

Future Prospects for IT Adoption Studies: Move Along or Make Way

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This paper looks at the recent studies on IT adoption in organizations. It looks critically at these studies by comparing the outcomes with their shortcomings. It then attempts to place this field of study in comparison with information systems research elsewhere to provide a perspective regarding its future prospects. In all, eleven different IT adoption articles, from leading IS journals, have been studied and their methodology discussed. In addition, four other articles, on macro IS theories have been included in the study for purpose of comparison and in order to appreciate the scope and pace of progress in this area of IS studies. The study of the IT adoption articles and the comparison with the development of the scope of macro IS theories highlights that the former field requires a greater sense of purpose and broader perspectives in order to move out of an apparent stagnation. Otherwise, it is in the danger of being swamped by progress in different, but related, fields of IS study. It is hoped that this paper will highlight the need for some fresh thinking in the narrowly defined area of IT adoption to allow further progress and to keep pace with research in other areas of IS.

Introduction

In this essay, I will try to highlight recent patterns of research into IT adoption issues. I will present the state of this area of IT research on the basis of fifteen different articles in leading IS journals. Out of these, ten articles are based on active research, or a prescription for such research. All of these articles adopt different ways of modelling the adoption behaviour, except for one which looks at the pattern of resistance to adoption. Also, seven of the articles adopt quantitative data gathering and analysis using sophisticated statistical models to provide a descriptive understanding of the process of adoption, while two articles use a more qualitative data gathering technique through case studies to provide a more explanatory overview of the process of adoption, or the resistance to it.

On the basis of these articles, I wish to demonstrate that in this rather mature area of IS research, a certain stagnation may be setting in due to continued preoccupation with either highly sophisticated statistical models flaunting their high explanatory power in terms of the variance explained in the dependent variable through R² (or adjusted R², if you like), or qualitative case studies that richly capture the unfolding of interesting events in a process of IT adoption following the introduction of a new technology, but do not allow generalization because of the specificity of the situation and the small number of respondents and cases.

I will venture to compare this area of research with the theorizing taking place at a more macro level regarding emergence of technology in organizations, in order to show that, in the latter case, important theories have emerged, which have much greater appeal and broader relevance, and at the same time have paved way for subsequent work to build upon.

Exposition of Recent IT Adoption Research

The underlying argument behind the IT adoption research is based on the issue of productivity paradox that continues to dog IT investments, and the reported low levels of IT usage. Given the high investment being made into Information Technology, the low level of utilization is a challenge for organizations as well as the people related with this field. For this rea-

son, much has been written about IT adoption issues with the objective of identifying key factors that can create user apathy or even outright resistance to adopting IT, in the hope that such research would help generate a set of practices or guidelines for managers of IT to help achieve higher levels of IT adoption, leading to better system utilization.

Among the numerous recent studies, (Venkatesh & Morris, 2000; Venkatesh et al., 2003; Thatcher & Perrewe, 2002; Ahuja & Thatcher, 2005; Karahanna et al., 1999; Gallivan et al., 2005 and Agarwal & Karahanna, 2000) have done research into this field by developing models of various predictors and measures of IT adoption, using past research as well as intuitive reasoning, to generate hypothetical relationships between variables of interest. They have then developed elaborate techniques for empirically testing these models by using statistical constructs to explain the key target, predictor and moderating variables. The explanatory power of these models has then been assessed in terms of the percentage of variance in the dependent variable explained by the model through R². In addition, the validation or otherwise of the different hypotheses has been used to refine the original models and offer discussions regarding their significance for practice and further research. The key measure of IT use in most cases is the users' intentions to adopt or use IT. In some cases, the actual usage behaviour has been included as an additional measure.

(Venkatesh & Morris, 2000) provide a model that extends the well known technology adoption model (TAM) by including the role of subjective norms along with the influence of perceived usefulness and perceived ease of use on the behavioural intentions to use IT. They have collected data from 342 respondents in five different organizations where a new technology has recently been introduced. This is done as part of a longitudinal study to measure the impact of perceived usefulness, perceived ease of use and subjective norms on the intentions to use IT, in the presence of two moderating variables, age and experience with IT. Data is gathered at three stages, namely, immediately after introduction (which they call short term), and then after one and three months, respectively (long term). Various hypotheses are formulated to describe the relationships between the predictors and measures of IT usage,

and the moderating influence of gender and IT experience on them. The key finding is that perceived usefulness is a strong predictor of IT usage for men and overshadows the influence of perceived ease of use and subjective norms.

