2012

'Re-composing the Elephant': Bringing the Big Picture back into IS Research

Jennie Carroll
RMIT University, jennie.carroll@rmit.edu.au

Justin Fidock
DSTO

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Jennie Carroll
School of Property, Construction & Project Management
RMIT University
Melbourne, Australia
Email: jennie.carroll@rmit.edu.au

Justin Fidock
Defence Science and Technology Organisation (DSTO)
Edinburgh, South Australia
Email: justin.fidock@dsto.defence.gov.au

Abstract

Information Systems is a practice-based discipline. It experiences periodic debates about the rigour and relevance of its research. The tensions between pretensions to be a 'real' science (rigour) and the need to contribute to practice (relevance) are intensified at a time of low student enrolment, lack of a clear identity, and uncertainties about the viability of our discipline. This essay argues that decomposing phenomena into narrow topics of research to achieve rigour is damaging to our discipline if we fail to then 'recompose' or integrate these back into understanding, lessons and guidelines for application to real-world practices. This argument is illustrated through recent work on the motors that drive changes in technology appropriation. It highlights the importance of plurality of theories and methods in understanding complex real-world phenomena in order to achieve both rigour and relevance.

Keywords

Rigour, relevance, multiple theoretical lenses, technology appropriation

INTRODUCTION

> *Six blind men encounter an elephant. The first feels the tusk and says the elephant is like a spear, the second feels the elephant's side and believes it is like a wall. The third feels a leg and thinks it is a tree. The fourth describes the elephant's trunk as a snake. The fifth says the elephant's ear is a fan while the sixth, holding the tail, thinks it is a rope.* (adapted from Morgan 1986).

This old Indian parable, applied by Morgan to his analysis of various metaphors of organisations, has powerful lessons for the future of information systems (IS) research.

IS is a practice-based discipline. It experiences periodic debates that highlight tensions between pretensions to be a 'real' science (rigour) and the need to contribute to practice (relevance). IS deals with complex phenomena in rich, real-world settings. Problems arise when examining concrete, detailed situations with highly abstract, de-contextualised concepts. Rather than dealing with such problems by selecting one paradigmatic 'camp' or approach, we investigate the value of employing multiple theoretical lenses to build more comprehensive understanding of important IS activities. We argue that relevance requires an understanding of the whole – that is, it is an elephant being studied. Rigour involves narrow and detailed analysis of the parts (e.g. the trunk, tail or skin) that may draw upon multiple theories and research methods. Bringing together these partial perspectives so they contribute to understanding of the whole is a requirement for relevance that is often overlooked in IS research. Thus, 'recomposing' the partial views into a whole is essential if we are to build understanding, lessons and guidelines for application to real-world practices.

A holistic approach that incorporates multiple theoretical lenses has the potential to provide a richer and more complete picture of phenomena than that provided by any one theoretical lens. This is because a lens brings some forces, variables or concepts to the fore, while necessarily obscuring others. Selection of a lens enables us to investigate some details to the exclusion of others: "Theory acts as a lens through which we focus and magnify certain things, while filtering out other things presumed to be noise" (Truex et al. 2006:800). In addition, in disciplines where there are entrenched and opposing perspectives, juxtaposing theories provides one way of "taking down the walls and building bridges" between perspectives (Okhuysen & Bonardi 2011).

An area marked by competing perspectives in IS is investigation of users' interactions with technologies, defined here as information technologies (IT) and IT-based information systems. In this paper we build on our experiences in applying multiple theoretical lenses to a core IS phenomenon, technology appropriation, to show how studies of the part can be integrated to provide greater understanding of a whole real-world phenomenon.

The paper begins by describing different approaches to achieving research relevance, a theory of technology appropriation that is represented by Model of Technology Appropriation (MTA) and motors of change. A model that maps four motors of change onto the MTA is presented and ways in which this captures the whole and various partial views is outlined. The paper provides examples of how such an approach can achieve research relevance and presents implications of the approach relating to research design and use of multiple theories. We conclude by reiterating our call for IS researchers to heed the entirety of real-world phenomena as well as investigating their component parts.

