



# Affordance potency: Explaining the actualization of technology affordances



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## ABSTRACT

Given the importance of information technology (IT) in effecting organizational change, scholars have strived for many years to theorize the ways in which IT can produce the changes intended for it. Recent arguments claim that most information systems (IS) research has taken a limited theoretical focus on the information technology (IT) artifact, which arguably should be at the core of the IS discipline (Benbasat & Zmud, 2003). This research engages directly with the IT artifact by evaluating the use of an electronic medical records system and its relation to actualization of technology affordances. We conducted a case study at a large urban acute care hospital in the Midwestern United States with registered nurses working on inpatient care units as the clinicians of interest. Through interviews with nurses and other clinical stakeholders, observation of nurse's work practices on three patient care units in the hospital, and direct examination of the medical records system, we develop theoretical insights into the role of IT in work practices. The novel concept of *affordance potency* is introduced as an integral theoretical construct in our model of affordances, helping to explain actualizations of IT in use. Our contribution provides a nuanced yet powerful way of understanding the nature of IT artifacts and their relationships to technology users and work practice.

## 1. Introduction

Information technology (IT) is typically designed to enable change in individuals, organizations, and societies. However, the relationship between IT and the change it is intended to facilitate is inconsistent, and much of information systems (IS) research is focused on understanding this issue through a variety of theoretical lenses (Robey & Boudreau, 1999). Recently, a number of IS scholars (Leonardi, 2011, 2013; Majchrzak, Markus, & Wareham, 2016; Markus & Silver, 2008; Robey, Anderson, & Raymond, 2013; Strong et al., 2014; Volkoff & Strong, 2013) have considered affordance theory, drawn originally from the field of ecological psychology, as a viable lens for theorizing IT-enabled change. Affordance is a foundational theory in ecological psychology and has been utilized in other fields like human-computer interaction (HCI) (Norman, 1988; Sutcliffe, Gonzalez, Binder, & Nevarez, 2011), engineering (Brown & Blessing, 2005; Maier & Fadel, 2009), and education (Dalgarno & Lee, 2010; Gamage, Tretiakov, & Crump, 2011). The recent interest in affordances within the IS field stems from a call to understand the material nature of IT and its relationships with its social context of use (Orlikowski & Iacono, 2001). Our study lies within this stream of research by offering new theoretical insights into IS affordances and their implications for IT-enabled work practices.

The term affordance was coined by psychologist James Gibson, who postulated that, "The affordances of the environment are

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what it offers the animal, what it provides or furnishes, either for good or ill” (1979, p. 127). IS scholars adopting the concept have adapted it by focusing on technical artifacts as the part of the environment directly relevant to IT users. For example, Markus and Silver define a functional affordance as, “the possibilities for goal-oriented action afforded to specified user groups by technical objects” (2008, p. 622). More recently, Strong et al. define an affordance as, “the potential for behaviors associated with achieving an immediate concrete outcome and arising from the relation between an artifact and a goal-oriented actor or actors” (2014, p. 12). Thus, affordance theory offers a promising perspective on IT-enabled change by focusing attention on aspects of the relationship between an IT artifact and its users.

The context of this research study is healthcare, and the IT artifact studied is an electronic medical records (EMR) system used by clinicians to provide and document patient care within an acute care hospital. Our aim is to use this context to further develop the concept of IS affordance and its relationship to work practice. We build on existing affordance research by introducing the concept of *affordance potency* as a novel theoretical construct within the nomological network of affordance theory. Affordance potency helps to explain the influence of IT’s material properties on work practices. We begin by reviewing affordance theory and developing the concept of affordance potency. Following this theoretical development, we describe the research methods, present the findings, and refine our contribution in a discussion of the findings. We conclude with implications for future research and practice.

