



IT artifact bias: How exogenous predilections influence organizational information system paradigms



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ABSTRACT

Efforts in IS research have long sought to bridge the gap between the information technology (IT) function and strategic business interests. People perceive affordances (possibilities for action) in information technology artifacts differently as cognitive structures (schema) which bias individual focus. This study explores how an individual's tendency to perceive the 'trees' in an IT 'forest' (artifact preference) affects their assessment of efforts to achieve more effective IT outcomes. The effect is demonstrated using a relatively simple IT success model. Further, in a sample of 120 survey responses supported by ten semi-structured interviews, we demonstrate that job role and organizational IT complexity systematically impact artifact perception. A better understanding of IT artifact bias promises to help organizations better assess information systems.

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1. Introduction

Efforts in IS research have long sought to bridge the gap between the information technology (IT) function and strategic business interests. The working philosophy behind these efforts is that less separation between the two will benefit the organization. While some have focused on defining the gap and quantifying its size (see for example, Bergeron, Raymond, & Rivard, 2004; Chan & Reich, 2007; Henderson & Venkatraman, 1993), others are focused on systematically closing the gap (see for example, International Organization for Standardization, 2005; IT Governance Institute, 2008; Taylor, Cannon, & Wheeldon, 2007). While assessing this 'gap' within an organization is important for IT management, it is also difficult because assessments are colored by the experience, understanding, and organizational role of personnel.

The work reported in this article explores how individual predispositions to focus on IT artifact affordances colors their assessment of information systems (IS) initiatives, IS success, and the antecedents of IS success. While IT artifacts may *afford* many possibilities for action (Leonardi, 2011), those "affordances" are

perceived differently based, in part, on one's personal preference. These preferences may be shaped by prior experience, which serves as a guide to interpreting related perceptions. Put another way, one's preference for perceiving IT forms a *cognitive bias*, which we posit will shade various judgments about organizational IT processes.

1.1. IT artifact perception preference

One way to characterize cognitive bias as it relates to organizational information systems is to assess an individual's predilection to either distinguish the IT artifact affordances in an information system or else to view IT as an enabler of organizational IS processes. Affordances, as considered in this line of work, are defined as perceived information system potentialities for organizational effectiveness. For example, an ERP system has the potential to decrease transaction costs; but the mechanisms to accomplish this are complex and some employees may not perceive these affordances and therefore contribute less effectively to implementation initiatives.

In order to be perceived (and therefore included in a multifaceted decision processes), system potentialities must make it through an individual's cognitive filtering process. People are more likely to sense capabilities consistent with their personal schema (Crocker, Fiske, & Taylor, 1984). Schemas are cognitive structures representing knowledge about a typical sequence of occurrences in a given situation (Ashforth & Fried, 1988). These

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mental models can conserve cognitive resources by reducing the effort needed to interpret the perceived world (Johnson-Laird, 1983), but they can also limit perception of potentially useful stimuli. We will refer to the cumulative effect of schemas on an individual's tendency to perceive the affordances of IT artifacts as perception preference.

IT artifacts are *structured IT applications, which enable business processes* (Benbasat & Zmud, 2003) or, alternatively, *purposeful innovations that enable information systems* (Hevner, March, Park, & Ram, 2004). IT artifacts include information technology (IT) or machines that process, store, and disseminate information (Nevo & Wade, 2010), such as computer hardware and software. IT artifacts may also apply to information systems (IS), or the interaction between people, processes, data, and technology (Kroenke, 2011). Additionally, IT workers, IT governance frameworks, policies, procedures, and documentation also play an important role in coordinating the flow of information through machines (Leonardi & Barley, 2008). Therefore, our use of IT artifacts encompasses IT, IS, and also related people, policies, and practices.

To illustrate the impact of perception preference on affordances, we compare an organizational information system to a 'forest' composed of many IT artifact 'trees.' Artifact preference is being inclined to see the affordances of 'trees' in the 'forest.' Such a preference will afford more possibilities to cognitively connect IT components to organizational outcomes. Conversely, individuals with a process preference are inclined to perceive IT in a supporting role to business processes, or have a tendency to see affordances at the 'forest' level. We anticipate that a 'forest-level' preference may limit perception of connections between more detailed IT artifact affordances and organizational outcomes.

We theorize that differing perception preferences are a frequent and common source of organizational problems because they complicate communication and make it more difficult to narrow the gap between IT capabilities and strategic business interests. Those who prefer to view people and processes as accomplishing goals assisted by IT are more likely to assign different credit for IT's contribution than those with an artifact preference.