BACKGROUND

Relevance

How can we achieve relevance in our research? What is needed for IS scholars to connect with industry practitioners? De Souza et al (2006) suggest that we should undertake research that 'really matters'. This might focus on important management issues or tackle real-life problems in business and society (De Souza et al. 2006). Research may be relevant to industry either currently—in the form of advice, collaboration or inspiration to tackle industry problems—or in the future as the basis for educating the next generations of IS professionals (Rosemann & Vessey 2008). Research must also be presented in ways that practitioners can perceive its value – it must be accessible to industry (Rosemann & Vessey 2008). Research findings should be communicated in ways that industry can see that they do matter – to practice, to productivity, to competitiveness, to fundamental problems.

There are diverse views on how to achieve research relevance. There is some agreement that studying practice is necessary, evident in the 'practice turn' in research (Schatzki et al 2001). This grounds our understanding of phenomena in their practice, familiarises us with the languages and priorities of industry, and furnishes the concrete examples that can be used for communicating with practitioners. However, this is not sufficient. We study practice, and then seek to abstract concepts and theories from practice, to explain, predict, or improve (see Gregor 2006).

We argue that studying larger real-life processes or problems is one way to achieve relevance. Presenting a whole process or problem enables industry to perceive that our research "really matters"; we can then draw on understanding of the parts to suggest practical solutions or take a holistic, cross-disciplinary approach to tackle the larger problem. Turning again to the Indian parable, we may describe in great detail the ways in which an elephant's trunk is used to swat flies, splash water, and communicate with other elephants. But such descriptions have limited use unless placed into the context of the whole elephant, and how these detailed descriptions are a part of key processes (e.g. surviving in a harsh climate).

Technology Appropriation

Technology appropriation is the process from users' first encounters with a new technology through to its integration into their practices. One representation of users' appropriations of technology is the Model of Technology Appropriation (MTA) (Carroll et al. 2002) that has been extended over the last decade.

The MTA represents the transformation of both a technology and an individual's use of that technology over time. Thus the MTA expresses the change from a technology as it is provided for use (Technology as Implemented) into the technology as currently used (Technology in Use). It also reflects changes relating to the user: from expectations to exploration and adaptation to experience of the technology in use. The MTA conceptualises interactions between users and technology at three levels, as shown in Figure 1.

Level 1: Users' initial encounters with a new Technology as Implemented in a shop, sales presentation or training session shape their expectations about the technology and how they will use it. At Level 1, users evaluate the technology without prolonged use of it. Positive influences on this evaluation result in the decision to adopt the technology; this decision may include the selection of, purchase, or commitment to use a technology (Rogers 1995). Alternatively, users may be uninterested in the technology, resulting in non-adoption. This is shown by a double line: the dotted line indicates that this decision may be reconsidered and that users may undertake further evaluation of the technology.

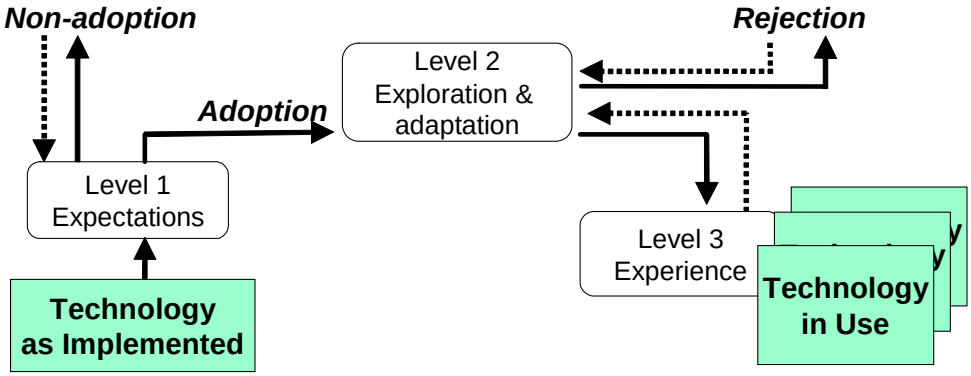

Figure 1 The Model of Technology Appropriation (adapted from Carroll 2004)

Level 2: Once adopted, users evaluate a technology more deeply by using it in context. At Level 2, users explore and experiment with the technology; this may involve adaptation of their practices as well as adaptation of the technology itself. In some instances, users choose not to persist with the technology or some of its features and so it is rejected.

Level 3: Persistent use is achieved when a technology is integrated into users' practices and becomes a part of their everyday experience. At Level 3, the technology is stabilised as Technology in Use and a user's practices have converged on routine activities. There may be multiple Technologies in Use for an individual as multiple stabilisations are achieved (Mendoza et al. 2010); different users may produce different Technologies in Use from the same Technology as Implemented. External changes may lead to re-evaluation of Technology in Use (return to Level 2) and its consequent rejection.

