

The Practice of Applicability Checks in Information Systems Research : An Empirical Confirmation

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Abstract: - The practice of applicability checks¹ can be considered a relative new concept in the field of Information Systems (IS) research. It is, however, an appropriate method to ensure the practical relevance of research. The discipline of information systems is in essence a practical science, with research required to be applicable in the real world. Whether research is classified as design science, where a specific artifact is developed, or behavior science, where the human behavior regarding the use of artifacts are explored, practical relevance continue to be elementary. Furthermore, research in general has its own challenges regarding time and finance, requiring the effective use of resources by focusing research efforts on examining problems relevant to practitioners. Dialogue between practitioners and researchers are regrettably limited in the field of IS research, unlike the academic disciplines of law and medicine, where co-operation between academics and practitioners are well established. To explore the possible usefulness of applicability checks in assuring research relevance and to improve the co-operation between researchers and practitioners, applicability checks were carried out by the authors. This was performed in a research project specifically focused on identifying factors that influence the use and effectiveness of Systems Development Methodologies (SDMs) in Health Information Systems (HIS). The area of health care can be identified as a field in critical need of affordable, effective and high quality information systems. This need is not unique to South Africa, but general to all countries. Ensuring practical relevance of the research performed was therefore essential. Results obtained by the use of applicability checks in the study were favorable, with advantages including improve research relevance, better co-operation between academics and practitioners, more exposure of researchers to practice and improve dialogue (richness) between practitioners and academics. Applicability checks are therefore endorsed by the authors as a valid and reliable method of assuring practical relevance. It is therefore recommended that IS researchers include applicability checks as a standard phase of the IS research life-cycle.

Key-Words: - research life-cycle, information systems research, applicability checks, practical relevance, scientific rigor, practitioners

¹ “Applicability checks are evaluations by practice of the theories, models, frameworks, processes, technical artifacts, or other theoretically based artifacts that the academic community either uses or produces in its research” [9].

1 Introduction

In 1999, Applegate [1] outlined that the field of IS research is in a crisis. The main reason for this observation was that most research methods and techniques have become relative sophisticated, but in the same time less useful for solving practical problems. Benbasat and Zmud [2], in the same volume of *MIS Quarterly*, further outline elements of concern related to the relevance of IS. Even today, 10 years later, it is not surprising to IS academics that practitioners question the relevance of IS research published in the leading IS journals. This naturally leads to the question of whether IS research produce the relevant artifacts and knowledge required by present IS professionals? It is the viewpoint of the authors that the answer may not shed a favorable light on research performed in IS. It is, however, not the intent of this article to criticize, but to explain the main reasons for a lack of relevance in most IS research and report the empirical confirmation performed of one possible solution, namely applicability checks proposed by Rosemann and Vessey [9].

In this paper, a short review of the relevance of IS research is provided, followed by the discussion of the reasons for the relative limited practical relevance of IS research. Then, some methods that can be use to improve relevance are suggested, specifically focusing on applicability checks. Finally, a short conclusion is provided.

2 Practical Relevance of IS Research

The requirement of practical relevance of IS research is essential. Without it, IS research will in essence become irrelevant, an exercise only useful to academics without any impact beyond the academic community. Practical relevance is however not only assured by selecting a "relevant" topic, but also by implementation, therefore, delivering a practical Information Technology (IT) artefact or by providing detailed prescriptions on how to solve a practical problem. In Figure 1, the two fundamental types of science (i.e., behavioral and design science) employed in IS research in this quest, based on a theoretical foundation, are illustrated.

