Towards a Richer Model of Rigor and Relevance:

Applying Rigor and Relevance on Rigor and Relevance in IS Research

Daniel Fällman
dfallman@informatik.umu.se
Department of Informatics
Umeå University, S-90187 Umeå, Sweden

1. Introduction

> "[…] The principal symptom of this crisis is that, as our research methods and techniques have become more sophisticated, they have also become increasingly less useful for solving the practical problems that members of organizations face." (Susman & Everéd, 1978)

In a series of articles published in MIS Quarterly[1], the primary journal for research within Information Systems (IS), the crisis identified in the citation above was renewed and applied to research in the IS community. This series of articles, and a handful of others, merely frames what seems to be a minor breakdown within IS research: as a community, why do not IS produce knowledge that is both scientifically rigorous as well as relevant to practice? In light of the articles reviewed for the making of this paper, it is the latter, the relevance to practice, that seems missing.

So far, the general discussion of rigor versus relevance in IS has taken place on somewhat abstract and unfocused level, where different authors sometimes represent completely different thing when they state something similar, and every so often mean similar things but articulate it differently. This paper is a modest attempt to move the discussion from the somewhat confusing meta-level to something that is more concrete, to make some aspects of what has been proposed as a tension between the rigorous and the relevant somewhat more tangible. Hence, as the title suggests, it is an attempt to apply rigor and relevance to the notion of rigor and relevance.

The main purpose of this paper is hence to introduce, discuss and question the notion of 'rigor' and 'relevance' as a dichotomy. To do so, it seems a necessity to produce working definitions of the concepts used in the discussion. These efforts will lead the way towards developing a richer model of the relationship and dependencies between the concepts than those currently employed. Hopefully, this richer model should be of some usefulness to researchers in IS as an intellectual tool when striving to attain the right equilibrium of rigor and relevance.

To do this, several factors need to be considered. In section 2, the discussion of rigor versus relevance within the IS community is explored and exemplified on a horizontal plane in terms of the perceived problem and proposed solutions. In section 3, some specific issues that are found in the literature and considered of significant importance are examined in a more detailed, vertical mode. With the horizontal discussion and the vertical forays in mind, section 4 introduces an attempt to combine rigor and relevance. In section 5, the discussion is analyzed and two for the reminding parts of the paper important recognitions are made.

[1] MIS Quarterly Vol. 23 No. 1, March 1999

Section 6 uses the analysis to make recommendations on how to establish and improve relevance. Section 7 produces working definitions of the terms rigor and relevance and important concepts in the vicinity. Section 8 presents and reviews different models proposed to describe the relationship between rigor and relevance. In the latter part of section 8, and based on the results of the paper, a richer model of the relations between the concepts introduced is presented. Section 9 summarizes the findings of this paper.

2. A Perceived Problem of Relevance

2.1 Identified Problems

Benbasat & Zmud (1999) claim that the relevance to practice in IS research published in the leading journals is limited. In their view, academic research published in IS do not produce knowledge that IS professionals can apply in their daily work, do not address problems or challenges that are of concern to IS professionals, do not focus on current technological and business issues, and is not accessible to IS professionals.

There are, they argue, five explanations to why this is the case, i.e. to why IS research seemingly lacks relevance to practice. First, IS researchers as well as editors of academic outlets have tended to emphasize the importance of rigor over relevance in order to establish IS as an academic discipline and to gain respect from other, more established, academic disciplines. Keen (1991) argues that until relevance has been established, rigor is irrelevant. Thus, rigor does not create relevance, which in turn means that the quality of a scientific work is not based solely on rigorous use of e.g. a method, which however often seems to be the case. Second, there has not been a success within the community in terms of developing a cumulative tradition, which makes it difficult to develop, evaluate, agree upon and maintain strong theoretical models that have the power to influence practice. This is a questionable explanation, and a more in-depth discussion of this topic is found below. Third, the dynamism of the technological environment, where researchers tend to pursue rather than lead practice, make many articles published in the leading IS journals outdated before they reach the reader as they report on 'new' technology already accepted or rejected by the users. Fourth, IS researchers tend to be insufficiently exposed to the practical contexts of IT-related use and business management. Fifth, the institutional environment, including academic patronage systems and power structures, do not encourage a search for relevance as it does for that of rigor.