The model can be populated with influences on a particular user cohort and their appropriation of a Technology as Implemented. It has been applied to different user cohorts (e.g. young people, truck drivers, academics, public servants) in different domains (e.g. construction, defence, educational and public sector organisations) using different technologies (e.g mobile technologies, educational systems, an electronic document system, email and open source software) (Ab Rahim et al. 2010; Carroll et al. 2002; Fidock & Carroll 2006; Fidock & Carroll 2011; Herszfeld et al. 2003; Mendoza et al. 2008; Mendoza et al. 2010).

Motors of Change

One important issue in developing the theory of technology appropriation related to motors of change. While the MTA maps a path through three levels, it did not explain why a user switches from deciding whether to adopt a technology (or not) to exploring it, to adapting it – and adapting to it – and integrating it into practice.

For this, we turned to theorists of organizational change. We chose de Ven and Poole (1995) who present four 'ideal type' theories that they claim are the building blocks for explaining organizational change. They argue that most research draws on at least one of these ideal types: the life cycle, teleological, dialectical and evolutionary theories. Each theory has a generative mechanism, also called a motor of change, to explain "how and why changes unfold" (Van de Van & Poole 1995: 511). Van de Ven and Poole (1995) argue that more than one 'motor' may generate a process (i.e. change). Motors may operate at different levels: they might be nested, entangled or aggregated. They might also have different impacts on each other: reinforcing, dampening or complex. Finally, motors may have a range of temporal relationship: succession (one motor displaces another), entrainment (external pacing factor causes coordination amongst motors) or cycle (alternating impacts of different motors).

A lifecycle perspective explains change in terms of a sequence of phases through which a system passes. The progression through the phases is presumed to follow a certain immanent logic or sequence that is pre-programmed. Whilst the environment influences how the entity expresses itself, these are mediated by the immanent logic. Such an immanent or prescribed motor of change provides little clarification in explaining how and why the system changes.

A lifecycle perspective underpins the Waterfall or Systems Development Lifecycle (SDLC). It is also the basis of many IS implementation and diffusion models (Kwon & Zmud 1987; Leonard-Barton 1988; Rogers 1995). A lifecycle perspective facilitates generation of rich descriptions of the interaction between people and technology, as is the case with the MTA (Carroll et al. 2002).

A teleological perspective frames change as being driven by the purposeful pursuit of goals. The generative mechanism is the enactment of goals. Entities are seen to act as intentional agents working to fulfil their goals. These agents are presumed to be adaptive and creative in formulating and enacting their goals. Unlike lifecycle

theories there is no prescribed sequence. Instead, there is "a repetitive sequence of goal formulation, implementation, evaluation, and modification of goals based on what was learned or intended by the entity" (Van de Ven & Poole 1995: 516).

A teleological approach is evident in cognitive rational theories in IS, such as theories of acceptance. These theories assume that change is driven by the intentionality of users, with users' intentions being informed by their beliefs and attitudes toward the technology of interest (Davis 1989; Pfeffer 1982).

Dialectical theories explain stability and change by reference to the tension that exists between opposing or contradictory forces, such as that between advocates of the status quo, the thesis, and those promoting change, the antithesis (Van de Ven & Poole 1995). The types of outcomes resulting from tensions can be understood in terms of maintenance (the thesis dominating the antithesis), substitution (of the thesis by the antithesis) or synthesis (an emergent result that differs from both the thesis and the antithesis). The generative mechanism or motor of change in dialectical theories is the tension or conflict that exists between opposing forces.

There are a few examples of use of a dialectic approach (Cho et al. 2007; Myers 1994; Robey & Boudreau 1999; Robey et al. 2002). Some IS researchers have drawn on theories in reference disciplines that employ a logic of contradiction. Giddens' structuration theory, for example, incorporates dialectic elements by identifying the possible tensions that exist between human agency and the structural properties of the contexts within which humans are embedded. The synthesis from this tension is the process of mutual constitution of agency and structural properties. Similarly, critical theory surfaces the tensions between structure and agency.

Evolutionary theory explains change as occurring through a continuous process of variation, selection and retention (Van de Ven & Poole 1995). The generative mechanism is competition between multiple entities. Variation comes about due to random or unpredictable changes or events. Selection occurs through competition for scarce resources in the environment. Retention refers to maintenance of an entity's form; it serves to counteract the "self-reinforcing loop between variations and selection" (p. 518). An evolutionary perspective captures the tension between change and inertia associated with the status quo.