For example, IT best practice frameworks, such as ITIL, ISO/IEC 27001, and COBIT, advocate IT processes such as identifying and addressing sources of risk as well as using performance metrics to systematically improve IT (IT Governance Institute, 2007; Taylor et al., 2007). These practices have been well established as antecedents to higher quality organizational outcomes (see, for example Duffy & Denison, 2008; Grembergen, Haes, & Amelinckx, 2003; Haes & Grembergen, 2008; Ridley, Young, & Carroll, 2004). However, our experience suggests that not everyone in the organization is inclined to consistently connect many IT best practice efforts to organizational effectiveness. Warnings about Internet threats, for example, are largely ignored because users rarely view their own activity as a security risk (Wu, Miller, & Garfinkel, 2006).

Because individual perceptions have been shown to predict IT system adoption (Davis, Bagozzi, & Warshaw, 1992; Venkatesh & Davis, 2000; Venkatesh, Morris, Davis, & Davis, 2003), establishing a method to gauge IT artifact preference could help to identify perception differences associated with IT's contribution. Information system adoption has also been linked to user satisfaction and IT quality as a predictor of organizational impact (DeLone & McLean, 1992, 2003). Consequently, examining the link between how employees' preferences influence their perceptions of IT processes and IT quality may offer further benefits to organizations.

Therefore, the research question we seek to answer in this exploratory study is:

Research Question: how does IT artifact perception preference influence perceptions of IT processes and IT quality?

1.2. IT management in SMEs

Our research question is particularly relevant for smaller organizations, which may have greater difficulty recognizing and correcting for variation in perception. Larger organizations may have a dedicated staff of *IT professionals* – employees with IT training or experience – who accept responsibility for delivering IT services. By contrast, small to medium enterprises (SMEs) are typically resource-constrained and have difficulty committing time, money, and effort to IT management (DeLone, 1988; Devos, 2007; Huang, Zmud, & Price, 2010; Tagliavini, Ravarini, & Antonelli, 2001). Because smaller organizations often have no IT professionals they transfer some responsibility to end users (Bayrak, 2013; Lee, Kim, & Kim, 2007; Qiang, Clarke, & Halewood, 2006). These users may innovate, attempt to troubleshoot issues, and initiate support requests. Greater participation in IT efforts by SME employees may influence user IT perceptions and, therefore, impact information system adoption, management, and governance initiatives.

We also anticipate that smaller organizations with informal management attitudes will be more open and transparent than larger organizations. We expect that such openness and transparency may help facilitate measurement of IT artifact perception preference.

This paper proceeds as follows: first, we describe the relevant literature and formulate our hypotheses. Next, we present our model for investigation, describe the study design, and present quotes from interviews to support our theory and classification of IT artifact perception preference. Finally, we statistically analyze our data and present the results. A discussion of the contributions, limitations, and proposed future work concludes the paper.

2. Hypotheses development

This section presents the foundation for our conceptualization of IT artifact bias and the development of hypotheses to answer our research question. We then present a research model for studying IT artifact bias in smaller organizations.

2.1. Entanglement, affordances, symbols, and schemas

Orlikowski (2010) and Orlikowski and Scott (2008) argue convincingly that social and material aspects of our lives are interconnected through technology. We summarize Orlikowski and Iacono's (2001) description of the organizational transformation of technology as follows: historically, technology was a distinctive artifact engineered to reduce labor (e.g., tractors, conveyor belts, or copy machines) and was considered separate from any purpose it fulfilled. However, as technology began to process information, this made it harder to visualize boundaries between technology artifacts and their function. Today IT is intricately entangled in our work, making it difficult to conceptually separate artifacts from their functions (Orlikowski & Iacono, 2001).

Because of the difficulty in conceptualizing IT artifacts, the concept of affordances associated with the work of Gibson (1979) may better aid our understanding of what employees perceive while they interact with IT artifacts. For Gibson, affordances are the possibilities for action we perceive in objects (1979), which can be both functional and relational (Hutchby, 2001). They are functional in the way they enable (or constrain) interaction and relational in the way they draw our attention. The more cognizant people become of IT artifacts, the more affordances they are able to perceive.

IT artifacts can also be conceptualized as a collection of signs combined into a persistent structure (Beynon-Davies, 2009b). Signs are representations of information and, similar to the concept of affordances, IT artifacts may enable activity by creating possibilities

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