Robey & Markus (1998) explain the crisis of relevance in IS in similar terms. They note that the measure of success is generally the number of papers per year published in academic journals, which is particularly true for US universities and business schools. When the community grew rapidly during the 70s, IS researchers faced a shortage of journals in which to publish their work and as a result IS began founding its own journals, and today there exists several IS-only peer-refereed journals. However, some of these journals are explicitly targeted towards other academics. Keen (1991) notes that most work within IS research seems relevant only to very specialized communities, many of which are in fact within IS research themselves. Thus, a tentative practitioner audience has effectively been alienated, and IS research is hence *"is in danger of talking mainly to itself about itself"* (p. 28). Robey & Markus (1998) believe it to be ironical that we would disparage articles in e.g. Harvard Business Review, Sloan Management Review, CIO Magazine, Computerworld and Wired, if they were to be sent to peer-refereed journals or appear in tenure applications, while we on the other hand put high value in the same articles as teaching materials, more than we value articles published in academic journals. Students in IS are hence exposed to appealing consultant writings, while academic work is strictly directed towards other researchers. Because of this, IS researches in a way prove their own irrelevance to practice by keeping their academic work away from their own students.

In addition, due to the delays in the publishing cycle of must respected journals, that is the time between a manuscript is sent to a publisher and it is in fact published, academic writings about 'new' technology is often outdated when it reaches the reader, which means that the practical interest in the technology has usually cooled down. Somewhat incisively, Robey & Markus declare that because of this *"we may ironically be ensuring irrelevance by targeting our work at traditional publication outlets"* (p. 8).

Keen (1991) also recognize what he believes to be a dangerous shift from previous topic-based efforts in IS research to a method-centered tradition where researchers gather and build sub-communities around specific methods rather than topics. The focus seems to have moved from the "what to study" to the "how to study".

2.2 Proposed Solutions

Benbasat & Zmud argue that a research article *"that is interesting, applicable, and current has the potential to be useful for practitioners"* (p. 12), and hence constitutes a relevant report of research endeavors. A research article is interesting if it addresses problems or challenges that are of concern to IS professionals. It is applicable if practitioners can use the produced knowledge. It is current if it focus on current—at the time of publication that is—technologies and business issues. According to Benbasat & Zmud, reports on research need also to be accessible for the intended audience to achieve relevance.

In their view, there are two primary actors involved in making IS more relevant, the authors that produce manuscripts and the journals' editorial processes that decide which manuscripts are published and which are not. Authors need to select topics that hold a high degree of future interest from key stakeholders, such as journals, colleagues and practitioners, and not so much what is their interest today. IS researchers should also strive to look to practice to identify core research issues as well as distinct topics, and not let the current IS literature influence the choice.

Authors need also rethink the purpose of their articles, according to Benbasat & Zmud. In their view, it often seems a primary objective for authors to communicate how they have dealt with a challenging problem rather than communicate a practical solution to the actual problem. To increase relevance, authors should focus more on the latter. With support from Robey & Markus, Benbasat & Zmud also state that authors should consider their articles' level of readability, and try to improve the language of communication. They argue that *"the vast majority of IS research articles should be crafted in a clear, simple, and concise manner such that they are accessible by all the potential readership of a journal"* (p. 12). Robey & Markus articulate a similar opinion: *"there is nothing inherent in research itself that renders it incomprehensible"* and that *"research can be made accessible to a wider audience, and style is the place to begin"* (p. 11). Lyytinen (1999) does not agree with this statement, but rather proposes that practitioners should be educated to *"appreciate brilliant intellectual efforts…that may demand difficult and esoteric language because they cannot be couched in the 'common language'"* (p. 26f). Lyytinen argues that esoteric language can be relevant, and hence that lack of relevance is not primarily a question of language.