IS studies have drawn on one or more aspects of evolutionary theory such as co-evolution (Fidock 2002; Kim & Kaplan 2006), and punctuated equilibrium (Lyytinen & Newman 2008; Sabherwal et al. 2001).

Van de Ven and Poole believe that the interplay between these four theory types is the basis of most more-complex theories of change. There are two ways to apply multiple theoretical lenses in research (Okhuysen & Bonardi 2011; Van de Ven & Poole 1995). The first and more common approach is to combine lenses. The second is to apply multiple lenses separately. In particular, Van de Ven and Poole see the value of applying multiple lenses separately. Juxtaposing or placing the different perspectives side by side surfaces different "world views of social change" and may enable emergence of new theories with "stronger and broader explanatory power" (Van de Ven & Poole 1995:511). Van de Ven and Poole believe that more comprehensive understanding of complex issues arises from the interplay between different perspectives because each perspective on its own can only offer a very partial view. Thus, they do not look to merely combine theories but to use them to provide 'alternative pictures' of the one phenomenon.

EXTENDING THE MTA

The MTA is principally a lifecycle model. In its initial form it mapped out the process from a user's first encounters with a new technology but provided little explanation as to why the system moves from levels 1 to 3. In line with Van de Ven and Poole (1995), we decided to supplement the lifecycle approach by juxtaposing the three other motors of change (Fidock & Carroll 2011) to understand the movement between levels. We note that IS research has only a modest tradition of applying multiple lenses separately (Lapointe and Rivard 2007).

The teleological perspective draws attention to the intentional pursuit of goals, both individual and organizational. It brings into relief the role of beliefs and attitudes in shaping intentions, choices and actions. It is valuable for explaining why Technology as Implemented was selected and users' expectations of usefulness, ease of use and business impacts.

If a Technology as Implemented fails to live up to these expectations then users may adapt their goals, resulting in partial appropriation, minimising use and workarounds that are not highlighted by the lifecycle approach.

There are influences for which a teleological perspective was unable to account: discrepant events and habitual use. This is because these influences do not entail perceptions of a system. A teleological lens therefore appears more suited to the earlier phases of the appropriation process such as understanding users' initial encounters with a particular technology and their adaptations to the technology (Levels 1 and 2 of the MTA). It is not as useful for understanding habitual patterns of use (Level 3).

Also, a teleological perspective cannot account for a user's prior appropriations. Users are not empty vessels. They bring with them experiences that shape how they make sense of the new technology and that influence what they believe will be possible when using the technology. They already have existing technology portfolios (Carroll 2008) that they draw upon for their work. The MTA characterises the start of the appropriation process as the user's first encounters with a technology. However, users' prior appropriations relate to their experiences of existing technologies; these can be viewed as the interface between two processes of appropriations - for the existing and the new technologies.

Dialectic theories explain change by reference to the tension that exists between opposing or contradictory forces, such as that between advocates of the status quo, the thesis, and those promoting change, the antithesis. Maintenance, substitution or synthesis are the outcomes resulting from these tensions. A dialectic perspective is particularly valuable in surfacing the role of existing technologies in the appropriation of a new technology. Enterprise systems may be introduced to replace existing systems and so lead to new 'best' practices: the new system acts as the antithesis to the status quo or thesis. However, a new system may operate alongside of existing systems (especially older paper-based systems) represented a synthesis between the old and the new. A dialectic approach may also highlight tensions arising from different perceptions of the attributes of a new technology, particularly its functionality and usability. This surfaces a finer-grained view of 'technology' in the MTA.

An evolutionary perspective explains population-level change as occurring through a continuous process of variation, selection and retention. Variation results from random or unpredictable changes or events such as reliability problems. Selection occurs through competition for scarce resources in the environment. Time and effort are important resources that affect users' selection of a new system. Retention refers to maintenance of an existing form that serves to counteract the impetus for change created by variation and selection. Inertial forces are apparent through maintenance of pre-existing practices and technologies.

Additional lenses for the MTA

We chose to juxtapose the lenses temporally to assist in explaining the transitions between the levels of the MTA, as pictured in Figure 2.

