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A Work System Perspective on Adoption Entities, Adoption Processes, and Post-Adoption Compliance and Noncompliance

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Completed Research Paper

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Abstract

This conceptual contribution responds to the invitation to the DIGIT 2015 Call for Papers "to reflect on and move forward from the dominant stream of research work on technology acceptance." The dominant stream of research is basically about antecedents and correlates of adoption and continuation of use for hardware/software artifacts. This paper uses work system theory and several of its extensions to identify directions for adoption research that have been realized partially, but not nearly to the extent possible. It focuses on three general issues: 1) what adoption means in the context of work systems, 2) how adoption occurs, and 3) how adoption entities change after adoption, including decisions by work system participants about whether and how to comply or not comply with prescribed practices that are often taken-for-granted as the result of adoption processes.

Keywords: post-adoption behavior, compliance, noncompliance, adaptation, workaround

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Completed Research Paper

Moving beyond antecedents and correlates of adoption, satisfaction, and continued usage

The call for papers for DIGIT 2015 invites "papers to reflect on and move forward from the dominant stream of research work on technology acceptance" exemplified by "seminal adoption papers such as "Davis (1989), Davis, Bagozzi, Warshaw (1989) and Venkatesh at al., (2003), which collectively have garnered more than 25,000 citations according to Google Scholar. These influential theoretical models have been extensively applied, modified and discussed regarding antecedents, contingency variables and construct refinements."

This paper responds to the Call for Papers by suggesting directions for moving beyond adoption research that focuses mostly on antecedents and correlates of adoption, satisfaction, and continued usage. While that stream of research has been generated many publications, leading researchers have questioned whether it has generated important knowledge. For example, Grover and Lyytinen (2015, p. 276) states, "TAM in general conveys a sort of axiomatic, common sense theory of human behavior (Lee et al. 2014). TAM studies tell us very little about how and why specific classes of IT tools and technologies are adopted and used, or how an IT tool being adopted might reflect back on the individual's intentions. Overall, only a precious few, truly novel theoretical ideas have come from the long legacy of TAM research."

Today's business and technology context challenges the future value of pursuing the same "script" (Grover and Lyytinen, 2015) in adoption research in the future. Three or four decades ago there were interesting questions about whether managers could or would use computers for their own purposes. Two or three decades ago it was important for the IS discipline to look at the antecedents and correlates of adoption and usage of technology. Questions that were important decades ago seem quaint today, when it is obvious that most businesses cannot operate without mandatory use of important IT-based systems. It is equally obvious that most businesses need to make major technology choices in relation to relevant infrastructures and business and technology ecosystems. Broadbrush survey results related to behavioral intentions provide little insight when enterprises need to make technology choices that support infrastructures and ecosystems rather than personal usage based on personal preferences.

Even at the level of voluntary adoption and use by individuals, everyday perspectives on technology are quite different from perspectives of two or three decades ago, when IT was experienced directly only by a minority of people. Today, many individuals check their smart phones not only in classrooms and during meetings but also when they wake up in the morning. Those smart phones and their apps led to shared expectations about operational efficiency, speed, and aesthetics that are far beyond expectations of several decades ago. Organizations that create or improve IT-reliant tools and methods recognize those expectations and assume that poorly designed applications and tools will be scorned. With a plethora of available choices, voluntary users of smartphones do not need broadbrush research because they are satisfied to apply "use try, and move on" until something better comes along.

This paper is a conceptual contribution that suggests a direction for moving beyond the dominant paradigm. It focuses on the organizational level rather than the individual level. It suggests using a work system perspective for considering what adoption means, how adoption occurs, and how whatever was initially adopted may evolve over time through a combination of planned and unplanned change. That perspective helps in visualizing practical management issues that go far beyond antecedents and correlates of usage intentions and that have not been explored fully in adoption research. For example, that perspective leads to recognizing that the post-adoption environment presents many situations in

which technology users and other work system participants decide whether or not to comply with the prescribed business process and/or prescribed pattern of using specific hardware/software technologies. This area is not well represented in the adoption and diffusion literature even though it is directly relevant to central topics in the IS discipline including systems analysis and design, management of IT-reliant work systems, organizational value of IT, and value creation for customers.

Organization. This paper establishes the context by identifying three broad topics for adoption research: antecedents and correlates of adoption, antecedents and correlates of continued use, and patterns and determinants of post-adoptive change. It uses work system theory (WST) and several of its extensions (Alter, 2013, 2015c) as a lens for visualizing adoption-related issues that become evident in the operation and evolution of work systems rather than antecedents and correlates of adoption. It focuses on three general issues: 1) what adoption means in the context of work systems, 2) how adoption occurs, and 3) how adoption entities change after including decisions by work system participants about whether and how to comply or not comply with prescribed practices that are often taken-for-granted as the result of adoption processes.

Overall, the application of WST and its extensions provides a new perspective on the general meaning of adoption in the context of the work systems through which organizations operate. The WST-based perspective emphasizes ideas that can be applied directly not only in research, but also during the analysis, design, and evaluation of IT-reliant work systems (including totally automated work systems). This approach is quite different from the traditional approach in adoption research, which focuses on validating hypotheses relying on psychological variables that are difficult to consider directly when deciding how to take management action related to IT adoption in systems in organizations.