Benbasat & Zmud also believes that the editorial processes and the journal editors have an important role in making IS research more relevant. Mission statements, review comments and editorial decisions must allow research efforts that strive for relevance, while they traditionally may have been too supportive of rigor oriented work. Davenport & Markus

(1999) agree, and add, *"journal reviewing and promotion and tenure reviews are important mechanisms for maintaining irrelevance"* (p. 22). Argumentatively, they propose a target 'portfolio' for the community's research output as a whole, where equal proportions of high science, applied theory and practical research are represented.

As an alternative to Benbasat & Zmud's rather hands-on solutions, Keen (1991) suggests two perhaps more general measures he believes need to be taken to improve relevance. First, the researcher should carefully choose the target audience. This may be one or many among senior business managers, human resource managers, academic scholars, system designers, computer vendors and educators to mention just a few examples. Second, it is important to identify the concern within this audience that you are addressing in your research. Concerns are often expressed as action-centered words, such as need, wish, aim, interest and search. Keen holds the identification of concerns to be essential in determining relevance. If there is no concern present, the research endeavor is *"a topic in search of a justification and the justification will not be found"* (p. 44).

3. *Specific Issues that Confine Relevance*

3.1 Academic versus Consultant Research

In response to Benbasat & Zmud's article, Davenport & Markus (1999) agree that IS research is indeed in need of more relevance, but argue that they do not go far enough in their analysis of why IS research of today tend not to be relevant as well as they do not go far enough in their proposed recommendations for change. They claim that an amendment towards relevance is not possible without *"fundamentally changing core academic values around research rigor, publication outlets and audiences, and the perils of consulting"* (p. 19). While Benbasat & Zmud argue that rigor is in fact what distinguishes academic research from consulting, and that consultants thus make poor role models for academic research, Davenport & Markus believe that even though consultant research tend to lack rigor, they are typically faster at identifying practitioners' needs and see the rapid production of good research as a key success factor. Rather than ignore hem, IS academics should instead study the methods used by consultants to learn about *"the relevance, the readability, and the emphasis on implementing results […]"* (p. 21). Robey & Markus note that consultants, vendors and practitioner media produce timely reports on practical implications of more or less every possible new or emerging technology, long before the squealing wheels of the academic publishing cycle have even started to move. It is now the case that these groups, and not the academic community, are the primary influence as to how practitioners think about emerging technology.

However, Robey & Markus claim, there are certain characteristics that distinguish academic work from that of journalists or consultants. Academic researchers have rigorous training in research methods, with which they are able to see through and *"…scrutinize critically superficial arguments and self-serving claims."* (p. 14). Another clear advantage is the neutrality of the researcher, which should lead to results that are perceived as more trustworthy because of this neutralness to name brands and products. A third advantage is that the results of academic research is usually available to everyone, and is not concealed on proprietary grounds. Yet another advantage of academic work, specifically over that of consultants, is a commitment to scholarly values and ethical principles not generally found or allowed to flourish outside academia.

3.2 Questioning the Importance of a Cumulative Tradition

Davenport & Markus make a strong argument against one of Benbasat & Zmud's explanations to why IS research lacks relevance, that of the development of a cumulative research tradition, i.e. to strive for a higher degree of consensus about core theoretical concepts and stable practical issues. It is not other academic management disciplines we should strive to emulate, Davenport & Markus argue, since a cumulative tradition, such as one generally found in these fields, would hinder relevance rather than assist it because of the rapid business and technology change within IS. Rather, IS should strive to model disciplines like medicine and law, which seem able to combine issues of rapid technology change with a high degree of academic research relevance. In these fields, academic research leads, rather than chase, practice. Note that medicine and law, which Davenport & Markus suggest IS emulate, are not scientific disciplines but rather professions. If we should emulate a field of profession rather than a scientific discipline, Lee (1999) argues that in order to reach relevance *"we ought to consider doing our research in a way that emulate inquiry in the professions"*, which would *"produce knowledge about how to intervene in the world and change it in order to satisfy real-world needs"* (p. 29). Keen (1991) argues strongly against the idea that IS should strive to emulate a profession such as medicine, or disciplines such as physics and chemistry. His argument is that these field work within a clearly defined tradition, in which the audience already has been defined. Here, a consensus on rigor and relevance has built a tradition, and people who enter these fields are trained in that tradition. Keen claim that IS is not yet such a field, and should perhaps not be one either, since it requires delimiting the field's rigor and relevance.