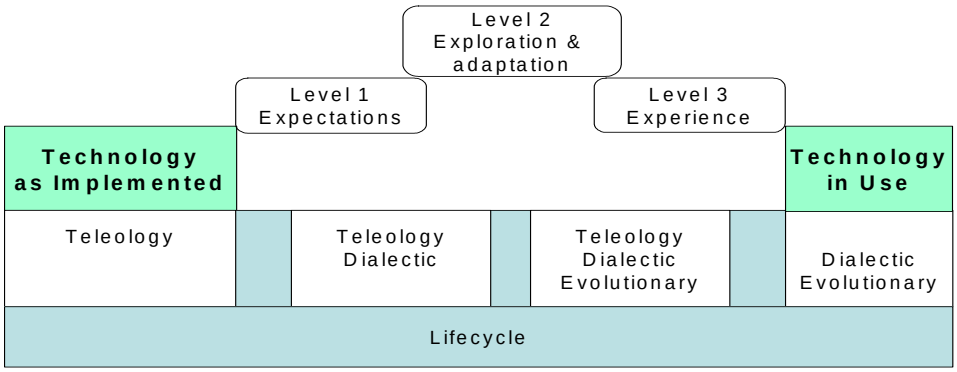

Figure 2 Juxtaposing lenses in the MTA

The selection of a Technology as Implemented is driven by pursuit of organizational goals (teleology).

The decision to adopt a new system by individual users (transition from Level 1 to 2) is shaped by their intentions to use (teleology) and attempts to resolve the tension between their existing portfolios of technology and a new system (dialectic).

The shift from exploration of a new system to persistent use or rejection (transition from Level 2 to 3) is shaped by adaptation of goals in response to users' experiences with a new technology (teleology), resolution of tension between existing and new technology (dialectic) and responses to random variations (evolution).

A stabilised form of the new technology, Technology in Use, is reinforced by synthesis in the form of a new portfolio of technologies and practices (dialectic) and retention or stability to counteract the forces of variation and selection (evolution).

We believe that complementing the lifecycle perspective the underpins the MTA with the teleological, dialectic, and evolutionary lenses provides greater understanding of the interactions between users and technology over time than any single theoretical perspective can offer (Fidock and Carroll 2011). In doing so, we provide a representation of a whole phenomenon (the process of appropriation) in which the narrow, partial investigations of topics such as acceptance, adoption, adaptation and integration can be placed.

DISCUSSION

We have shown how understanding of the whole (the process of appropriation) can be decomposed into parts (selection of a new technology, users' expectations, exploration and adaptation, and integration of a stabilised technology into their experience), each of which is worthy of detailed investigation. Our argument is that these examinations of the parts only make sense when referred back to the whole. Augmenting the MTA with additional motors of change provides a more complete picture of the interactions between a user and a new technology than any single motor can provide.

How can such an approach increase the relevance of our research to industry? We argue that, from industry's perspective, the process of integrating a new technology into use is a problem "that really matters". The original MTA provides a parsimonious representation of this process that has successfully been used with industry practitioners. Extending the MTA with multiple motors of change provides further potential applications of the MTA with industry. Figure 2 highlights the different influences that generate change in users' interactions with a new technology over time. Some of these influences are supported by substantial streams of research (e.g. teleology with the Technology Acceptance Model (Davis 1989)) while others are less well-explored by IS researchers (e.g. dialectics).

We outline two areas in which the extended MTA can help industry. We draw on Figure 2 and our analysis in this paper to describe ways in which this research can be presented so that industry perceives that it is useful.

1. Design of technologies that suit organisations' needs.

The extended MTA provides for better design of new technologies. The gap between Technology as Implemented and Technology in Use represents the way that a particular group of users have completed the design process for their particular work context (Carroll 2004). Analysis of the gap represents the context-specific requirements for technological support (that allows design for appropriation). Technology in Use can be used as the basis for a new version of the technology (design from appropriation). The resulting design capitalises on the practical knowledge and skills of users who completed the technology design through their actions in work contexts. It enhances the likelihood of achieving successful information systems that satisfy the diversity of users' needs, expressed through their actions in 'taking possession' of the systems over time. This places research streams into IT design and requirements engineering in larger context where users are seen as co-designers of IT for their particular processes/organisational situation.