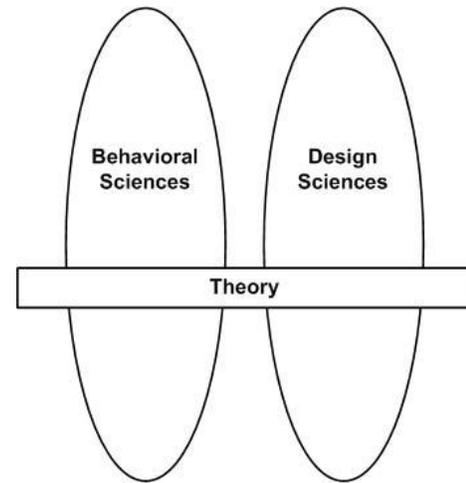


Fig. 1: Behavioral/Design Sciences

- Behavioral science in IS endeavor to create and verify behavioral theories that explain and predict human or organizational behavior. For example, behavioral IS studies explore diverse aspects like human factors, cognitive modeling, decision-making and structures of responsibility and authority [7]. As such, it is generally employed by IS research to seek solutions to problems regarding human and organization behavior in the use of artifacts, thereby improving business processes and competitiveness.
- Design science in IS research originates from the engineering discipline. As such, design science's main goal is to extend the boundaries of human capability by developing ground-breaking and innovative artifacts. Such artifacts are, however, not exempt from behavioral theories. To the contrary, their creation relies on existing theories, including behavioral theories [8].

In an influential article, Iivari [5], when considering design science outcomes, stressed the need for more design science in IS research based on scientific rigor, sometimes lacking in IS design science research. It is critical to distinguish IS design science from the normal practice of developing artifacts. In other words, developing a particular artifact does not represent research. This naturally would imply that all software developers are researchers. Iivari [5] therefore emphasized that design science should be based on a paradigmatic framework, which includes a sound ontology, epistemology and methodology. As such, it is the viewpoint of the researchers that any science, including behavioral and design

sciences, should be based on a well defined ontology, epistemology and methodology (i.e., research methodology).

It is critical to note that practical relevance does not imply that research needs to be carried out in a less rigorous fashion, disregarding a well defined ontology, epistemology and methodology. This would be a fallacy. In fact, from the authors' experience, practitioners respect and value scientific rigor because it allows for the distinction between academic and other less rigorous contributions (e.g., vendor documentation). Academic studies must however focus to some extent on the concerns and problems of practice, thereby providing substantial value to IS professionals. Furthermore, researchers must as far as possible describe how developed artifacts, ideas or actions would be implemented in practice, using a relative clear and simple language.

3 Reasons for Limited Relevance in IS Research

Benbasat and Zmud [2] described five possible reasons for the relative lack of practical relevance in IS research, briefly outlined in Table 1.

Table 1: Five possible reasons for lack of practical relevance

Reason(s)	Description
Emphasis on Rigor over Relevance	In general, researchers and editors of academic journals tended to emphasize rigor over relevance.
Lack of Cumulative Tradition	Although previously a concern (in the 1990's), currently, IS research has a well-defined set of relevant theories, research constructs and instruments, equivalent to other more mature academic disciplines.
Dynamism of Information Technology	The dynamism of IT naturally adds to the complexity and uncertainty in IS research, with research generally chasing after practice, rather than leading practice. Unfortunately, presently, this trend seems to be continuing.
Limited Exposure to Relevant Contexts	IS researchers must in some form or another be exposed to practice. For most IS academics, such exposure tends to be limited due to academic responsibilities.
Institutional	Like most organizations,

and Political Factors	constrains within academic institutions wield influence on the degree of freedom academics have in pursuing practical relevance. Universities generally stress the need for theory-based empirical research in awarding research funding. Especially in South Africa, with its limited resources, governmental funding requires scientific rigor.
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The first two reasons, listed in Table 1, are mainly associated with the nature of academic research, where rigor is commonly considered more crucial than practical relevance. The third reason reflects the dominant attribute of the domain in which IS research takes place, namely the rapid changing area of information technology. The fourth reflects the limited extent to which IS researchers are exposed to practice. The final reason is related to institutional and environmental constraints that influence the freedom and behavior of academia.