A closer look at this study reveals certain issues that raise questions regarding its usefulness. Firstly, a longitudinal study which gathers data within a short period of five months (additional two months to collect usage data for the last stage at which intentions data was collected) can hardly lend itself to extrapolation regarding continued use of technology that the study hopes to address.

Secondly, as we will see in our discussion of other models, in the keenness to make adoption a statistically measurable process, different constructs have been created. Unfortunately, these constructs characteristically fall short of comprehensively representing the “variable” of interest. For example, usage has been measured in terms of average weekly use, which is clearly not only difficult to report, but also ignores many qualitative aspects of usage.

The scales used for constructs such as intention to use are also problematic due to the poorly worded statements in the questionnaire. For example, “Given that I had access to the system, I predict that I would use it,” is hypothetical and clearly doesn’t capture intentions in a useful way.

Finally, in spite of all the sophistication of the model, the implications are quite impractical and even preposterous. For example, it is suggested that given the difference in the determinants of intentions to use IT between men and women, there should be different IT training programmes for them.

(Venkatesh, 2003) goes further in developing a unified theory of acceptance and use of technology (UTAUT). It identifies eight models from previous research (including theory of reasoned action, technology acceptance model, theory of planned behaviour and innovation diffusion theory, among others) and then offers an integration of the key variables and constructs in these models in the UTAUT.

The usefulness and salience of the finding aside, we again see some important issues that make such modelling questionable. Usage data is based on a system feature that automatically logs off “idle” users. This surely does not capture the nature of usage or interaction with IT.

Moderating variables, such as experience and age have been treated as discrete dummy variables. Experience is potentially a rich construct and can hardly be reflected in a dummy variable that can take on at most two or three values.

Regarding gender, there is the argument whether we should look at the biological sex or the psychological sex when studying such phenomena.

In the end, performance expectancy seems to be the leading predictor of usage intentions. The practical implications, thus, remain limited, in spite of some bold assertions such as that the social influence is more relevant for older users, especially women.

In addition to ease of use and perceived usefulness, computer anxiety and computer self efficacy have also received significant attention in IT adoption literature. Thatcher and Perrewe (2002) develop a model that explain intentions to use in terms of users’ feelings of computer anxiety and computer self effi-

cacy. Specifically, they study the effect of broad stable traits such as negative affectivity and trait anxiety, and situation specific stable traits such as personal innovativeness in information technology, on dynamic individual differences of computer anxiety and computer self efficacy. They model these relationships to generate a number of hypotheses regarding the nature of influences that different traits exert on the individual’s feelings towards using IT.

The results clearly show the importance of personal innovativeness in information technology as a strong influence on users’ perceptions of computer anxiety and self efficacy. However, the implications in the article relating to developing training programmes based on people’s traits seem less useful. We also sense problems in the measurement process due to the hypothetical nature of some questions (“I would if:”) and obtaining response on sensitive issues relating to negative affectivity (fear, shame, etc.). In the construct used for trait anxiety, four items were dropped out of the ten used in previous research. The internal consistency of such constructs, then, becomes questionable.

(Ahuja & Thatcher, 2005) recognize the problems with using intentions alone as a measure of IT usage, because intentions may be constrained from translating into behaviour due to various contextual factors. Instead, they use the theory of trying from behavioural literature, to suggest the theory of trying to innovate with IT as a measure of IT usage, since it involves an appreciation of the impediments to successful use of IT. They focus on innovation as a path to diffusion of technology, citing previous literature regarding diffusion and emergent use of IT. They use the concept of trying to innovate with IT to study the influence of overload and autonomy in the work environment. Using this framework, they collect data from volunteering students to study the influence of overload and work environment on their efforts to innovate with IT. The results support the hypotheses being tested, including the moderating role of gender on the relationships.