2. Improved implementation processes.

a. Figure 2 shows that the motors of change of users' interactions with a new technology vary over time. Their initial expectations alter as they use the technology in context and compare it to prior systems. Greater familiarity with the system's capabilities may lead to adaptation of the system and/or practices. Pressures on time or effort, and technical problems may lead to partial appropriation with resulting workarounds or rejection. Each of these is a research topic with accepted theoretical lenses (such as TAM, coping and resistance), Bringing them together enables organisations to successfully manage the entire implementation process (i.e until persistent use is achieved).

b. In addition, changing influences on user-technology interactions require tailored support (Mendoza et al. 2010). The influences on technology adoption are different to those on medium- and long-term use (Carroll et al 2002; Karahanna et al 1999) and so training, motivation and support should be tailored to the particular influences that are in operation. For example, focusing on ease of use with long-term users is ineffective as they are more interested in usefulness (Carroll et al 2002).

c. Figure 2 highlights the importance of time in the appropriation process. At level 2, users may be encouraged to play and explore the new technology in order to to maximise the outcomes from 'windows of opportunity' for adaptation (Tyre and Orlikowski 1994).Once the technology is stabilised (Level 3) it becomes invisible to users and they are less likely to adapt it further without breakdowns or external triggers that highlight its inadequacies (Tyre and Orlikowski 1994). Managers need to be careful that they do not push to 'close' the technology prematurely, preventing further modifications that may improve its effectiveness.

Implications

This argument has implications for IS research. Here we explore the consequences for IS research design and issues around use of multiple theories.

Research design

Applying multiple theoretical lenses in the one research study has methodological implications. Robey and Boudreau (1999) apply a logic of opposition in studying the role of IT in organizational outcomes. They believe that researchers need to employ research methods suited to their aims, so that opposing forces can be identified

and examined over time. The theories they applied—organizational politics, culture and learning and institutional theory—all share common assumptions about reality.

In contrast, Markus (1994:509) noted that 'The differing theoretical perspectives …. make differing and sometimes conflicting methodological demands." These demands may involve varying units of analysis (both the individual and the individual within an organization), hypothesis testing (surveys across hierarchical levels and large samples for statistical analysis) and inductive analysis (interviews). Applying methods drawn from different research paradigms surface concerns about the capacity to effectively reconcile competing paradigms that are argued to be incommensurable (Mingers 2004; Truex et al. 2006). Such a mixed-method research design differs from employing complementary research methods underpinned by the one paradigm that is common in case study research (Yin 1994). Rather, each theoretical lens may require unique types of data that represent different ontologies and epistemologies.

Our experiences of applying different generative mechanisms (Fidock 2011) is summarised in Table 1 and explained below.

Table 1 Mapping of motors to features of research design

	Lifecycle	**Teleology**	**Dialectics**	**Evolution**
Method mapping	Selection of cases that map across levels of the appropriation process. Data analysis using time data (cross sectional and/or longitudinal)	Variance-based research approach (ie surveys with rating scale items) informed by cognitive rationale theory	Repertory grid technique Multi-stakeholder perspective Case description including personal, technical and organisational context	Semi-structured methods that are open to emergent phenomena Longitudinal data

A lifecycle perspective explains change in terms of a sequence of levels through which the system of interest passes (Van de Ven & Poole 1995). Research designs that support examination of appropriation from this perspective include selection of cases that map across the levels of the appropriation process and assessment of the temporal aspects of appropriation through cross sectional and longitudinal analyses.

A teleological perspective frames change as being driven by the purposeful pursuit of goals. There is no prescribed sequence and users are presumed to be acting as intentional agents. This is associated with cognitive rational theories (Pfeffer 1982) that employs quantitative survey-based research. This body of theory frames change in users' dispositions toward technology in the same way; users' beliefs and attitudes inform their intentions which in turn shape their behaviour. The prior identification of influences that might explain users' patterns of appropriation, and changes over time, such as such as ease of use, usefulness, behavioural intention to use, and extent of use, can be drawn from this variance research literature.

Dialectic theory explains stability and change by reference to the tension that exists between opposing or contradictory forces, such as that which can exist between designers and users of a system. We used three aspects of research design to support exploration of dialectics:

- a multiple stakeholder perspective. Data from multiple stakeholder groups provides a way of surfacing agreements and tensions between stakeholders.
- use of the repertory grid technique. The repertory grid technique is designed to identify constructs associated with the objects of interest. This provides a way of comparing the status quo portfolio of technologies and practices (the thesis) with new technologies and potential practices (the antithesis). The presence of a changed portfolio of systems and practices represents the resolution of tensions between the new and the status quo over time (synthesis).
- building case descriptions that included personal, technical and organisational context. Data representing different elements of the system surfaces conflicts between their needs.