Three Broad Contexts of Adoption Research to Date

Adoption research to date has focused on three broad contexts that will illustrated be through several examples of each. (A full journal article would provide a longer and more detailed literature review.) Much of the research involves conceptual models that are tested through obtaining quantitative measures for the variables and calculating statistical significance of the relationships between variables. Many of the independent variables are psychological variables or perceptions such as perceived usefulness, perceived ease-of-use, performance expectancy, social influence, and satisfaction. The subsequent sections will show how WST provides a perspective for adoption research that focuses on different types of issues.

<u>Antecedents and correlates of adoption</u>. Figure 1 shows the two most widely cited models that describe antecedents and correlates of adoption, the technology acceptance model (TAM) and the unified theory of acceptance and use of technology (UTAUT). Both models are about the conditions that lead to an intention to adopt, which in turn leads to actual usage. The earlier comment from Grover and Lyytinen (2015) applies in both cases. Both models were a step forward several decades ago, but "tell us very little about how and why specific classes of IT tools and technologies are adopted and used."

TAM, the Technology Acceptance Model (Davis, et al., 1989)	UTAUT. The Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003)

Figure 1. Models Describing Antecedents and Correlates of Adoption
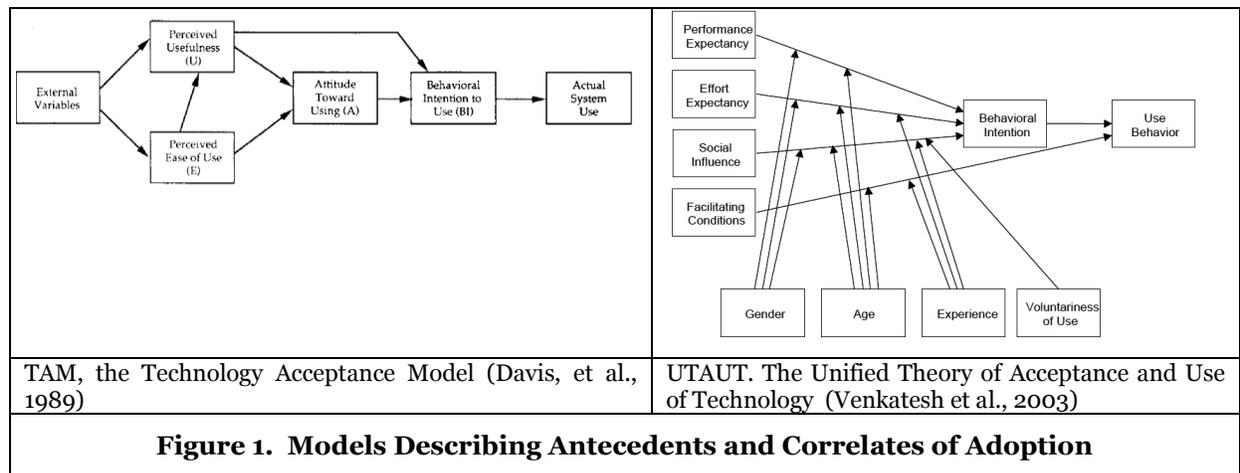
Both models fall within what Ramiller and Pentland (2009) calls the "variables-centered" research paradigm. That paradigm "focuses its attention on covariance among independent and dependent variables. As the predominant research tradition in the [IS] field, the variables-centered paradigm ought to constitute a major platform from which our community can speak to issues of managerial interest. Unfortunately, the variables-centered paradigm appears to distance researchers from the organizational actors, such as managers, to whom they would give advice and counsel. Particularly disturbing is the systematic erasure of those very actors from the domain of inquiry. Erased, too, are their actions and means of acting. Thus, when it comes time to offer useful prescriptions for action, our community attempts to do so on the basis of research in which, ironically, neither actors nor action directly appear." Using a work system perspective to look at adoption will address this issue, as will be demonstrated later.

Antecedents and correlates of continued use. The logical step after determining antecedents and correlates of adoption is to look at antecedents and correlates of continued use. Karahanna et al. (1999) moves to continued use through theoretical models based on pre-adoption and post-adoption beliefs about adopting or using "the IT". The pre-adoption states of a series of behavioral and normative beliefs about adopting the IT lead to an individual's attitude toward the IT, which leads to a behavioral intention about adopting the IT if adoption is voluntary. The post-adoption states of behavioral and normative beliefs about using IT lead to an individual's attitude toward using IT, which leads to a behavioral attention about using IT. Bhattacherjee (2001) introduces an expectation–confirmation model whose hypotheses express relationships between perceived usefulness, confirmation, satisfaction, and IS continuance intention. Limayem et al. (2003) proposes steps toward an integrative model that spans adoption and post-adoption. The variables in the adoption phase included attitudes, subjective norms, and perceived behavioral control, which affects behavioral intention and initial usage. Initial usage enables IS continuance, which is affected by perceived usefulness, confirmation, and satisfaction, leading to continuance intention with the moderating effect of habit.