In spite of clear and useful results, the study does not address the influence of some important variables from other studies, such as age, education, experience with IT, and socio-economic background of users. These variables were seen as confounding and therefore excluded from the study. Another shortcoming is the collection of data from students as they cannot be expected to represent the organizational users especially when issues of work related autonomy and overload are involved.

(Karahanna et al., 1999) try to identify the antecedents of pre-adoption and post-adoption behaviours, separately. They argue that pre-adoption involves potential users for whom adoption is an issue and their attitudes are based on cognition and affect. On the other hand, post-adoption involves users for whom continued use is relevant and their attitudes are shaped by past experience. The set of attitudes are likely to change from adoption to continued use given the concept of cognitive dissonance. Therefore, they study the impact of personal interest characteristics (that determine the strength of the individual’s attitude) and social influences (subjective norms) on behaviour towards IT, while differentiating between users and potential users. They study the issue of adoption of Windows 3.1 in a large financial organization, where 50 percent of all PC owners had converted to Windows from MS DOS. While the design of the study is quite clever in terms of identifying an environment where the users and potential users could be

clearly identified, it should be clear that in terms of their views, the two groups would in any case have a different set of reasoning to support why they were or were not using Windows. Hence, these biases should have been expected to colour the responses, rendering them less useable to explain the differences in terms of the stage of adoption. Thus we see that the users had stronger beliefs supporting their continued use of Windows. Quite interestingly, the profile of users is also different from that of potential users, as they constitute relatively more managers, MBAs and Master/Bachelor qualified.

(Agarwal & Karahanna, 2000) take a different approach by moving away from focussing on the instrumentality considerations and, instead, looking at the holistic experience with IT in explaining individuals' intentions to use IT. They argue that the prevalence of richer media, graphics, addiction to the web and more engaging experience with IT suggests that people's attitude and intentions towards IT use are shaped increasingly by whether they are having enough fun using it. They introduce the concept of cognitive absorption, building on similar concepts in previous literature, to suggest how personal innovativeness with IT and playfulness can combine (as cognitive absorption) to influence perceptions of usefulness and ease of use of IT, which in turn affect behavioural intentions towards IT use. They define cognitive absorption in terms of temporal dissociation, focussed immersion, heightened enjoyment, control and curiosity. However, their selection of students as respondents and Internet as the technology experience makes the interpretability of the findings very contextual. As a cross-sectional study, it cannot be expected to enlighten on the emergence of usage patterns in organizations.

Each of the above mentioned studies focus on the user to study the process of adoption in the organization. (Jasperson et al., 2005) suggest that the IT adoption behaviour is the outcome of individual cognitions and organizational drivers. Thus from the individual's point of view, the attention that he gives to an IT innovation, his cognitions with respect to the innovation, his history of using IT, and his sensemaking of the new technology may be important determinants of his behaviour towards the innovation. On the other hand, there are organizational processes of work system outcomes, sensemaking and interventions that affect the final outcome in terms of adoption. These the authors put forward as key extensions to the UTAUT (Venkatesh et al., 2003). However, they stop short of employing the complex model in actual research. The model in spite of its detail, ends up dividing the IT adoption processes into distinct sub-processes and separating the individual from the organization.

(Gallivan et al., 2005) do attempt to look beyond the individual user and include the role of coworkers in hypothesizing about IT adoption and usage levels. Using social information processing theory, they posit that individual and social influence factors, specifically coworkers' influence, work together to affect the individual's beliefs and behaviour regarding IT use. They focus on training as one of the key facilitating factors that shape the beliefs and attitudes of the individual, but suggest that while training equips individuals for the use of IT, it cannot alone help increase IT usage. The influence of coworkers, especially as lead users/resident experts/informal consultants, affects the individual's own pattern of IT usage. At the same time, they investigate whether the influence of coworkers is in the form of mere compliance by the individual or if there is a concomitant internalisation of their beliefs.

In spite of its high explanatory power (R² of about 70 per cent), the model fails to support most of the hypotheses regarding impact of training, beliefs regarding training and self efficacy, on training. One finds numerous problems with the modelling itself, such as the statistical problems with aggregating results from the individual to the (work) group level, use of single item attitudinal constructs and measurement of usage in "past week".

