

## Mind the Gap: A Critical Review of the Information Systems Research and Practice Relationship

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The gap between information systems research and practice has been widely recognized and observed. The exchange of knowledge and resources between IS research and practice are facilitated by mechanisms such as IS publications, education, funding organisations and conferences. Using the literature from the reflections of IS academics and practitioners on the research relevance debates and empirical papers, each mechanism is discussed in detail to identify where the gap occurs. Suggestions and some positive developments have been put forward to bridge the gap. However, the longstanding debates in the identity, status and value of IS research remains to be a structural challenge in building this bridge. No easy solutions are offered, nor are there any immediate ones in sight. This paper concludes with some important caveats and suggestions for future research.

### Introduction

Information systems (IS) can be defined as “an *instantiation* of information technology” (Lee, 1999a) “embedded in a complex web of social norms and practices” (Hirschheim & Klein, 2004). This definition underlines the social and technological aspects in the study and practice of IS.

IS research and IS practice cannot be divorced for “[w]ithout MIS<sup>1</sup> as a profession or corporate function, there would be no *raison d’être* for MIS research” (Lee, 1999a). The use and application of information technology in the organizational context is one of the motivations that has given rise to the study of IS (Avgerou & Cornford, 1998; Khazanchi & Munkvold, 2001). A “symbiotic relationship” between IS research and practice (Benbasat & Zmud, 1999) is most desirable, where both inform and impact the other (Galliers, 1997).

The gap between IS research and practice has been long recognized (Farhoomand, 1987; Grover & Sabharwal, 1989; Sjazna, 1994; Pearson et al, 2005). This gap has manifested itself in many forms—in the lack of relevance in IS research (e.g. Benbasat & Zmud, 1999; Westfall, 1999), in the disconnect between university education and industry requirements (Lippert & Anandarajan, 2004; Beckman et al, 1997), in the divergent interests of IS researchers and practitioners (e.g. Gosain et al, 1997), in the lack of communication, collaboration and shared goals between them (Desouza et al, 2006; Glass, 2001; Moody, 2000), in the difficulty of accessing each other’s resources and in the social, institutional and political complexities of disseminating research to practice (Nevill & Wood-Harper, 2001).

Evidence of this gap can be found in the literature of unresolved IS debates and the critical reflections of IS researchers in the relevance of their work to practice. This paper focuses on the mechanisms that connect, or disconnect, the exchange of knowledge and resources between the two constituencies. Its aim is to engage the reader to raise more questions than offer answers in order to have a greater appreciation on the developments of the IS field.

### The IS research-practice relationship

The goal of IS research cannot be removed from its source—the practice which it intends to support. Its goal is to encourage thinking, widen knowledge (Pearson et al, 2005), and

more importantly to impact practice (Orlikowski & Baroudi, 1991). Galliers (1997) and Moody (2000) described what the research-practice relationship ought to be against what actually happens (see Figure 1 and 2). Ideally, research is informed by problems in practice. Research findings are disseminated and applied to improve practice. IS research could emulate studies in medicine, law or business finance which enjoy a tightly coupled relationship with practice (Moody, 2000; Davenport & Markus, 1999; Banville & Landry, 1989).

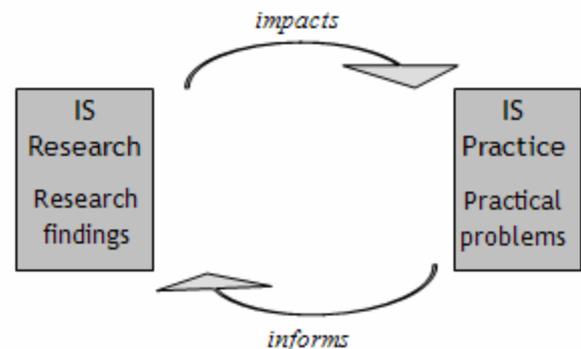


Figure 1: The ideal IS research-practice relationship (adapted from Galliers, 1997 and Moody, 2000)

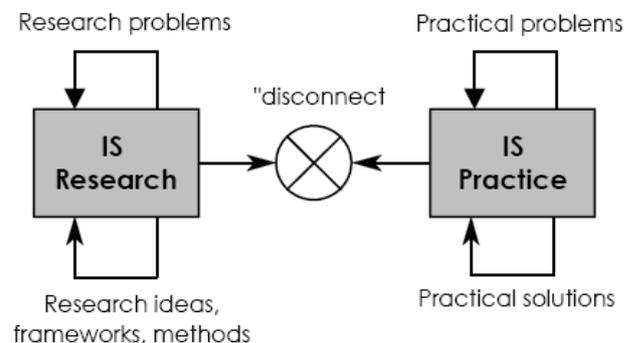


Figure 2: What actually happens: the gap between research and practice (taken from Moody, 2000)