Evolutionary theory views change as occurring through a continuous process of variation, selection and retention (Van de Ven & Poole 1995). Variations occur by chance, they are random events. Selection occurs through competition for scarce resources (such as time) in the environment. Retention refers to maintenance of an entity's form; it serves to counteract the "self-reinforcing loop between variations and selection" (p. 518). An evolutionary perspective therefore captures the tension between change and temporary stabilisations. The use of semi-structured methods can identify random events that influence users' patterns of appropriation (that may be overlooked using more structured methods).

Using multiple theories

Theory plays a central role in IS research. It "guides the process of making sense of complicated and often contradictory real-world phenomena" (Truex et al. 2006:800). In acting as a lens, theory can blind us: just as it influences what we see, it also influences what we do not see (Weick 1985).

The value of using multiple theories in a study has long been advocated in the social sciences. Okhuysen & Bonardi (2011) note challenges arising from differences in the phenomena studied by each theory and compatibility of their underlying assumptions. Applying multiple theories raises concerns including the fit with the phenomenon of interest and issues of epistemology, ontology and methodology that underpin the theory. These concerns are echoed by Truex et al. (2006:799) who note the risks of "the temptation to adapt and use the bits of a theory that seem applicable to the task at hand without having understood and considered the limits and problems that may be associated with that theory."

An effective area for using multiple theories is where the candidate theories focus on similar research areas but with incompatible assumptions about processes, causal relationships, mechanisms of change and other influences (Okhuysen & Bonardi 2011:9). The challenge for researchers is to bridge the different perspectives so that a coherent and plausible explanation is constructed. It is important to note that each contributing theory need not have equal weighting but "rather, that one will be in the foreground and will be enriched by the perspective provided by the other" (Okhuysen & Bonardi 2011:10)

This is the approach that we have taken in this paper. We have placed the theory of technology appropriation in the foreground and enriched it with the explanatory mechanisms provided by three other theories (see Figure 2). In doing so we have heeded warnings that, while applying multiple theoretical lenses may provide richer explanations, they also threaten parsimony. Our treatment of the MTA as a meta-theory that is illuminated by research into its parts enables us to produce theory that is "accurate, parsimonious, general, and useful" (Weick 1979). Such an approach overcomes the "the 'compartmentalization' of perspectives [that] has produced isolated and impoverished lines of research" (Van de Ven and Poole 1995). Van de Ven and Poole argue that more comprehensive understanding of complex issues arises from the interplay between different perspectives because each perspective on its own can only offer a very partial view. We believe such comprehensive understanding of an important real-world phenomenon can be used to develop solutions that "really matter".

CONCLUSION

This essay tackles one of the challenges that our practice-based discipline faces in times of uncertainty. It seeks to accommodate both the academic forces pushing for greater rigour and the industry/government calls for greater relevance. It provides one mechanism to overcome problems of irrelevance arising from a very narrow research focus (to achieve rigour) while maintaining rigour.

We argue that IS researchers should study real-life processes or problems that are important (to organisations and to society). This necessarily involves detailed investigations of parts of the problem that may draw upon different theories having different epistemological and ontological foundations. In IS, as in other disciplines, such research has engendered entrenched and opposing perspectives. The mechanism of juxtaposing multiple theories is a way of overcoming opposing perspectives. This enables researchers to relate partial understandings back to the whole or the original problem.

This argument to 're-compose' narrow topics of research back into understanding of complex, real-world phenomena is illustrated through a theory that has been built and refined over a decade. Technology appropriation captures the process from first encounters with a new technology, through adaptation of the technology and/or practices, to either rejection or integration into practice. Addition of motors of change from different paradigms is used to demonstrate how existing research into parts of the phenomenon can be brought together to help understand technology use in practice.

In our argument, we have taken an approach that values the importance of the materiality of IT artefacts and the choices (and constraints on those choices) of humans. We believe that the social and the material are essential to IS studies: both individually and for the emergent outcomes of their interactions. Some take a different philosophical approach (e.g. Orlikowski's more recent essays). Others will disagree with our framing of the whole (e.g. by arguing that the elephant cannot be studied in isolation from its habitat). Our aim in this essay is to extend the conversation about the relevance of our research. We hoped to provoke thought and discussion about how to engage with stakeholders beyond academia so that our labour, creativity and intellectual efforts have impact beyond the world of IS researchers.

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