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Toward a deeper understanding of IT adoption: A multilevel analysis

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ABSTRACT

This study adopts a multilevel perspective and uses cross-level modeling to explore how resistance to change (RTC) influences information technology (IT) adoption behaviors. RTC is conceptualized at two levels of analysis (personal and contextual) and with two levels of specificity (distal and proximal). Data were collected from 258 employees within 25 administrative work units undergoing a new IT initiative. The findings from this study reveal a "maverick effect" wherein pro-initiative employees react in contrast to their workplace contexts. They champion IT adoption when their work units resist the IT initiative and prolong IT adoption when their work units readily embrace the IT initiative. This study introduces a novel interactionist perspective on IT adoption that considers employee dispositions and perceptions, as well as workplace climate and culture, as enablers and inhibitors of IT adoption. Moreover, the study advocates for change management practices that account for multilevel interactions among the personal and contextual influences of IT adoption.

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1. Introduction

The challenges associated with end-user adoption of information technology (IT) have been studied extensively within both the practitioner and academic communities. Motivated by the failure of many significant IT initiatives reported in the practitioner press [57], researchers have sought to elucidate issues associated with the adoption of newly implemented IT solutions to facilitate corporations' ability to fully leverage their oftentimes substantial infrastructure investments [57]. Despite this focus on IT initiatives, obstacles to IT adoption persist when IT initiatives are deployed to end users. IT infrastructure investments are often expected to bring significant benefits, but unfortunately, these returns are rarely realized [9].

We posit that issues associated with IT adoption can be better understood by simultaneously taking into account the characteristics of both the institutional context and the end user, particularly as these characteristics relate to resistance to change (RTC). We are not alone in making this assessment. Although rapidly changing and complex technological systems are frequently blamed for these adoption failures, research suggests that technological problems account for less than 5% of project failures [8]. Conversely, psychological (as opposed to technological) challenges associated with employee resistance to new IT adoption are often cited as fundamental barriers to successful IT adoption [70,74,75]. This paper explores the psychological influences, both personal and contextual, that shape employees' decisions to behaviorally adopt newly implemented IT. By elucidating the personal and contextual factors that drive adoption and the interactions between them, this paper aims to increase the odds of success during risky and costly IT initiatives.

Previous research has identified RTC as a critical impediment to an organization's ability to achieve the anticipated benefits from an organizational change [44,48,85]. Often conceptualized as a person-level personality trait, RTC has been defined in the literature as an individual's dispositional inclination to resist changes [67]. RTC is thought to be a stable pattern of behavior associated with a tendency to avoid change and to find change aversive [67]. However, RTC can be viewed from three theoretical perspectives [44]: the *person-oriented* perspective, which focuses on resistance factors that are internal to the end user, the *system-oriented* perspective, which focuses on factors inherent in the IT system, and the *interaction-oriented* perspective, which examines the interactions between the user and the system. Although the person-oriented approach is the most commonly applied perspective for understanding RTC, it adopts a limited view that ignores the contextual environment within which IT adoption occurs. Moreover, the person-oriented approach often relies on *intentions* to adopt IT rather than actual IT adoption *behaviors* [75,78].

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This paper addresses these limitations by drawing on a social constructivist belief that IT adoption behaviors are the product of personal cognitions (thoughts about the IT system or initiative) and contextual workplace influences [33,73]. From this position, we explore how RTC operates at two levels of cognitive specificity (distal and proximal) and two levels of analysis (personal and contextual). Combined into one cross-level measurement model, the direct and interaction effects associated with these multilevel RTC concepts are hypothesized to predict IT adoption behaviors. As Burton-Jones and Gallivan [15] suggest, multilevel perspectives can offer a more complete understanding of IT adoption behaviors.

One methodological and theoretical implication of this multilevel approach is that it allows for a novel interactionist perspective on IT adoption processes. Furthermore, from an applied point of view, an examination of these interactionist processes may reveal improved methods for anticipating the influence of the context on end user behavior and leverage points for better managing change during strategic initiatives.

1.1. Assessing extant models of IT adoption

Recent IT adoption research advocates for an interactive person-system perspective [44] that recognizes technology acceptance and resistance as two conceptually distinct (and not necessarily opposing) constructs and predictors [21,41,44,60]. Aligned with this research stream, the present study examines both positive (acceptance) factors that enhance IT adoption and negative (resistance) factors that inhibit IT adoption—a dual focus that has been absent in the literature [17].