Robey & Markus has similar objections to the development of a cumulative tradition within IS, when they observe that since the domain of IS practice is rapidly changing, the establishment of long term research programs about, and hence also the establishment of a cumulative tradition within, any particular technology a questionable endeavor, since it remains unclear to what extent the collected body of knowledge can be applied to new technology when it emerges.

Keen (1991) also believes that IS must protect its diversity, because in the evolution of the field the IS research community *"…has flourished from an infusion of new theory and method from new reference disciplines"* (p. 40). Keen does not see the IS community's diversity of themes, methodology and notorious borrowings from other disciplines as a weakness. Rather, he says, it is in fact the diversity the community should focus on and make it an essential strength of IS research. Also, Keen notes that his views on the question of a cumulative tradition refer to building on previous work when approaching a topic, rather than doing work on the same topic, which obviously is Benbasat & Zmud's interpretation and use of the concept.

3.3 Framing Relevant Research

Benbasat & Zmud make a case for academic research that make concrete recommendations, articles that syntheses prior research and essays that criticize parts of current practice. The best way to achieve this goal of relevance while at the same time being able to be published in leading academic journals, they argue, is by conducting "applied research" (see Zmud, 1996), where academic theories are applied to practical problems. Davenport & Markus and Robey & Markus suggest two alternatives to this approach, evaluation research, where practical and theoretical criteria are applied to the evaluation of an intervention, and policy research, which focuses on solving identified policy problems. They also note that while these two approaches, as well as Benbasat and Zmud's recommendations earlier, are largely accepted in other academic fields, they are not easily published in IS academic journals since they do not fit current definitions of acceptable IS research. This is, according to Davenport & Markus, means that IS researchers must not only focus on producing readable and accessible articles in the leading IS journals, but also direct their efforts towards outlets that practitioners value, which traditionally has been of less academic value.

In addition, Lyytinen notes that textbooks are of great importance in shaping the minds of future generations of practitioners, i.e. students, but that these books are outdated in only a few years time and that much of what is said in them do not really relate to research findings, which in turn may explain the low interest in empirical research by practitioners. Lyytinen claim that sole exposure to this mode of knowledge delivery makes students incapable and unmotivated to read anything other than neatly packaged *"teaching hamburgers"* (p. 26). Lyytinen asks: When our students do not read our research papers in our courses, how can we believe they will start doing so when they graduate and become practitioners?

3.4 Institutional Justifications Yield Opportunistic Research

Lyytinen is also surprised that Benbasat & Zmud do not look at what he addresses as broader institutional issues for at least parts of the answer to why relevance seems absent. The lack of critical mass of IS researchers and the related lack of long-term perspectives in IS research constitute an apparent problem, and according to Lyytinen, *"without strong and well-organized IS institutions, it is difficult to establish good relations with industry in order to really understand and shape industrial practices"* (p. 25).

Lyytinen also touch on a potential origin of the problem—which is also present in Benbasat & Zmud, Davenport & Markus, however not as explicitly stated—that of opportunistic research behavior by academic scholars. Lyytinen point to the fact that the professional image of IS researchers are dependent on rigor, scientific expertise and tenure policies, which lead to researchers' tending to ignore practice. For instance, it is not uncommon for researchers to want to work with a specific research solution in which they are experts, rather than engage in systematic and long term research efforts. Lyytinen also indicate that the highly specialized focus and the individual working styles of empirical researchers lead to a low level of understanding of technical matters and practical problems related with these, which are important for practitioners. Robey & Markus also note this problem area, when they state that IS academics have treated the seemingly opposing conflict between rigor and relevance as disparate and in general chosen the academic path, since the academic system tends to reward those whose work is considered rigorous.