## 2. Affordance theory

A number of scholars have issued calls for the study of technology affordances as an inroad to understanding IT-enabled social change. In sociology, Hutchby (2001a, 2001b) posits affordances as a theoretical mechanism for understanding the constraining influences of technology on human action. In organization science, Zammuto et al. suggest that affordances can provide an effective lens for explaining the “increasingly symbiotic relationship between IT and organization” (2007, p. 752). Leonardi and Barley (2008) hypothesize that material features of IT act as both affordances and constraints on individual user behavior, and argue for developing a language of affordances that allows us to better explain and predict technology-occasioned change. Affordances have also assumed prominence in IS research directed at understanding and solving societal-level problems (Majchrzak et al., 2016).

One approach to responding to such calls is to use affordances to complement existing theories used in IS research that limit their treatment of the IT artifact. As Majchrzak et al. advise: “By looking at technologies as sets of affordances and constraints for particular actors, IS researchers can explain how and why the “same” technology is used or has different outcomes in different contexts, thus enriching general and substantive IS theories” (2016, p. 272). For example, Giddens’ (1984) structuration theory provides little guidance for understanding the theoretical role of IT artifacts. To compensate, Jones and Karsten (2008) suggest that affordances could provide a way for IS researchers using structuration theory to construct a more consistent theoretical account of the IT artifact. In similar fashion, Markus and Silver (2008) note that the concepts of “structural features” and “spirit” in Adaptive Structuration Theory (AST) (DeSanctis & Poole, 1994) have seen little use by other researchers. Markus and Silver therefore suggest that, in addition to “technical objects” and “symbolic expressions,” “functional affordances” could serve as an effective substitute for “structural features” and “spirit” in research using AST to understand IT-enabled change. As seen in these examples, a theory of affordances may not stand apart from existing theories of IT-enabled change, but rather serve to enrich and deepen the explanatory power of theory by more precisely theorizing IT artifacts in relation to their social contexts of use. In the spirit of enriching theories of IT-related change, we propose a new concept of *affordance potency* within the nomological network of affordance theory and explain its added value for understanding IT-related change.

We adopt the definition of affordance from Strong et al., mentioned earlier: “the potential for behaviors associated with achieving an immediate concrete outcome and arising from the relation between an artifact and a goal-oriented actor or actors” (2014, p. 12). Thus, an affordance is dependent upon the relationship between other concepts, in this case an artifact and an actor, and therefore does not exist independently of those concepts. However, relational views of affordance have not been universally held by scholars, as some have argued that an affordance is a property of the environment.<sup>1</sup> Initially, ecological psychologists understood affordances as dispositional properties of the environment (Heft, 1989; Michaels, 2000; Reed, 1996; Turvey, 1992). More recently, Stoffregen (2003) and Turvey (2009) argued that affordances should be conceptualized as emergent properties of the inseparable animal-environment system. Fayard and Weeks (2014) offer yet another view of affordances as both dispositional and relational. We are partial to Strong et al.’s definition, which resonates with Chemero’s (2003) assertion that affordances are “relations between the abilities of organisms and features of the environment” (2003, p. 189). This relational definition of affordances is also consistent with other IS researchers (Leonardi, 2013).

Affordance theory in IS research also tends to distinguish between information systems and social contexts within which information systems operate. A relational view of IS affordances maintains the relevance of the social context while emphasizing the distinct role of IT artifacts in generating affordances. While the social context also consists of material artifacts, such as physical human bodies and workspaces, it usually refers to abstractions like work routines, authority relationships, job responsibilities, and incentive systems. A convenient way to approach social context is to focus on “work practices,” the recurring activities through which individuals and groups direct their work-related efforts. The phrase is meant to refer in a general way to recurrent situated activities rather than to stand on its own as a theoretical concept. Work practices may or may not be treated as “routines” (Feldman & Pentland, 2003) and our intent is not to contribute directly to a theory of routines. Rather, we use the term to denote the application of a

<sup>1</sup> Divergent schools of thought emerged in part because Gibson’s (1979) initial definition was ambiguous on whether an affordance is a property of the environment or a property of the relationship between an animal and its environment.

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