Evolution of post-adoption practices. Other papers address post-adoption practices and phenomena. The following summaries of research models illustrate typical concerns:
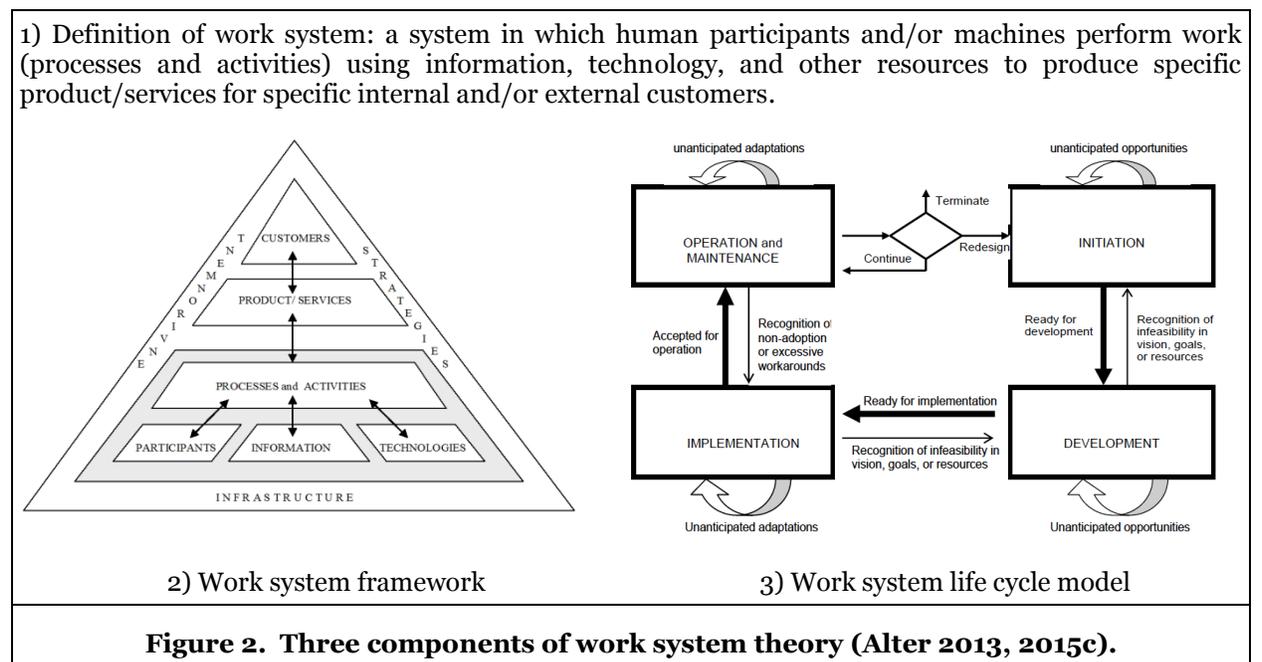
- Ahuja and Thatcher (2005) traces the impact of four variables on "trying to innovate." The four variables are autonomy, overload, autonomy/overload interaction, and gender.

- Jasperson et al. (2005) proposes a conceptual model of post-adoptive behavior that includes both an organizational action model and an individual cognition model. The organizational action model states that work system outcomes affect work system sensemaking and then work system interventions. The individual cognition model describes how individual cognitions affect post-adoptive intentions which affect post-adoptive behaviors and then technology sensemaking. Other variables include individual attention, individual differences, use history, and user-initiated learning interventions.

- Lee et al. (2009) looks specifically at mobile data services using a research model that separated satisfier variables related to information quality (relevance, timeliness, reliability, scope) from dissatisfier variables related to system quality (access, usability, navigation). The combined effect of this satisfiers and dissatisfiers along with usage motives affects service usage change.

- Sorgenfrei et al. (2014) proposes a reference framework for IT adoption that starts with five categories of antecedents and contextual factors. Those factors contribute to a series of beliefs which lead to motivation, use, post acceptance beliefs, post acceptance motivation, effective use, and outcomes.

A Different Approach: Visualizing Adoption from a Work System Perspective

The approach to adoption and post-adoption research represented by the examples in the previous section differs greatly from the approach proposed in the remainder of this paper. Instead of starting from psychological relationships, the rest of this paper is based on WST, which emerged from research on developing systems analysis methods for business professionals. Seeing adoption and post-adoption through that lens leads to insights that are more directly applicable to management and systems analysis and design, while also suggesting new directions for adoption and post-adoption research.

As shown in Figure 2, WST consists of the three components: the definition of work system, the work system framework (nine elements of a basic understanding of a work system) and the work system life cycle model (summary of how work systems evolve through planned and unplanned change). The details of WST have been explained many times and are summarized in the "work system basics" tab in www.stevenalter.com. Alter (2013, 2015c) explains that WST is the core of ideas underlying the various versions of the work system method (WSM) that have been revised and extended incrementally for almost two decades. WST was first articulated as a theory in Alter (2013).