3.5 Beyond the Perspective of Positivism

Lee (1999) agrees with Davenport & Markus that Benbasat & Zmud do not go far enough, but from a slightly different angle. Lee believes that it is not appropriate to restrict oneself to the perspective of positivism in the rigor versus relevance discussion. In the social sciences, positivism refers to an approach where the social sciences emulate research in the natural sciences. Lee argues that research conducted in the manner of the natural sciences is one of many research strategies—it is not the only one that can and ought to be pursued. Keen (1991) implies that research goals and target audience should drive the choice of method, and that methodology should be seen as a choice, and not as oppression.

Benbasat & Zmud's model-in-use seems to be an instrumental model of practice, in which a researcher formulates, tests and validates a theory that specifies independent and dependent variables and the relationships between them (Lee, 1999). Their primary method of assessing what is relevant to practice and what is not consists of asking managers what they believe to be interesting and important. This model is applicable in some situations, but does not apply in all situations, and—which is important—do not answer all sorts of questions a researcher might want to answer. Lee proposes that *"there are circumstances in which one of our responsibilities as academicians is to be the conscience for our practitioner colleagues and, indeed, for society in general"* (p. 31). In other words, relevance can be achieved without practitioners being the judges, and where their acceptance or use of the knowledge produced are not an important factor for determining the level of relevance.

4. Combining Rigor and Relevance: Consumable Research?

In their article entitled *"Beyond Rigor and Relevance: Producing Consumable Research about Information Systems"* Robey & Markus (1998) state that it is their confidence that there is no inherent conflict between being rigorous and relevant in one's research efforts, which is believed to be true for both the process of research, e.g. applying a specific method, and the product of that research, e.g. a published article. They propose researchers in IS should strive to produce "consumable research"—research in which it is in fact desirable to be both rigorous and relevant.

The authors make four recommendations for achieving the goal of consumable research. The first recommendation has to do with research sponsorship. The perhaps most straightforward way to have practitioners consume academic research is to carry out the research efforts with their money. Practitioner sponsorship may be used as a mechanism to ensure that the outputs of a research effort meet the needs of those who pay, even though it is obvious that they might not always know what really meet their needs in all situations. Secondly, the IS community must be open to and learn to use research practices from other fields than the traditional social sciences. Research models from fields such as policy studies and education, disciplines that tend to value both rigor and relevance, should be just as applicable and useful within IS. The third recommendation for achieving the goal of consumable research has to do with the style of the resulting research reports, an issue discussed in some detail in section 3. Four, Robey & Markus suggest that researchers do not only aim at academic journals for publishing consumable research, but also try to identify appealing alternative outlets, for instance Sloan Management Review, Communications of the ACM, popular books and edited volumes around a particular theme, Internet publication channels and numerous conferences and workshops of varying sizes and focuses.

5. Analysis of Rigor versus Relevance

5.1 The process and the Product of Research

When examining these papers, it seems somewhat unclear whether the authors are talking about the product of research or the process of research, and to what extent a specific argument put forward applies to both, or if not, to which. I refer to the "process of research" as the act of applying scientific methods to collect data, carry out interviews, review literature and perform analysis. The process of research does not imply using a particular method or approach, rather that such are in fact used.

The process of research may be considered separate from the "product of research", by which I point at the interface between the researcher and the audience. Currently, the most prominently know, used and demanded interfaces in the IS community are the published articles and books. For instance, a paper may be viewed as the product of a particular research effort, which most of the time is the only point of contact between the audience and the researcher, and hence the only source the audience can utilize to gain knowledge about the undertaken research endeavor.

Obviously, the process and the product of research are not always clearly separate events seen from the perspective of the researcher. From the researcher's perspective, the product is often merely the result of the process. However, from the perspective of the audience, the product constitutes a representation of the process to which they do not have direct insight. The fact that both rigor and relevance is concentrated and established through product from the perspective of the audience but not necessarily so from the perspective of the researcher makes it useful to separate the process and the product of research for our purposes. By making this separation between the process and the product, it is possible to put an exceptionally high degree of rigor into the process of research. Then, however, the researcher might want to address two different audiences with the results, e.g. an academic conference and a popular science magazine. This is possible to do by giving the product of research, i.e. in this case the two very different articles that need to be produced, different levels of rigor. Note that the research process on which both the popular science article and the academic conference article is the same, and thus the same level of process rigor. The popular science article however, does not mediate this process rigor as rigorously. Hence, the popular science article has a product rigor that better suit its audience.