In reality, however, IS research and practice form self-referential silos or two quite separate worlds (Galliers, 1997). The ‘disconnect’ occurs when problems and solutions are disseminated within their own communities with “little over-

<sup>1</sup>MIS is a commonly used term in the US. For the purpose of consistency, this paper uses the term IS.

lap or knowledge transfer between them” (Moody, 2000). For example, practitioners rarely follow techniques and methodologies prescribed by research in information systems development (Bansler & Bødker, 1993; Fitzgerald, 1997; Lang and Barry, 1997).

The diagrams above assume a linear and functional relationship between IS research and practice. But the socio-technical nature of the study of IS means that research and practice are embedded in the social context. They exist in a complex web of social institutions, mechanisms and stakeholders— “the web of researching” (Lee, 1999a). Nevill and Wood-Harper (2001) expounds on this perspective. Based on their interpretive research and the responses of 35 IS academic leaders in the UK, they outline the resource-dependency relationships in IS research and the various stakeholders involved (Figure 3). They argue that socio-political influences and limited resources affect the choice, intended audience and relevance of IS research. They mention role of publications, funding organisations, education and conferences in disseminating research to practice and facilitating exchange of knowledge and resource. In the next section, we take a closer look at each of these mechanisms to identify the disconnections between IS research and practice.

**Mechanisms of (dis) connection**

*(1) Publications*

Publications such as journals, the “lifeblood of all academic professions” (Gray et al, 2004), are important mechanisms in diffusing and communicating knowledge from research to practice (Sjazna, 1994; Gosain et al, 1997; Nevill & Wood-Harper, 2001). IS practitioners are most interested in publications that address their critical concerns (Sjazna, 1994; Benbasat & Zmud, 1999). To be effective mechanisms, publications should be relevant, readable, timely and accessible (Benbasat & Zmud, 1999; Robey & Markus, 1999; Pearson et al, 2005; Desouza et al, 2006).

The question of whether IS research pursued and published is relevant to practice comes to the fore. The rigor versus relevance debates hit a ‘raw nerve’ among academics (Gray, 2001) as evident in a number of IS journals special issues, conference discussions and empirical studies (see Table 1). Rigor and relevance are not mutually exclusive goals of research (Applegate, 1999) but the debates suggest that the pendulum has swung far to the pursuit of excessive rigor at the expense of being relevant to the IS practice it intends to support (Moody, 2000). Many academics contend that long-standing emphasis in publishing rigorous research has created a gap with its intended audience—the IS practitioners. A recent survey by Pearson et al. (2005) point out that most IS/IT practitioners do not read, value or apply research because only a few are familiar with IS publications. Darroch and Toleman (2005) interviewed practitioners who expressed dismay over the inaccessibility of IS publications and the time-consuming efforts in searching for the applicable research material. Another compelling evidence is the subscription withdrawal from MIS Quarterly, a top IS journal aimed for academics and practitioners, by the Society of Information Management International, an organization composed of CIOs (Westfall, 1999; Benbasat & Zmud, 1999).

Several periodic analysis of IS journals have revealed that IS research topics diverged from the critical concerns of IS practitioners. Using statistical analysis and mapping to analyse whether the top IS and business journals published between 1984 to 1993 reflected key concerns of IS practitioners, Sjazna (1994) discovered that research converged with practitioners’ concern in the area of IS-business alignment but diverged in the area of software development where it continued to be a pressing concern for practitioners. These findings were echoed in the comparative analysis between academic and practitioner-oriented journals by Gosain et al (1997).