Applying WST to adoption research immediately raises questions that will be discussed separately under the three headings: what is being adopted, how does adoption happen, and what happens after adoption. These headings provide a way to recognize the three headings that were used in illustrating adoption research to date but to look beyond that type of research. Part of the value of using WST for adoption research is that the work system framework and work system life cycle model provide straightforward directions that lead to deeper answers than can come from trying to correlate variables in a conceptual model.

1) Definition of work system: a system in which human participants and/or machines perform work (processes and activities) using information, technology, and other resources to produce specific product/services for specific internal and/or external customers.

2) Work system framework   3) Work system life cycle model

Figure 2. Three components of work system theory (Alter 2013, 2015c).

The Adoption Entity: What Is Being Adopted?

General discussions of adoption and diffusion tend to gloss over the issue of exactly what is being adopted. In relation to IT adoption in business settings, the issue is whether IT adoption means adoption of a particular hardware/software artifact, whether it means adoption of a work system that uses that artifact, or whether it means something else.

An example illustrates how those issues play out. Consider the adoption of a new CRM (customer relationship management) system. The elements in WST's work system framework lead to identifying several different aspects of what is actually being adopted:

- **Technology**. Most CRM implementations involve installation, configuration, updating, or modification of CRM software that is provided by a CRM vendor.
- **Processes and activities**. The main reason for adopting new or improved CRM technology is to improve capabilities within processes and activities performed by work system participants.
- **Information**. It is likely that a significant change in CRM technology and or CRM-related processes and activities will generate or use information that was not available previously. Thus, adopting a new CRM system usually implies adopting new information.

- **Product/services**. The new or improved capabilities make it possible for work systems to produce better product/services for their customers.

Application of the work system framework shows how shortsighted it is to think of adoption related to CRM as nothing more than adopting new CRM hardware/software. Seeing CRM adoption as IT adoption would miss the necessity of adopting new or improved processes and activities, using information in new ways, providing different product/services for recipients of CRM-related information, and so on. The direct implication is that a managerial view of CRM adoption necessarily views it as adoption of a new or improved work system, not just adoption of technology.

A research view of adoption in this situation would be more realistic and more beneficial to management if it treated adoption in the same way, i.e., by treating the unit of analysis as adoption of a new or improved work system rather than adoption of a new technology. In relation to the comment by Grover and Lyytinen (2015), both TAM and UTAUT "tell us very little about how and why specific classes of IT tools and technologies are adopted and used." Rather, the variables in the TAM and UTAUT models in Figure 1 seem equally relevant to adoption of a new lawnmower or refrigerator as to adoption of a new CRM system. Furthermore, seeing the adoption entity as a work system would come closer to addressing Ramiller and Pentland's (2009) comments about the difficulties of generating valuable management prescriptions from a variables-centered research paradigm.

A complete literature survey of IS/IT adoption research (beyond the current scope) would find that much research under the general heading of IS adoption research is basically about the adoption of new or improved IT-reliant work systems. Some of it is about the adoption of new tools in existing settings. For those tools to have significance, other aspects of the work system will have to change. Other research is about creation or improvement of sociotechnical information systems with human participants. (Based on the definition in Figure 2, information systems are sociotechnical work systems whose processes and activities are devoted to processing information.) Other research is about adoption of methods and mindsets ranging from adoption of agile development or object-oriented methods through adoption of reengineering or total quality management. A work system interpretation applies equally well to all four of those cases because nothing will actually happen until the ideas of agile, or object orientation or reengineering or TQM are incorporated into work systems. The foregoing assumptions about the need for a work system interpretation of adoption can be tested easily. This can be done by asking whether any particular business situation in the IS adoption research literature could be described completely by talking only about IT adoption and not about a new or improved work system whose effectiveness and efficiency requires new or improved processes and activities, information, participants, and so on.

The Adoption Process: How Does Adoption Happen?

The dynamic part of WST is the work system lifecycle model (WSLC), which summarizes how work systems evolve over time through a combination of planned and unplanned change. Unlike the SDLC, the WSLC is an iterative model which assumes that many work systems go through multiple iterations or versions as they evolve over time. Planned change occurs through three general phases, initiation of a formal project, development of resources required for implementation in the organization, and implementation in the organization. Those phases lead to a new version of the work system that is represented in the operation and maintenance phase. Unplanned change is represented by inward facing arrows in each of the phases. The WSLC uses the term unanticipated adaptations to describe unplanned changes in the operation of an existing work system.

The WSLC does not use the term adoption directly, but traverses many aspects of adoption. Consider how the four phases of the WSLC describe the adoption of a new customer relationship work system.

- **Initiation phase**. Managers and other stakeholders conclude that the existing customer relationship work system is inadequate and allocate resources for a formal project. During this phase, some of the variables in TAM, UTAUT, and other variables-centered research might be observed, such as perceived usefulness, perceived ease-of-use, attitude toward use, performance expectancy, effort expectancy, and behavioral intention. Actual use, the last variable in TAM and UTAUT cannot be observed here because the new or improved system has not been developed.

