundary teaming.” It presents a sharp contrast with teams that are well-bounded, reasonably stable, and functionally homogenous such as salespeople on sales teams at an insurance company or researchers on drug development teams at a pharmaceutical firm.

Research on team diversity in organizational behavior provides useful insights that inform the topic of cross-boundary teaming. Two broad categories of attributes define diversity in this literature. The first is surface-level attributes, or readily detectable differences such as gender, age, and ethnicity. The second, deep-level attributes, includes less visible, underlying differences related to knowledge and work, such as functional or educational background (Harrison, Price, & Bell, 1998). In this paper, we focus on the effects of deep-level attributes on teaming, which we term “knowledge diversity.” These differences pertain directly to team knowledge and, through integration, comprise crucial inputs to innovation (Ancona & Caldwell, 1992a; Pelled, Eisenhardt, & Xin, 1999). Knowledge diversity expands the range of perspectives that teams can draw upon to innovate.

Yet, when organizations convene groups of individuals with diverse knowledge to develop a new product or service or solve a complex problem, the challenges of teamwork are particularly intense (Edmondson & Nembhard, 2009). Despite notable successes, qualitative case studies often reveal how difficult teaming across boundaries can be in practice (e.g., Seidel & O'Mahony, 2014). Tapping the potential performance advantages of integrating diverse knowledge is not simply a matter of getting a diverse group of experts into the same room. Most people take the norms and values within their own professions, organizations, or industries for granted, sharing largely unquestioned assumptions that can thwart communication across boundaries (Cronin & Weingart, 2007; Edmondson & Reynolds, 2016). In this paper, we draw from research on team effectiveness and knowledge in organizations to build theory about how strangers with diverse expertise and organizational affiliation can team up in flexible and temporary forms to pursue innovation.

## 2. The need for an integrative model of cross-boundary teaming

We aim to develop an integrative model of cross-boundary teaming because there are limitations to the applicability of team diversity research for our topic. First, this stream typically examines effects of knowledge diversity in reasonably stable, well-bounded teams seeking to achieve a familiar goal (e.g., Jehn, Northcraft, & Neale, 1999; Shin, Kim, Lee, & Bian, 2012). Recent emphasis has been put on people working in highly temporary team-like arrangements (e.g., Edmondson, 2012; Mortensen, 2014; Valentine & Edmondson, 2015), but studies of team diversity have not explored the process through which a group of diverse individuals develop into a team ready to solve a new complex problem.

Second, prior research on teams and diversity has emphasized a cognitive view of knowledge, treating it much like information that can be transferred from one individual to another individual or to a group of individuals, largely ignoring knowledge's contextually-embedded nature (Lave & Wenger, 1991). In contrast, scholars adopting a practice lens stress that not everything we do or understand can be explained by the knowledge we possess (Brown & Duguid, 2001). From this standpoint, knowing and doing are interconnected through people's work practices (Gherardi, 2000) and localized in particular contexts (Sole & Edmondson, 2002). As Orlikowski (2002) explains, in high-tech contexts, skillful practice is not based on experts' application of a priori domain knowledge, but instead emerges from practitioners' ongoing and situated actions as they engage with their environment. An implication of this observation is that diverse knowledge is not readily available to all members of cross-boundary teams. To understand the specifics of how groups of diverse individuals can become high-performing teams nonetheless, it is crucial to look at what they *do*, and how they process their diverse knowledge, not only at the expertise they *possess*.

Consistent with calls for more grounded theories of work in organizations (Barley & Kunda, 2001), we integrate research streams on team diversity and knowledge boundaries to better inform human resource managers who wish to enable cross-boundary teaming within and between organizations. Harrison and Klein (2007) divided diversity into three types: *separation* (opinions, beliefs, values, attitudes), *variety* (content expertise, functional background, network ties, industry experience), and *disparity* (pay, income, prestige, status, authority, power). We build on these categories to suggest that separation, variety, and disparity are often entangled and confounded in practice. Most notably, education or functional backgrounds (variety) produce beliefs or opinions and generate status or prestige. The theoretical benefits of variety of expertise cannot be realized without overcoming the challenge of integrating expertise, and the degree of separation and disparity that may be associated with the expertise variety is likely to determine the degree of challenge. In short, knowledge boundaries can be thick or thin—thickened by differences in language, interpretation, or interests (Carlile, 2002, 2004), as well as those of separation and disparity. The construct of knowledge diversity thus can be better understood, and the thickness of boundaries better explained, by drawing on qualitative research on knowledge in organizations.

In the sections that follow, we first review research on team development and team effectiveness, discussing key terms and constructs that have implications for the success of cross-boundary teaming in Section 3. Section 4 looks at prior research on knowledge diversity in teams, and considers the history of mixed results in this work along with recent efforts to identify the conditions and processes that increase the chances that knowledge diversity can be put to good use in a team. Section 5 builds on both reviews to develop a new model of cross-boundary teaming, integrating constructs from prior research and drawing on qualitative research on knowledge in organizations. In Section 6 we consider the challenges and opportunities for measuring cross-boundary teaming, drawing from both the teams and knowledge literatures. Finally, Section 7 explores the implications of our model for HR theory and practice, and we conclude (Section 8) with a reminder that cross-boundary teamwork is on the rise and in need of a model that fully appreciates its complexity.

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