



Managing the innovators: Organizational and professional commitment among scientists and engineers



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ABSTRACT

How can leaders best manage commitment among innovators? We applied theory on dual allegiance to multiple targets of commitment, in conjunction with person-organization fit theory, to explore the dynamics of organizational and professional commitment among scientists and engineers working in hybrid, research-focused organizations. These types of organizations are founded on large-scale multi-disciplinary and multi-institutional collaboration between academe and industry. Using both individual- and organizational-level variables collected from 255 academic science and engineering researchers working in 22 National Science Foundation-funded Engineering Research Centers, our analyses revealed that researcher innovation orientation (i.e., the predisposition to approach work in novel ways) was positively associated with organizational and professional commitment. Those relationships were moderated by two factors: organizational productivity in late-stage technology transfer and the researcher's perceived role significance (i.e., in fulfilling the strategic mission of the organization). The strongest positive relationship between innovation orientation and organizational commitment emerged among researchers who perceived high role significance and worked in highly productive organizations. A negative relationship between innovation orientation and professional commitment also emerged among those individuals. Post-hoc analyses revealed that highly innovative, senior researchers who perceived high role significance were the most likely to report higher levels of both organizational and professional commitment. Leaders of multi-disciplinary research centers who are aware of the complexity of dynamics among organizational commitment, professional commitment, and role significance may be better equipped to effectively manage science and engineering researchers.

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1. Introduction

Scientists and engineers are deeply involved in the generation of new innovations (Keller, 2012), but despite some promising insights on motivational forces among scientists and engineers (Sauermann and Cohen, 2010), organizational leaders continue to question how to best manage, motivate, and retain these unique individuals. It is widely believed that scientists and engineers are more committed to their profession than their organization, enjoy relatively high mobility, are more intrinsically than extrinsically motivated, and exhibit highly innovative, sometimes non-conformist tendencies, which may help or harm the organization (Burton and O'Reilly, 2004; Keller, 1997, 2012; Lam,

2011; Mainemelis, 2010; Morrow and Wirth, 1989; Schein, 1971). Thus, the motivations of scientists and engineers are complex, and may be difficult to predict by leaders (Lam, 2011). But often, creativity and innovation lie at the root of these complexities, which are highly valued because they predict organizational performance (Keller, 2012; Krauss et al., 2005; Lumpkin and Dess, 1996). Thus, these topics are worthy of further study by management scholars.

Applying a broad stream of literature on organizational and professional commitment to highly innovative research organizations, in conjunction with person-organization fit theory, we posit that the most innovative researchers experience good fit in such organizations, which produces commitment (Kristof-Brown et al., 2005; Solinger et al., 2013). Despite assumptions to the contrary, organizational and professional commitment may not necessarily be incompatible. We draw from work on dual allegiance to explore the processes that may predict commitment to both referents (Tuma and Grimes, 1981), thus contributing to “an old debate in

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a new context.”¹ Namely, we explore factors that may help leaders enhance both organizational and professional commitment among scientists and engineers who work across organizational and disciplinary boundaries, which may lead to more effective motivation and retention strategies (Guest, 2002; Mathieu and Zajac, 1990).

We also analyze two additional factors – individual role significance and the impact of the organization’s research outside the laboratory. These may help leaders nurture loyalty from innovatively-oriented, professionally-focused individuals. Research organizations that are successful in moving research outputs to the public sphere where they can have an impact may offer unique opportunities to academic scientists and engineers, in contrast to their mainstream profession where fewer such opportunities exist (Solinger et al., 2013; Tuma and Grimes, 1981). Furthermore, when scientists and engineers experience a sense of personal significance in the strategic mission of the organization (i.e., role significance), their fit with the organization and its technology transfer efforts may be even more salient to them (Lam, 2011). We apply Tuma and Grimes’ (1981) theoretical work, as well as work on dual allegiance, fit theory, and strategic human resource management (HRM) to better understand these two forms of loyalty.