- **Development phase**. This phase involves the creation or acquisition of resources that are required in order to implement improvements in the organization. This phase is part of adoption because adoption cannot be completed without the needed resources. The same TAM and UTAUT variables that were relevant in initiation are also relevant here because developers and managers know that low-quality products of this phase will be resisted publically in the next phase.
- **Implementation phase**. This phase involves implementation in the organization, including activities such as implementation planning, training, any reconfiguration that is required, and cutover to the new work system. This is part of adoption because adoption cannot happen an organization without some kind of implementation phase, which can be accomplished many different ways. Different approaches range from providing new capabilities to enthusiasts and observing their voluntary usage patterns all the way through totally planned corporate rollouts with mandatory schedules and usage expectations.
- **Operation and maintenance**. This phase is the temporary end state of adoption for a new or improved version of a work system. If one had to identify a precise point of transition from a *not yet adopted* state to an *adopted* state, that point would occur at the instant when the new work system was declared fully operational. On the other hand, the inward facing arrow in this phase of the WSLC highlights the transient nature of adoption, and hence an inherent limitation of seeing adoption as a state transition. From the time a new work system is declared operational, there is a high probability that various parts of it will change organically as the work system participants discover more effective ways to do their work and as they respond to unanticipated exceptions, contingencies, and changes in the surrounding environment.
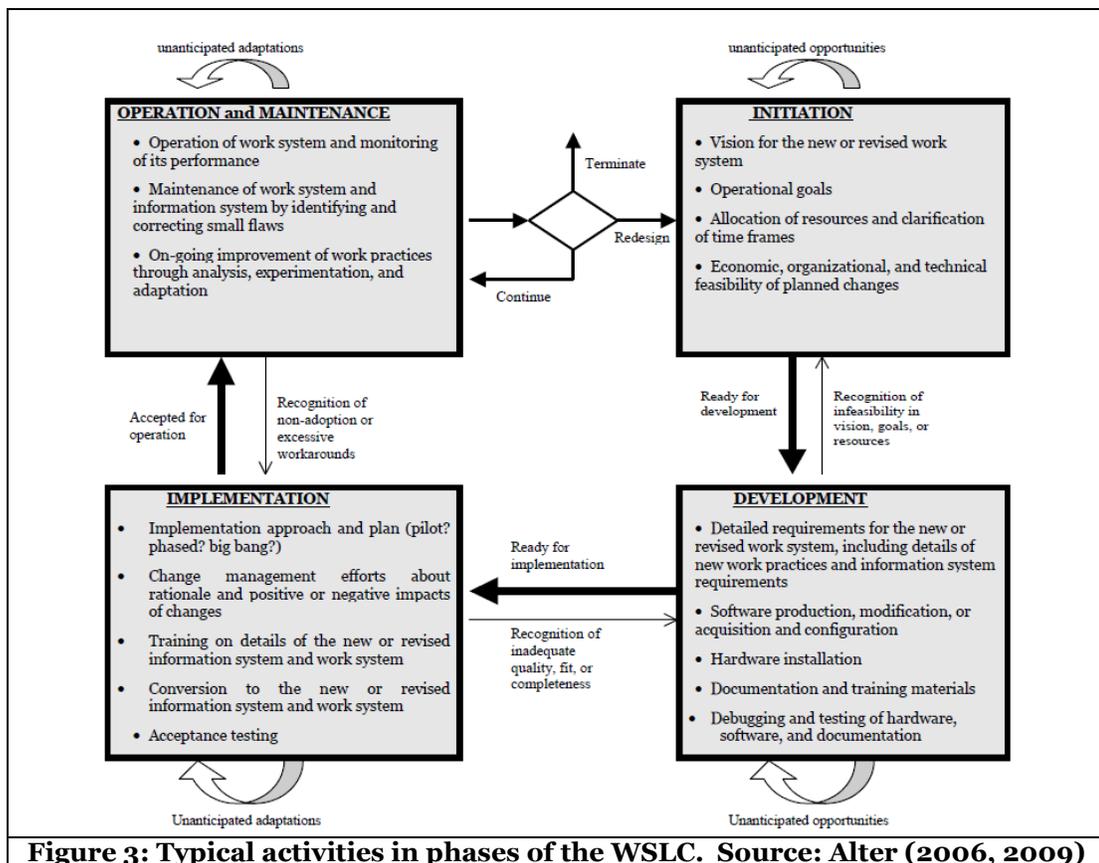
Figure 3: Typical activities in phases of the WSLC. Source: Alter (2006, 2009)

Figure 3 is a more elaborate version of the WSLC that can be used to trace an adoption process in more detail. Even more detailed versions of the WSLC can be specified, but most of those would probably focus on a particular type of work system. Regardless of which version was used, the ideas in the WSLC can help in clarifying both the meaning of adoption and the nature of adoption processes.

Post-Adoption: What Happens after Adoption?

The likelihood and treatment of various occurrences after adoption are important adoption-related concerns. The issues include assessing the genuine extent of adoption, channeling emergent change in beneficial directions, and dealing with appropriate and inappropriate compliance and noncompliance.

What is the genuine extent of adoption?

Whether or not something is adopted, i.e., used to at least some extent, often is not a very interesting question because the answer is not directly linked to business results. Two organizations that adopted the same software tool may have used completely adoption processes leading to completely extents of adoption and completely different business outcomes. The fact that the two organizations adopted the same thing is not nearly as interesting as comparing the two stories and understanding why the results were so different. That is the type of issue that both managers and researchers should be interested in.