Clearly, some issues have to do neither with properties of the process nor the product of research directly. These issues include such as journal publishing policies, teaching, academic hierarchies and tenure systems and the solutions proposed by the authors also lie beyond the scope of the process and the product of a research effort.

5.2 Defining Audiences: Rigorous and Relevant, Says who?

As Keen (1991) argues, it seems necessary to define the audience of a product of research in order to be able to establish what may come to influence relevance. It is interesting to see the way the question of potential audiences is treated in the examined papers. Benbasat & Zmud do not put much effort in analyzing this problem, when they slovenly state that the primary audience for the practical, relevant IS research strived for is senior practitioners.

Lyytinen (1999), with support from Davenport & Markus, quickly responds that Benbasat & Zmud *"ignores the most important way in which our research findings are appropriated in practice—through our teaching"* (Lyytinen, 1999, p. 26). It seems reasonable to not only restrict the consumers of research to managers of large corporations, rather to make it explicit that undergraduate and graduate students constitute a significant research audience. Davenport & Markus note that it is important for the discipline as a whole to grow the base of "reflective practitioners" that consume academic research, and that we must because of this also include students in the intended audience, not only senior managers.

However, Keen (1991) take on a much broader and serious approach to the issue of audience in IS research. He states that there is no one audience for the IS community as a whole. It is indeed possible to find a great number of potential audiences for IS research results. Some researchers, like Benbasat & Zmud, might want to influence top managers, while others, like Lyytinen, a concerned with influencing students. Lee (1999) touched on the subject of influencing a society as a whole. Yet others might want to influence scholars in other fields, educators, hardware and software vendors, politicians, computer scientists, designers etc.

Keen argues that the choice and a clear conception of the intended audience is a key concern when doing IS research. As introduced earlier, different audiences have different concerns. For them, as well as for the researcher, their concerns constitute the level of relevance in a particular product of research. Knowing these concerns is thus of importance to the researcher, both while carrying out the process of research as well as when producing the final product (or products) of a specific research effort[2]. It is of importance in the process, since the researcher must be conscious about the intended audience to approach the world in a way that allows him or her to be able to explore relevant issues. It is also of importance in the process of producing a specific research product. For instance, a single article need not cover an entire research process; it can merely use empirically data to prove a point. However, knowing the audience allows the researcher to give the product of research properties that align with the target groups' conception of relevance and requirements of rigor. Interestingly, this makes it possible for a researcher to produce several research products, each with different properties such as level of showed rigor, style and tone, designed to fit the target audiences' needs.

6. *Improving Relevance*

Keen (1991) says that those who see themselves as part of IS research *"share an implicit or explicit belief that research is purposive"* (p. 26). The intention of IS research is in some way to influence and improve action on some level in some domain, whether it is for being more effective, having more fun or for reasons of democracy or any other purpose on a personal, group, organizational, societal or technical level. IS research is thus teleological (see e.g. Churchman, 1971); it has a purpose and wishes to influence. Given the teleological nature of IS research, it follows that relevance must drive IS research, because rigor does not alone create relevance—which is to say that rigor is not equal to quality, and that methodological issues are not an end in themselves. Without relevance, rigor is not a relevant issue (Keen, 1991).

Finding a target audience that has concerns will establish relevance for that specific audience. This relevance then comes to influence and imply a particular style of rigor, aligned to the relevance requirements of the target audience. Keen notes, however, that this of course does not mean that relevance in itself is an excuse for not being rigorous, only that relevance always precedes rigor, and that rigor without relevance is irrelevant.