Clearly, in an academic environment, IS researchers have limited exposure to practice. This is especially of great concern in health care, where research in improving HIS not only promise financial gains, but also have possible life saving consequences. For the researchers, which focused on the use and effectiveness of SDMs in HIS, this was of great concern.

4 Suggestions for Increasing the Practical Relevance of IS Research

In literature, specific proposals can be identified to ensure practical relevance. The most frequent proposal encountered relates to selecting research topics that are considered pertinent to practitioners. Unfortunately, most prospective IS researchers choose their research topic by studying IS academic literature, which may be less than desirable. Furthermore, most IS articles are not current, and very few are explicitly motivated by the concerns of practice. In fact, Benbasat and Zmud [3] expressed their concern that IS research are becoming to ambiguous, under-investigating phenomena of real importance to IT-based systems and over-investigating phenomena distantly associated with IT-based systems.

Importantly, IS research must in effect focus on the IT artifact. This implies that IS researchers and practitioners must strive to increase their collective knowledge and understanding of how IT artifacts are constructed and implemented, how IT artifacts are used and how IT artifacts impact the real world. It has therefore been suggested that researchers attend practitioner conferences, talk to practitioners, engage in consulting activities and read practitioner journals to gain a better understanding of the requirements of practitioners [2]. Unfortunately, as highlighted in the previous section, not all of these suggestions can be implemented.

One solution that can assist in this impasse is application checks. In the research project performed by the authors, applicability checks were implemented. The basic proposal by Rosemann and Vessey is that IS researchers conduct applicability checks with practitioners on identified research objects (e.g., theories, models, frameworks, processes) or other theoretically based artifacts that the academic community either uses or produces in its research. In their paper, Rosemann and Vessey [9] suggests two additional *applicability check* steps, one at the beginning and one at the end of the traditional research life-cycle, while leaving untouched the rigorous phases used to conduct standard academic research [6].

In Figure 2, a graphical depiction of the traditional research life-cycle is presented, with the two additional applicability checks phases as suggested by Rosemann and Vessey [9].

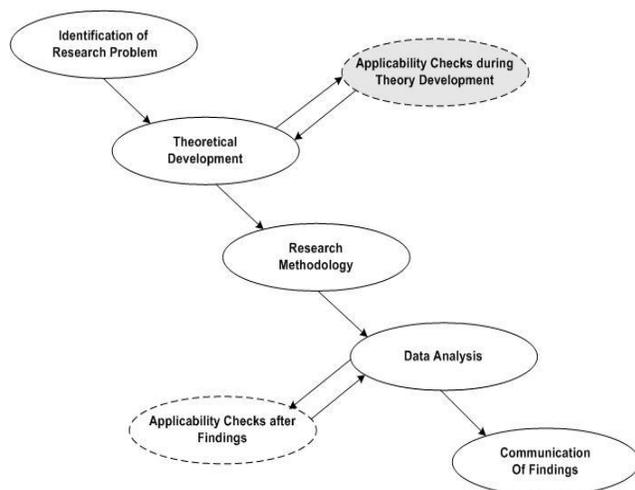


Fig. 2: Applicability checks in research life-cycle (derived from [9])

As portrayed, applicability checks can either be implemented during theoretical development or after data analysis, when findings are confirmed and communicated to practitioners.

In the study performed, applicability checks during theory development were performed with unique advantages:

- By performing application checks during theory development, it was possible to adapt the research focus to be more in-line with practical concerns and problems experience in the real world.
- Endorsement of the proposed theory (e.g., model, framework) was obtained early in the research phase, thereby ensuring a more stable research outcome.
- Closer co-operation between the researchers and practitioners was established, assisting in increasing the exposure of the authors to HIS and improving the richness of the dialog between the authors and practitioners.

Although Rosemann and Vessey [9] also proposed the implementation of applicability checks after data analysis, this step was not performed in the study. The main objective of the second applicability check, specified by Rosemann and Vessey [9], is the communication of findings to practitioners. It was however decided that it would be more beneficial if not only the small group of practitioners used during applicability checks were informed, but a wider audience. The research project results are therefore communicated to practice in the form of conference papers, academic journal articles and industry journal articles.