Partial adoption. Part of the issue is that real world users may use only part of a tool, method, or idea. Using only a fraction of the capabilities in Microsoft Office is not a problem because most users need only a limited set of those capabilities. On the other hand, research about the usage and limitations of UML and BPMN have found that many capabilities of each language are not used in most specific applications. (Siau et al. (2005), Dobing and Parsons (2006, 2008), zur Muehlen and Recker (2008), Recker (2010). Consider an IS project that employs use cases and activity diagrams but does not use other UML diagrams. That project employs valuable, widely used tools, but may totally ignore the purported benefits of UML's object-orientation. In that case, the essence of UML is not used. That might not matter in some cases but might matter greatly if UML had been introduced to attain the benefits of object orientation.

Flawed adoption. Another issue is that some users may not use a tool, method or idea appropriately. Here are three examples from a paper about workarounds (Alter, 2014):

- "Given [an ERP system's] perceived inflexibility, users deviated from prescribed work processes and 'tweaked the system' to make it respond to their needs. … [One instance] was the use of a field (the statistical code) to capture information of another nature (a credit card payment). Although not intended for credit card information, the statistical code field's purpose was reinvented by a user to work around an assumed system deficiency" (Boudreau and Robey, 2005, p. 13).

- Information systems for call center operators in insurance sales often require them to fill in data fields before providing quotes for insurance premium costs. Those constraints are designed to improve data quality by ensuring completeness, but are often circumvented by entering "dummy data in order to move through the system to gain the required information. These kinds of practice can seriously degrade customer data quality" (Lederman, Shanks, and Gibbs., 2003, p. 8).

- The project leaders committed to using a CASE (computer aided software engineering) tool that seemed promising but proved functionally deficient and was inconsistent with established work practices. A workaround was developed in order to meet deadlines, and the CASE tool was used ineffectively. To minimize embarrassment, the workaround was described as "following an instantiation of the CASE approach," which basically meant that we use the CASE tool as a drawing tool, but we code in pairs approximately as we did before (Andelfinger, 2002, p. 198).

The fact that software was used demonstrates that it was adopted in all three cases, but few managers would be proud of the outcomes. Treating a work system as the unit of analysis for adoption research would encourage the detailed analysis that would uncover such issues and would question adoption.

What about emergent change?

Emergent change (Orlikowski, 1996) is represented in the WSLC by inward facing arrows that are labeled unanticipated adaptations or unanticipated opportunities. Emergent change is unplanned change that is improvised or designed in work situations when work system participants discover reasons to change existing methods, procedures, and relationships. Emergent change within a work system may change any particular work system component or any combination of components. Thus, emergent change is qualitatively different from top-down planned change that tends to occur through projects to which

management allocates resources. Emergent change is largely the product of human agency. Accidents and happenstance may create new options or foreclose others, but the options still must be selected by people.

Nudging emergent change in beneficial directions. A management understanding of a work system's post-adoption trajectory needs to include aspects of emergent change because emergent change affects business results. Post-adoption research needs to trace different types and paths of emergent change and ideally should support management understandings that will lead to better management decisions about nudging emergent change in beneficial directions.

Figure 4 shows how small improvisations and workarounds that occur over seconds-to-minutes can be a source of emergent change. Transient or persistent obstacles lead to a temporary workaround or adaptation, which leads to learning about its effectiveness, which in turn may lead to a routinized workaround or adaptation. Additional learning from experience with those incremental changes provides a rationale for planned improvements that may result in formally systematized methods.

Fig. 4. From temporary workarounds to emergent change (Alter, 2014)
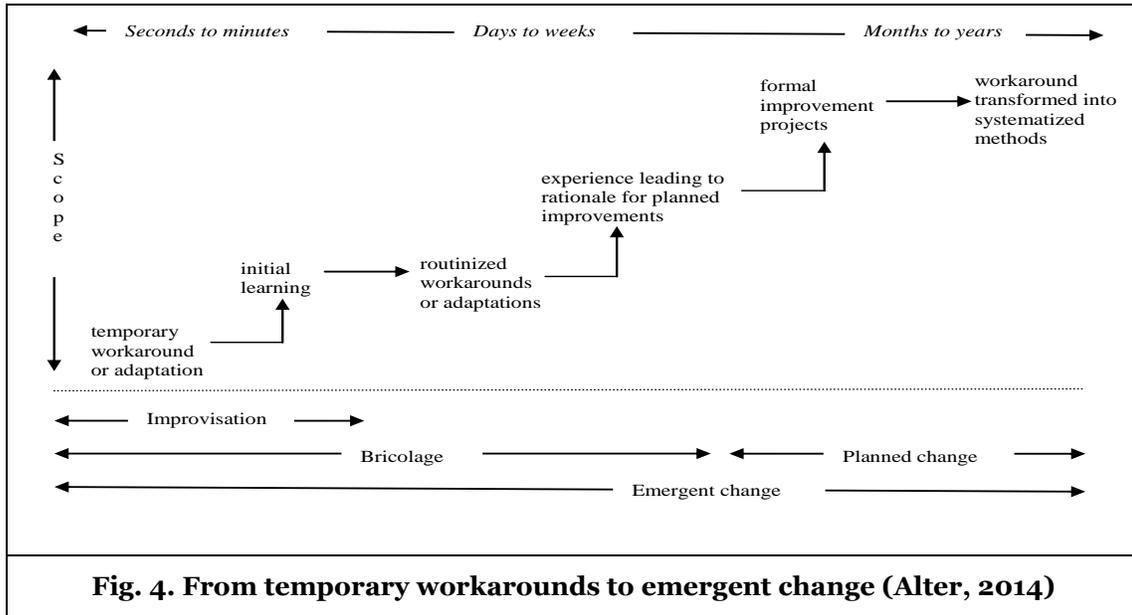
What does adoption mean in the presence of compliance and noncompliance?