6.1 How to Establish and Maintain Relevance

Most efforts in this paper has been to made in order to grasp the concept of relevance, and to some extent rigor is not treated with the same enthusiasm partly because it is already quite well defined. Relevance, on the other hand, is not as easily established. Hence, the following two sections are an attempt to provide a collection of ideas on how to improve on relevance, both in the process and product of research. Obviously, they should not be seen as a checklist or a recipe for achieving relevance, but rather as ideas on how a researcher in IS could go about to achieve relevance.

6.1.1 Strengthening the Relevance of the Product of Research

As for the product of research, the following list is a distillation of the refereed authors' views on how to strengthen the relevance of the product of research, collected and edited based on

[2] Obviously, the product and the process of research are not always two distinct phases. However, for conceptual reasons, they are so in this paper. In reality, of course, producing the product of research is often—but not always—a part of or overlap the process of research.

the discussion in this paper. Again, the product of research can be an article, a book, a talk, a web page or any other interface between the researcher and the audience.

To achieve a high degree of relevance, the following attributes should be considered in a research product:

- It should address problems, challenges or concerns of a perceived audience
- It should be practically applicable to the target audience
- It should be current in its focus on technology and business issues
- It should be accessible to the intended audience, i.e. the researcher should communicate the product to the audience through an appropriate—from that of the audience—communication channel
- Its topic should hold a high degree of future interest from intended audiences
- It should focus on convey issues of the topic, e.g. practical solutions to a perceived problem, rather than communicate issues of methodology
- It should align its style, its language of communication, to suit the needs and prerequisites of the intended audience

6.1.2 Strengthening the Relevance of the Process of Research

The following considerations apply to the process of research. They are ideas on what an IS researcher need to consider when carrying out the process of research, such as e.g. when preparing interview questions. To achieve some degree of relevance, the following attributes should be considered in the research process:

- Choose or find the audience you want to address carefully
- Identify concerns within the target audience, e.g. look to practice to identify research issues and topics, and do not to the current IS literature be the primary influence

7. Working Definitions of Rigor and Relevance

Peculiarly, the articles previously referred to in this paper are about issues of rigorous and relevant research, and while several different stands are taken and many opinions are uttered, some core concepts seem not properly defined, or—at least—the definitions made are not explicitly stated or agreed upon by all authors. Ironically, one could say that the perceived relevance of these articles seems to have made the authors lose some of the rigor that lie in defining the concepts used.

Obviously, the terms “rigor” and “relevance” is of key importance to define, but other concepts in the vicinity need also attention, for instance “audience” and “publication channel”. I will also introduce two concepts called relevance of rigor and rigor of relevance, which are used to imply what should be inherent links between these two concepts. This section is intended to result in working definitions of these notions that work for the purposes of constructing a model of the relationships between them.

7.1 Rigor and Relevance of Rigor

Rigor denotes a structured and controlled way of planning, carrying out, analyzing, evaluating and producing products of research, independent of research methods. However, certain methods and theories may require different measures to be taken in order for a particular study to be regarded as rigorously executed. Being rigorous is simply to devote oneself to being thorough and careful, and to use the tools provided by e.g. method in an accurate way. Rigor applies to both the process and the product of research.

Rigor is also about placing the study in a wider context, for instance to find communities outside IS which study the same or analogous topics and to what extents that work is applicable[3].

To achieve *relevance of rigor*, rigor is decided through the needs and the requirements that follow the concerns expressed by the intended audience. The appropriate level of rigor is hence established in a dialogue with the audience through the properties of their concerns. This decided-upon level of thoroughness suggested by relevance should then constitute the rigor searched for in the research endeavors, a goal of rigor that the researcher should try to achieve. If the researcher is able to satisfy this level, a high degree of relevance of rigor should have been attained.

Unfortunately, the rigor demanded by the audience is not always the same as that required by other actors that influence a particular piece of work, such as journal editors, academic supervisors and other gatekeepers of the publication channel. However, by separating between the product and the process of research, as noted earlier, this is not an insurmountable dilemma. The process can be executed rigorously, while the product is not transparent to—or mediate—the same level of rigor.