Thus, we find in all of the quantitative models a preoccupation with achieving a high R², by modelling complex social processes involving human beings. Such models, in themselves, constrain understanding and appreciation of these social processes by forcing researchers to think "inside the box." (Lamb & Kling, 2003) have criticised the atomic view of the user as an individual as being too narrow a concept to understand the complexity of factors that lead to adoption of technologies within organizations. Making use of actor-network and new institutionalist theories, they instead suggest the concept of the social actor, whose interaction with, and adoption of, technologies is shaped by a varying self-representation through affiliations, environments, interactions and identities.

Two other recent IT adoption studies, (Beaudry & Pinsonneault, 2005) and (Lapointe & Rivard, 2005) differ from the abovementioned studies in that they adopt a more qualitative data gathering approach based on case studies and exploratory interviews. Both studies yield rich understanding of adoption related issues in real environments. (Beaudry & Pinsonneault, 2005) develop a coping model of user adaptation to show how users overcome their feelings after their initial appraisal of an innovation, to adapt in a variety of ways, resulting in different outcomes. The case study, unfortunately, is based on retrospective questioning and cross-sectional research, which might reduce its usefulness. Both cases involve banks and the individuals being studied were accounts managers.

(Lapointe & Rivard, 2005), on the other hand, study resistance to the adoption of packaged software solutions for a paper-free environment in three hospitals. The study brings out interesting comparisons and lessons. However, we again see that the hospital environment, characterized by the polarization between doctors, nurses, administrators and pharmacists is too specific to allow a generalization of the findings.

Comparative Perspective: Macro Theories regarding Emergence of IT in Organizations

In order to substantiate my views regarding the state of the IT adoption research, I will now present comparable developments elsewhere in the IS literature. Theories of institutionalism, actor-networks and social construction spell out the emergent nature of information systems. In these theories individuals have a role to play in the adoption of the technology, but that role is circumscribed by the contextual factors that shape the emergent technology. (Silva & Backhouse, 1997) in their account of circuits of power highlight the processes of agency, social integration and system integration, resulting in organizations moving in the direction of achieving collective goals. Individuals play a negotiation role based on the resources and means available to them. (Orlikowski & Barley, 2001), too, talk of organizations as active players, "responding strategically and innovatively". The institutional context that emerges is resistant to change because it is the outcome of generations of organizational actors shaping the

technology by integrating it into their everyday practice. (Orlikowski, 2000) emphasizes emergent use instead of simple adoption processes. She even challenges the stability implied in the social constructivist approaches and the concept of structures being embedded in technology. Instead, she stresses upon appreciating the enactment role of humans in shaping the “technology-in-practice.” Her presentation of case studies on the adoption of Lotus Notes are more illustrative than the IT adoption studies we have discussed earlier.

(Swanson & Remiller, 1997) argue that human role does not shape the emergence of technology only from the point of adoption onwards. It actually goes back to shaping an organizing vision for the technology within a much bigger process of sensemaking. Organizing vision discourses that take place across “IT practitioners”, “business problematic” and communities of people dealing with inventing, promoting and adopting technologies, help in interpreting, legitimating and mobilizing the technologies.

Conclusion

The purpose of providing a brief introduction to macro theories in the IS field is two-fold: firstly, to give a flavour of the very broad spectrum that constitutes the IS field of study, so that we can appreciate where IT adoption studies are placed within this spectrum. Secondly, I wish to illustrate the point of vantage from which these theories can extend to move into the area of IT adoption, as illustrated by the case studies in (Orlikowski, 2000), (Orlikowski & Barley, 2001), and Silva & Backhouse, 1997). Compared to the IT adoption studies that remain focussed on achieving greater explanation of observed variance through R2, or attempting broad generalizations of case studies that are not grounded in sound theories, the macro theories in IS retain an open-minded approach. They attempt to provide a clear lens (Orlikowski, 2000) instead of a keyhole, to study real life IT phenomena.

IT adoption studies will therefore need to look beyond restrictive models and focus instead on their usefulness by extending the domain of research and focussing on broader outcomes of adoption. Otherwise, they are likely to be swamped by the progress in other areas of IS study.

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