The theory of workarounds (Alter, 2014) led to other ideas that are relevant to understanding and nudging or controlling post-adoption behavior. First was the idea of a workaround design system (Alter, 2015a), a temporary work system that would attempt to identify likely workarounds that might occur in a proposed or newly designed system and would try to evaluate whether those workarounds were appropriate or not. Discussions of many related issues (e.g, how to collect and display generic workarounds, how to support a workaround design process, how to use anticipated workarounds in training and documentation, etc.) led to a more general discussion of compliance and noncompliance.

The typical assumption in most adoption situations is that work system participants will comply with prescribed practices. However, research for Alter (2014) found hundreds of contrary examples. Looking beyond workarounds per se, the more general issue concerns post-adoption compliance and noncompliance, where either can be beneficial or detrimental (see Table 1 from Alter, 2015b).

Post-adoption compliance and noncompliance. Figure 5 is a modified version of the theory of workarounds that identifies steps in considering compliance or noncompliance along with common factors that affect that decision and its execution. Figure 5 says that both compliance and noncompliance should be viewed as choices in many situations. Italicized terms on the left side of Figure 5 identify generic steps in deciding whether or not comply with a process specification, software usage procedure, or business rule in a specific situation. The boxes and arrows indicate factors that are typically relevant at each step. Consistent with the explanation of the theory of workarounds in Alter (2014), Figure 5

combines ideas from the theory of planned behavior (Ajzen, 1991), improvisation and bricolage (Orlikowski, 1996; Baker and Nelson (2005)), and agency theory (Eisenhardt, 1989).

	Beneficial	**Detrimental**
Compliance	Beneficial compliance • wholehearted compliance • halfhearted compliance	Detrimental compliance • working-to-rule • malicious compliance • self-serving compliance • thoughtless compliance
Noncompliance	Beneficial noncompliance • working around unrealistic processes • working around unduly restrictive controls • working around inadequate hardware/software • working around malfunctions and temporary obstacles • prioritizing higher goals over process specifications • cheating slightly to accomplish higher priorities	Detrimental noncompliance • accidental noncompliance • well-meaning but harmful noncompliance • fraudulent or malicious noncompliance

Table 1. Combinations of beneficial and detrimental compliance and noncompliance

Figure 5. Decisions about compliance and noncompliance (Alter, 2015b)
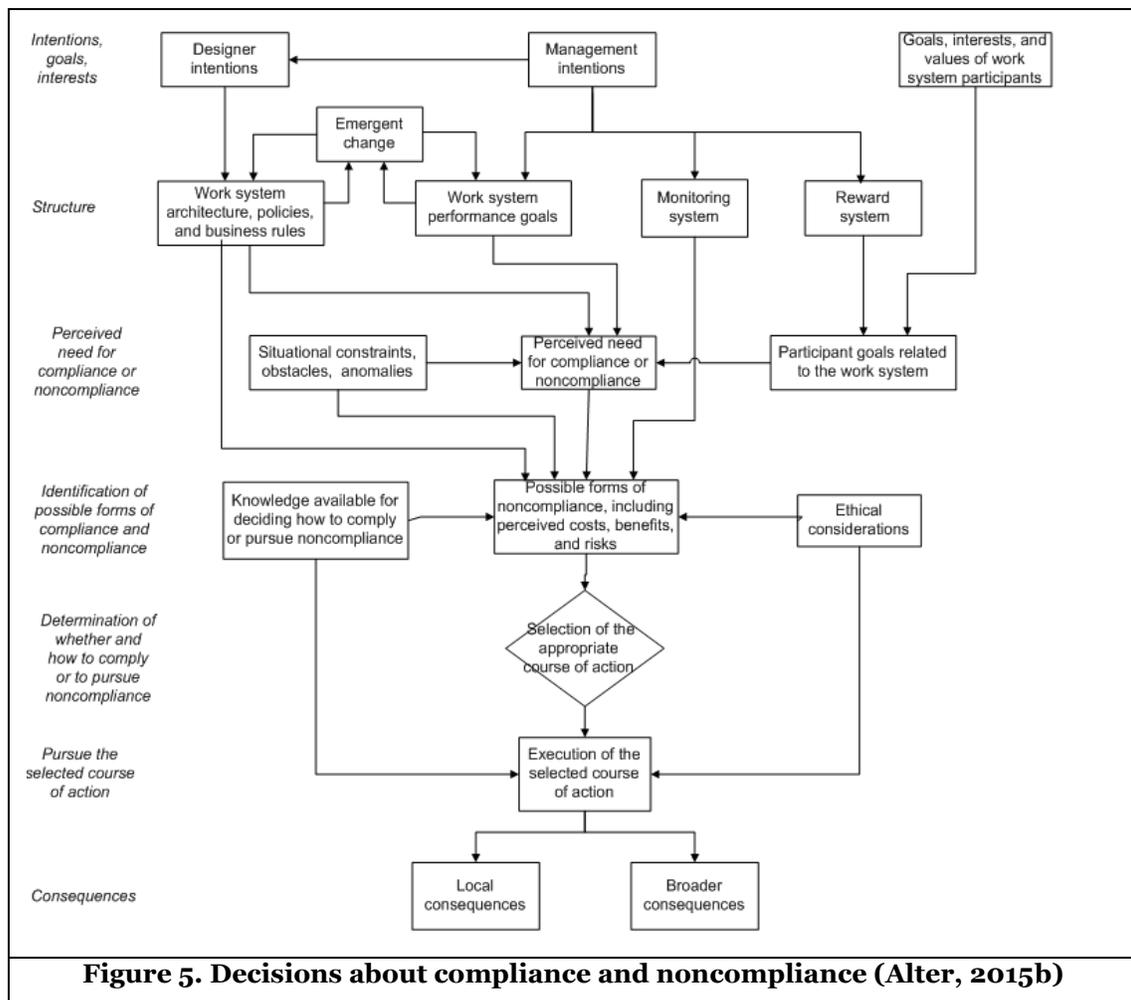
Conclusion