Some practitioners opine that academic publications should be as practical and accessible like the New England Journal of Medicine (Byrne, 1990). However, the ‘publish or perish’

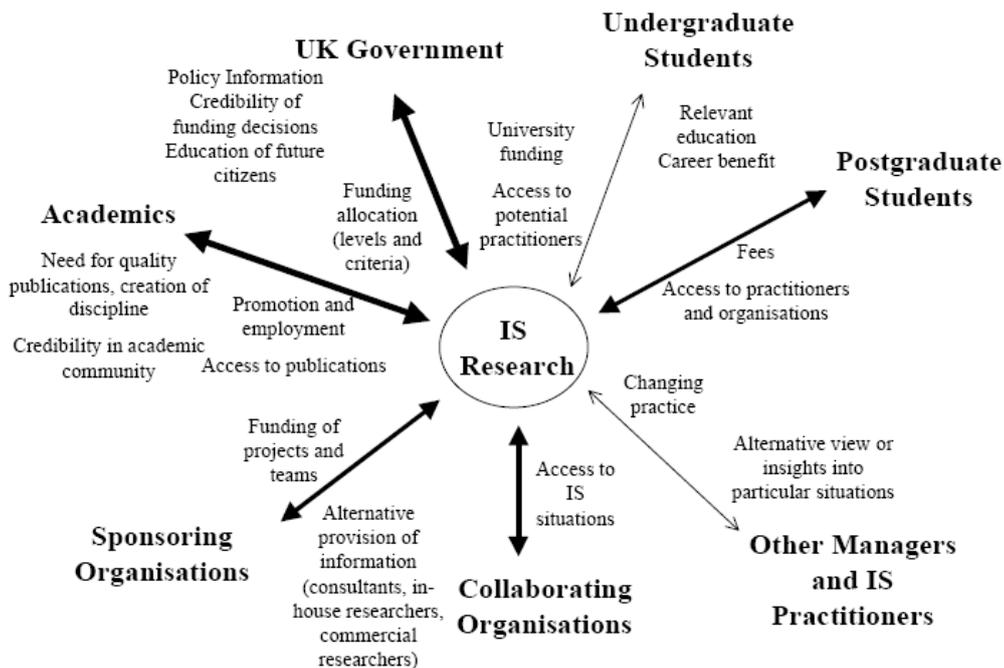


Figure 3: The resource-dependency relationships of stakeholders in IS research (taken from Nevill and Wood-Harper, 2001)

<b>Special Issues of Academic Journals</b>	<ul style="list-style-type: none"> <li>• Information Resources Management Journal 1998:</li> <li>• Saunders, 1998; Robey &amp; Markus, 1998; Senn, 1998; Mandviwalla and Gray, 1998</li> <li>• Management Information Systems Quarterly (MISQ) 1999:</li> <li>• Applegate, 1999; Benbasat &amp; Zmud, 1999; Lee, 1999b; Lyytinen, 1999; Davenport &amp; Markus, 1999</li> <li>• Communications of the AIS, Volume 6, 2001</li> </ul>
<b>Conferences and Panel Discussions</b>	<ul style="list-style-type: none"> <li>• Grover et al., 1999</li> <li>• International Conference on Information Systems (ICIS) 2002 conference; Australian Conference on Information Systems (ACIS) 2003 and Pacific-Asia Conference on Information Systems (PACIS)</li> <li>• ICIS 2005 panel (Desouza, El Sawy, Galliers, Loebbecke and Watson, 2006)</li> </ul>
<b>Empirical Research</b>	<ul style="list-style-type: none"> <li>• Grover &amp; Sabherwal, 1989</li> <li>• Sjazna, 1994</li> <li>• Gosain et al., 1997</li> <li>• Lippert &amp; Anandarajan, 2004</li> </ul>

Table 1: Special issues, conferences and studies on IS research relevance

predicament of many IS academics has lead to publishing as an ends rather than a means for disseminating research (Moody, 2000). IS journals have become mechanisms of promotion for academics rather than communication to practitioners. The institutionalized university reward systems impose that recognition, promotion and tenure will be granted to IS researchers whose work is published in the top IS journals (Westfall, 1999; Jennex, 2001). To illustrate, Avison et al (2006) notes that the Research Assessment Exercise (RAE) in the UK evaluates universities according to their research published in top IS journals listing. They argue that the excessive fixation in publishing has caused the decline of high quality books and monographs. Insights from their interview of UK IS academics reveal that achieving credibility, career promotion and fulfilling RAE requirements have become the purpose of publishing since ‘papers produced for practitioners don’t usually count’ (Nevill & Wood-Harper, 2001). These institutional pressures combined with the lengthy, and often political, journal reviews (Gray et al, 2004), the lack of accessibility and availability of research (Desouza et al, 2006), and the time constraints and problem of information overload faced by practitioners (Darroch & Toleman, 2006) weakens the effectiveness of IS publications in bridging research and practice.