Early IT adoption research established a series of models that integrate users' perceptions of technology as a foundation for evaluating technology acceptance (e.g., technology acceptance model (TAM) [22]; the perceived characteristics of innovations (PCI) [64]; the unified theory of acceptance and use of technology (UTAUT) [79]). More recently, acceptance researchers have begun to shift their focus away from end users' *perceptions* to *dispositions*—a pattern of thoughts, beliefs, and/or behaviors that facilitates IT adoption [26]. Unlike perceptions, which are relatively narrowly targeted and fleeting cognitions (e.g., "I think this change initiative is a bad idea."), dispositions are more enduring and more broadly generalized cognitions (e.g., "I think change, in general, is a bad idea."). Therefore, dispositions are thought to be more stable and reliable for behavioral prediction.

For many years, psychologists have used dispositions to predict behavior (for a review, see [30]). Underpinnings of the theory of planned behavior and empirical meta-analytic findings indicate that significant relationships exist between people's attitudes and their behaviors [4,6,35]. Studies that use dispositions to explain IT adoption behaviors are only just beginning to emerge [26,27,47,62,68]. For example, studies on computer self-efficacy (CSE) [20], personal innovativeness in the domain of IT (PIIT) [2], and cognitive absorption [1] provide evidence that dispositions can predict both positive and negative reactions to IT initiatives.

Therefore, an additional strength of this paper is that it also incorporates both perceptual and dispositional RTC measures to identify the unique cognitions that enhance and inhibit IT adoption [60]. Specifically, two conceptual distinctions of the RTC construct are explored. First, two degrees of cognitive specificity are examined and are aligned with the traditional conceptions of dispositions and perceptions. *Distal RTC* is characterized as generalized and stable dispositional beliefs about change, whereas *Proximal RTC* is a specific and dynamic perception about a given change event.

Second, in response to a growing body of literature that promotes multilevel research designs that include workplace structures (e.g., psychological culture and climate) [3,54], we posit that Distal and Proximal RTC can be conceptualized at two levels of analysis: the *Person-level* (Level 1) and the *Context-level* (Level 2). While RTC is commonly conceived of as a person-level phenomenon [67], we extend the construct to describe shared beliefs and attitudes that are held by employees within a work unit. Isomorphically, the Distal RTC variable conceptualized at the context-level reflects a work unit's generalized belief and orientation toward change (i.e., Adaptability Culture; "In general, my work unit thinks change is a good idea."). Likewise, the Proximal RTC variable conceptualized at the context-level embodies a work unit's fleeting perception about a specific change event (i.e., Acceptance Climate; "My work unit thinks this IT initiative is a good idea."). A summary of the conceptual and operational definitions of the RTC variables can be found in Appendix A.

Because IT adoption naturally occurs in an interactive psychosocial environment, our multilevel research design examines the influences of IT adoption at multiple levels of analysis (person and context levels) as well as the interactions among these influences (in cross-level measurement models) [55]. To the best of our knowledge, only one multilevel study has examined IT adoption intentions [55], and no cross-level or multilevel studies of IT adoption *behavior* have been undertaken. This sophisticated analysis of field-based data from actual organizations not only is novel but also provides a deeper, more naturalistic, and externally valid understanding of the IT adoption phenomenon [15,81].

We postulate that contextual workplace influences, such work unit Adaptability Culture and Acceptance Climate, will affect the rates at which employees adopt new IT above and beyond what can be explained by person-level dispositions and perceptions, namely, Distal RTC and Proximal RTC, respectively. This finding would suggest that despite an individual's inclination toward or against change, the workplace context affects the individual's behavioral IT adoption. Support for this hypothesis would imply a need for organizations to simultaneously weigh both personal and contextual factors when planning and managing strategic change initiatives. Moreover, this multifaceted and multilevel investigation of RTC may help to explain "how organizations influence the behavior, attitudes, and well-being of members, [and] why some organizations are more innovative and quicker to adopt new technologies" [37].

1.2. Variables and hypothesis rationale

1.2.1. IT adoption time lag

The dependent variable of interest in this study is the duration of time between when an employee gains access to new IT (IT implementation) and when s/he reportedly begins to use the new system (IT adoption). *IT adoption time lag* is operationally defined as:

$$\text{IT Implementation} - \text{IT Adoption} = \text{IT Adoption Time Lag}$$

IT adoption time lag is critical to IT initiative success, symptomatic of IT initiative failure, and indicative of technology resistance [56,70].

1.2.2. Resistance to change (RTC)

IT initiatives bring with them an array of changes that affect communication and workflow processes, knowledge and skill needs, and work attitudes and behaviors [39]. When examined in combination, Distal and Proximal RTC are thought to provide clues that explain when and how employees adopt new IT and constitute important indicators for distinguishing change innovators from change laggards within an organization [60,71]. Employees who are open to change and who are accepting of new initiatives may

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