The DIGIT 2015 Call for Papers invited papers that "reflect on and move forward from the dominant stream of research work on technology acceptance." This conceptual contribution to adoption research demonstrates that WST and several of its extensions provide ideas for describing and exploring aspects of adoption and post-adoption that the dominant paradigm rarely touches. These ideas provide a rich view of what adoption means, going far beyond a yes/no view of whether adoption did or did not happen and focusing attention on many well-known activities and factors that contribute positively or negatively to adoption outcomes. Adoption research in the future might apply this paper's content in a number of ways:

- Use the work system framework (Figure 2) to see that adoption of new technology in an organizational context typically requires adoption of a new or improved work system that uses the technology. Aside from clarifying the meaning of adoption in organizational contexts, using a work system perspective makes it more likely that adoption research will address issues that are of genuine importance to management. For example, a related proposition might say that an up-front intention of creating or improving a work system (rather than just demonstrating or trying out a new technology) increases the likelihood of successful adoption of a technology that has not been used previously in the organizational context.

- Use the work system life cycle model (Figure 2) to visualize how adoption of planned changes occurs within the context of a work system's iterative life cycle. This process-oriented perspective goes beyond focusing on correlates of intention, usage, and satisfaction. The simpler version in Figure 2, the more detailed version in Figure 3, or some other version not yet developed could help in bringing more of a process and life cycle focus into adoption research. This type of research addresses the question of how adoption occurs and what conditions lead to success.

- Support new understandings of post-adoption behavior by using a combination or extension of the work system life cycle model (Figure 2) and the emergent change model (Figure 4). These ideas can help in visualizing how adoption occurs not only through projects, but also through emergent (unplanned) change in the form of adaptations and workarounds, some of which are eventually incorporated into repetitive practices. This perspective on post-adoptive developments provides a basis for anticipating and channeling foreseeable adaptations and workarounds.

- Use current or extended versions of Table 1 and Figure 5 (both about compliance and noncompliance) as a springboard for visualizing different forms of post-adoption compliance and noncompliance to practices prescribed and possibly taken-for-granted during an adoption process. Of special interest in this regard is that possibility of being more effective in anticipating and managing various forms of beneficial noncompliance and detrimental compliance.

- Use this paper's content as part of a new research approach for studying diffusion of innovations, both inside of a single organizations (e.g., how instances of voluntary usage of a new technology become a model for other voluntary use) and across organizations (e.g., how instances of usage by one or several enterprises in a supply chain are communicated to supply chain partners and lead to expanded adoption and possibly new forms of coordination between supply chain partners).

- Overall, create a new style of adoption and diffusion research based on a unit of analysis, the work system, that generates business results in enterprise settings. Focusing on how the affordances of new technologies enable better work system performance could lead to adoption research with important implications for management and for IS research in general. It probably would be a step toward realizing the frequently discussed goal of highlighting "the IT artifact" in IS research.

The above ideas are potential directions for future research. As demonstrated by the forgoing discussions and diagrams, these ideas have been articulated within the IS field but have not been applied directly to adoption and post-adoption studies.

Obviously there is no guarantee that this paper's suggested directions for new streams of adoption and post-adoption research actually will inspire new research. Nonetheless, the fact that work system theory and related concepts have been articulated clearly increases the likelihood that ideas in this paper could contribute to adoption and diffusion research in the future.

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