### (2) Education

Education received by students, the main audience of research, is another linking mechanism between IS research and practice (Nevill & Wood-Harper, 2001). Students, the would-be practitioners, are conduits in transferring the knowledge and skills they acquired in their education (Ellis et al, 2003; Pearson et al, 2005). Academics play an important role in imparting their knowledge and research findings to students (Lee, 1999b). Textbooks are an important medium for disseminating academic research (Olfman, 2001). The IS curriculum should therefore reflect current practice (Avison & Fitzgerald, 2001), expose students to both rigorous and relevant research (Pearson et al, 2005) and prepare them to work in the industry (Lippert & Anandarajan, 2004).

However, the divergent interests of academics and practitioners results to a “disconnect between university offerings and organizational necessities” (Lippert & Anandarajan, 2004). In software engineering education, for example, graduates are not equipped with requirements of the industry (Beckman et al, 1997; Coulter & Dammann, 1994). The slow effects of IS research in the curriculum (Moody, 2000) and the lengthy publication process of textbooks results to teaching that is outdated and lagging behind practice (Lyytinen, 1999). The increasing demand for competent IS graduates provides a high motivation for IS education to explore alternative avenues to connect to practice—cross-disciplinary programmes, distance education, industry centers (Larsen & Levine, 2005), sabbaticals and faculty internships in companies (Kohli, 2001; Khazanchi & Munkvold, 2001), joint university-industry careers (Moody, 2000) and collaborative partnerships such as the Carnegie-Mellon Software Engineering Institute (Ellis et al, 2002) or the University of Queensland and Boeing partnership (Carrington et al, 2005).

### (3) Funding organisations

Research is made possible through the financial support of funding organisations, the third mechanism. Sources for funding could be internal i.e. from the limited university budget, or external i.e. from government grants or Research Councils, charities, industry sponsors or through consultancy (Arnott et al, 2005; Nevill & Wood-Harper, 2001). To quote Loebbecke in Desouza et al (2006), sponsors are the major stakeholders in research. Through industry sponsorship, IS research gains access to practical problems and the financial resources to carry out their relevant research aimed to impact practice.

The exchange of resources and access between the two communities has weakened and the gap between them has become more evident because of the perception that IS research lacks relevance to practice (Hirscheim and Klein, 2004). Acquiring external funding is competitive and dependent on the researcher’s credibility, personal networks, and other stakeholders such as the government and the RAE whose evalua-

tion weighs heavy in obtaining favorable funding decisions (Nevill & Wood-Harper, 2001). An analysis of the research literature to investigate the funding sources for decision support systems (DSS) research by Arnott et al (2005) provide empirical evidence on the IS research-practice gap. First, the significantly low percentage of industry-funded DSS research attests to the dwindling confidence in the relevance of research. Second, topics that were dominant in practice received little research grants. This confirms that research remains divergent from the concerns of practice. Third, positivist research papers, primarily published in top US journals and almost never in the major European journals, received the bulk of industry funded grants. Research methods are influenced by funding policies and positivism remains as the dominant approach (Orlikowski & Baroudi, 1991; Chen & Hirscheim, 2001). Since sponsors favor positivistic research, academics who pursue alternatives such as interpretivism (Walsham, 2006), action research (Baskerville & Myers, 2004) or multimethodology (Mingers, 2001) are in a tight spot. IS researchers recognize the shortcomings of positivism (Orlikowski & Baroudi, 1991; Benbasat & Zmud, 1999; Bacon & Fitzgerald, 2001) but they need funding to pursue these alternatives.

However, the perception that IS research is not relevant may only be partially true. Loebbecke points out that relevant IS research is not published because its value is derived from the confidentiality and exclusivity of research findings for utilization of the sponsoring organization (Desouza et al, 2006).

#### (4) Conferences

Conferences are mechanisms for networking, discussing ideas and dissemination of research (Davis, 1987; Nevill & Wood-Harper, 2001). For example, the Pacific Asia Conference on Information Systems has been instrumental to the establishment and development of IS research in Asia (Chau et al, 2005). The IFIP TC8/WG8.2 working conference in 2001 was particularly aimed to realign research and practice (Russo et al, 2001). However, these networking activities have been limited within the boundaries of each community, instead of facilitating an exchange. IS researchers and practitioners hold separate conferences with little cross-participation and representation (Moody, 2000). IS conferences discusses topics that are already passé (Glass, 2001). Moreover, the pressure to publish in top IS journals, has a knock-down effect in diminishing the variety and quality of submitted conference papers (Avison et al, 2006).