Important to note is that applicability checks not only allow for better communication between academics and practitioners, it also supports the continual requirement of academic rigor in research. By incorporating applicability checks in the traditional research life-cycle, academic and governmental organizations can be satisfied regarding scientific rigor, while still ensuring relevance.

With reference to the research project, applicability checks not only allowed the confirmation of the theoretical research model, statistically estimated by using Structural Equation Modelling (SEM), but also assisted in the identification of factors previously not

reported in literature. This allowed the empirical validation of a more encompassing theoretical research model, more in-line with the real world scenario. In Figure 3, the studies research model is represented as depicted in Amos.

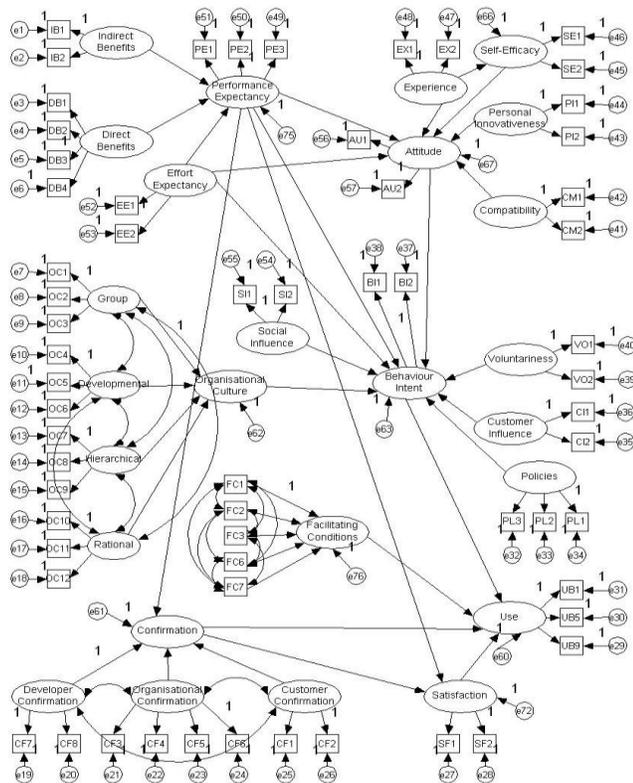


Fig. 3: Theoretical research model created by incorporating applicability checks

As such, with applicability checks, it was possible to develop a more in-depth understanding of the use and effectiveness of SDMs in HIS. Unfortunately, the use of applicability checks is limited, which may be the reason for the relative “small” research models, incorporating a low amount of latent variables. Generally, with theory-based empirical studies, researchers strive to develop parsimonious (e.g., “small”) models that can be used to explain phenomena in a wide range of settings [4]. Practitioners, however, seek in-depth prescriptions that can be applied in their specific situation. Therefore, the potential for direct applicability of available IS research is relatively limited. By incorporating applicability checks, it is possible that this requirement can also be address.

5 Conclusion

Similar to academic researchers offering strong theoretical support to practitioners, practitioners can offer academic researchers valuable input with regard to practical relevance. Invariably, it is practitioners, as they strive to stay ahead of their competitors, who will continue to identify the need for new innovations.

Clearly, a strong symbiotic relationship in relation to IS can and must be fostered between practice and research. Unfortunately, practitioners infrequently seek the assistance of academics. It is therefore suggested that IS academics take the first step towards this mutually beneficial synergy.

Applicability checks, as implemented by the authors, were found to be indispensable in developing the research project’s research model, while allowing invaluable contact with practice. It is during this dialogue that the authors discover the critical success factors and challenges HIS practitioners face, questioning the issues they believe to be relevant. It is therefore advised that fellow IS researchers use applicability checks in crossing the identified gap between scientific rigor and relevance.

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