1.1. Contributions to the literature

In positing and testing our model with a field sample of academic scientists and engineers, we aim to make four contributions to the literature. First, we contribute to literature on dual allegiance, or multiple foci of commitment, thus broadening the field’s understanding of levels of commitment to one’s profession and organization. We take an interactionist approach and integrate Tuma and Grimes’ (1981) work with person-organization fit theory to better understand the relationship between distinct commitment targets. Our results offer theoretical insight into those theories, as well as practical recommendations for leaders who aim to foster loyalty from scientists and engineers. As a second contribution, we explore the role of a stable predisposition, innovation orientation, in the development of commitment. Innovation orientation is a good starting point for better understanding these unique, highly-valued researchers, where they best fit in, and how loyalty is cultivated. Third, by considering the cross-level moderation effect of organizational productivity, we aim to contribute to the innovation and technology transfer bodies of literature, building on work in strategic HRM (e.g., Guest, 2002) that explores links between work factors, employee commitment, and organizational productivity. This is in contrast to many studies on technology transfer that only explore predictors of innovation outputs (e.g., invention disclosures, patents, or licenses; Becheikh et al., 2006; Dietz and Bozeman, 2005; Hunter et al., 2011; Keller, 2012). Thus, we aim to shed light on the role of organizational performance influencing the effect of individual differences and work experiences on commitment to one’s organization and profession.

Finally, as a fourth contribution, we add to the knowledge base on research organizations. National Science Foundation (NSF) Engineering Research Centers (ERCs), the setting of our study, are one example of an increasingly popular and vital organizational form – multi-institutional, multi-disciplinary university research centers (MMURCs). Other similar organizations include the advanced manufacturing centers funded by the United States Congress in 2015, the Intel Collaborative Research Institute, and the Francis Crick Institute in the United Kingdom. MMURCs contribute significantly to the economy, particularly as companies have moved away from

doing their own basic research (Boardman and Bozeman, 2007; Currall et al., 2014; Hunter et al., 2011; Lam, 2007; Perry et al., 2007). This hybrid organizational form is evolving at a faster pace than the management research surrounding it, and case studies indicate that traditional management knowledge cannot always be generalized to this unique organizational context (Corley et al., 2006). As these types of organizations become increasingly common, it is imperative to understand how to effectively lead them (Boardman and Bozeman, 2006; Hunter et al., 2011).

2. Theoretical background

2.1. The context

We begin with a brief overview on the contextual focus of our study, hybrid organizations involved in complex multi-disciplinary research, broadly called MMURCs. The characteristics of these organizations may have important implications for the theoretical foundation of our hypotheses. These research centers offer unique opportunities because they are hybrid environments, which contain attributes of both industry and academia (Roach and Sauermann, 2010). They are typically based in multiple universities in partnership with multiple industry partners and/or government agencies. Although researchers in MMURCs typically work for one of the partner universities, the most proximal “boss” for employees is the research center’s leadership. In this way, MMURCs are hierarchically positioned much like a traditional department in a traditional university. Likewise, the “employees” of MMURCs are typically first and foremost academic researchers who likely chose an academic career in part because of the research autonomy offered in that career path (Roach and Sauermann, 2010). Still, the primary mission of an MMURC is to generate significant, relevant, multi-disciplinary research outputs, with a focus on commercialization of those outputs and training of students to do the same. This is not the typical mission of a university, nor is it the emphasis in most academic training programs that focus on publication in academic journals (Dietz and Bozeman, 2005).

Researchers are typically asked to join an MMURC because they exhibit both a commitment to scientific excellence and some level of willingness to engage in innovation activities, including commercialization of research. Even so, issues of competing loyalties, goals, and incentives may arise as they consider how to achieve “success” in their employing university, their research center, and their profession overall. Particularly when reward structures are not aligned, researchers may be faced with the possibility of dual allegiance, reflected in attitudes of commitment. We focused on two proximal foci of commitment for the scientists and engineers in our sample – the research center (the most proximal “boss” compared to the broader university) and the profession. We assert that the lessons learned in MMURCs can also help leaders in other types of hybrid organizations, particularly those in which knowledge work is forefront.

2.2. Organizational and professional commitment

Formally defined, organizational commitment is one’s “identification with and involvement in” the employing organization, which we defined as the research center (Porter et al., 1974, p. 604). We focused on affective commitment, which reflects pride in belonging and emotional attachment to the organization. This form of commitment predicts continued, enthusiastic engagement with and contribution to the MMURC and its technology commercialization efforts, and is thus most critical for managers of scientists and engineers in these types of research centers to understand (Harrison et al., 2006; Meyer et al., 2002; Porter et al., 1974). The other two

¹ We thank an anonymous reviewer for this phrase.

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