#### Bridging the gap?

Academics did not stop short with explanations of the IS research-practice gap. Their reflections have called for changes in the status quo. Journal editors are challenged to shorten review times and to be 'facilitators' rather than 'gatekeepers' by encouraging pragmatic and relevant research (Benbasat & Zmud, 1999; Chen & Hirscheim, 2004). Pearson et al. (2005) suggested guidelines to increase research relevance research to practitioners—(1) choose topics interesting to practitioners via partnerships with them; (2) write in a readable language and style; (3) offer usable research findings; (4) increase timeliness of publications through shortened lead times; (5) a paradigm shift to esteem academics who publish in practitioner journals; (6) publish in targeted journals or magazines that practitioners read; (7) increase access to published research. The re-evaluation and expansion of the 'top' IS jour-

nals ranking list (Avison et al, 2006), the increase of online visibility and availability of more journals (Chen & Hirscheim, 2004; Gray et al, 2004) and the inclusion of publications in practitioner journals as criteria for promotion (Westfall, 1999; Jennex, 2001) are significant changes that could result to increased relevance and disseminating capacity of IS publications. Adopting an open resource research approach where researchers and practitioners with the same interest can openly communicate, freely conduct peer reviews, collaborate in agenda-setting can better facilitate dissemination of research whilst in its development stage (Hardaway, 2005).

The IS curriculum could be amended to include hands-on experience and teaching of current technologies such as the Enterprise Resource Planning systems (Watson & Schneider, 1999). Collaborative university-industry initiatives such as the Working Group on Software Engineering Education and Training (Ellis et al, 2002) are positive efforts in of universities re-educating practitioners to competent software engineers. MSIS 2006 (Gorgone et al, 2006), the fourth collaborative effort by ACM and AIS, is an example of a model IS curriculum for graduate level that has been updated to accommodate changes in the industry. Watson and Huber's (2000) paper contained innovative programs employed by various IS academics to establish a closer partnership with practice. Close interaction with practitioners will ensure that research remains relevant to attract greater funding whilst practice is guaranteed a supply of competent problem-solvers (Watson & Huber, 2000).

#### Structural problems

Though intended to connect IS research and practice, each of the mechanisms discussed above seem to be unsuccessful. Nevertheless, to conclude that IS research-practice gap exists because of the ineffectiveness of the linking mechanisms is quite myopic. Building and preserving a bridge on shifting foundations is problematic. The same analogy applies to the IS field whose foundations are built on longstanding debates about its identity, status and value (Banville & Landry, 1989; Orlikowski & Iacono, 2001; Avison, 2003; Benbasat & Zmud, 2003; Larsen & Levine, 2005) and whose 'empirical referent is itself always in a state of change' (Lee, 1999a).

The fragmented nature of the IS field, its lack of cumulative tradition and coherent themes (Swanson & Ramiller, 1993; Bacon & Fitzgerald, 2001; Larsen & Levine, 2005) have resulted to a body of knowledge that is similarly disjointed and heterogeneous. Furthermore, the multiplicity of theoretical paradigms, epistemological approaches, and research methods (Orlikowski & Baroudi, 1991; Avison & Fitzgerald, 2001; Chen & Hirscheim, 2001) not only leads to different ways of researching the same thing, but also makes understanding research a daunting and complicated task for the IS practitioner. Wixon (2003) argues that the evaluation of IS research methods is irrelevant to practitioners and that the case study approach produces the most practical and usable research findings. Alternatives to the dominant positivist methods such as reflection-in-action (Heiskanen & Newman, 1997) and action research methods (Baskerville & Myers, 2004) are aimed to bridge the gap between research and practice. These similar methods encourage practitioners to be active whilst situated researchers develop practice-oriented theory.

## Conclusion and caveats

The IS research-practice relationship is influenced by social, political and institutional complexities which affect the mechanisms that operate between them. The four mechanisms discussed above are not exhaustive or treated extensively; the limited space of this paper does not allow for such. The goal of research has been explicitly limited to its relation to practice. While this was intentionally restrictive, it is equally important to remember that although research and practice have overlapping interests to work with each other, they do not operate with the same goals. Beyond rigor and relevance, IS research has a greater responsibility of tackling societal problems and improving the way of life (Lee, 1999b; Desouza et al, 2006). Thus far, the implied meaning of 'practice' in the literature has been limited and equated to the industry. Future studies could re-examine the domain and definition of IS practice, explore innovative mechanisms of knowledge transfer and report on the positive actions taken to bridge, not just mind, the gap.

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