7.2 Relevance and Rigor of Relevance

From what has been said above, *relevance* can only be established in dialogue with and through the concerns of a specific audience. Thus, a clear conception of the intended audience is a key concern for establishing relevance. Relevance may thus be defined baldly as the act of making efforts into research issues that is of concern to a perceived audience.

Relevance applies both to the process and the product of research, and measures need to be taken in both areas. In the process of research, relevance is established through finding an audience and through finding out that audience's concerns. The product of research should then manifest the established relevance by showing properties that corresponds to the needs of the intended audience.

Hence, *rigor of relevance* can be defined as the rigor by which researchers are able to find out and answer to the concerns of their perceived audiences, and not—consciously our unconsciously—drift in relevance in order to achieve other goals, which would make the target audiences play the part of mannequins to other, unspoken, audiences.

7.3 Audience

The *audience* can be defined as the explicit or implicit group or groups of people that, through the publication channel, will constitute the target for the results of a specific research effort.

7.4 Publication Channel

The *publication channel* is the means by which a researcher communicates with its intended audience. These include for instance journal articles, conference articles, books, textbooks, web pages, talks and presentations. Clearly, the *choice of communication channel* is of key importance, since it is the means by which a research effort is communicated with its intended audience. However, certain *gatekeepers*, such as journal editors or publishers, influence the extent to which the researcher is able to make choose the communication channel that seems most appropriate for a specific product of research. This may result in a situation where the researcher is forced to choose another communication channel, such as another journal,

[3] Which, by the way, indicates a weakness of rigor of this paper

another conference or publish the results as a web page. This channel of communication may be less *accessible* to the intended audience, and hence reach only a sub-group within the target audience, or even worse, a completely different audience for which the relevance of the product is significantly lower.

8. Towards a Richer Model of Rigor and Relevance

8.1 Reviewing Existing Models

In order to construct a new model of rigor and relevance that includes the issues and concepts introduced in this paper, it seems necessary to first review existing models introduced by refereed authors.

8.1.1 A Model of Rigor vs. Relevance as a Dichotomy

The simplest model of the relation between rigor and relevance suggests that we can only obtain better rigor by sacrificing relevance, and the opposite, i.e. to increase the level of relevance, we must give up some rigor. This model corresponds to what has been proposed as a fundamental tradeoff in observational research (Mason, 1989) in which the two dimensions degree of reality (which roughly corresponds to relevance) and degree of control (which roughly corresponds to rigor) are in dialectical opposition. Mason also notes that while the dimensions are in opposition, *"one is not the logical negotiation of the other"* (p. 6). While this proposed dichotomy might be plausible for empirical observational experiments, it seems not a convincing model for interpreting IS research as a whole. In the examples given earlier, we have seen that it seems possible to improve both rigor and relevance, which is not possible according to this model. The main problem with this model is that it is by far too simplified, and does not take into consideration contextual aspects that relentlessly influence the rigor and relevance of any given process or product of research.

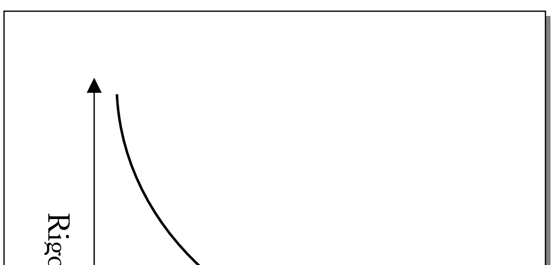

Figure 1. Rigor/relevance dichotomy model

8.1.2 The Impact Frontier Model

Davenport & Markus (1999) refers to an alternative model to the relationship between rigor and relevance, called the impact frontier model. Here, the researcher is intended to have the potential to contribute to both business and academic communities by having the choice of how to position a publication for the kind of impact wanted. The main idea behind this model is that the "impact quotient" of a product of research is not dependent of its communication channel. A product of research published in a rigor-oriented journal may have the same, less or more impact than an article published in a relevance-oriented magazine. While it is certainly debatable if this model actually brings us closer to or answers any questions in relation to the concepts of rigor and relevance, it does help us realize that there are more dimensions to the question than introduced in the rigor/relevance dichotomy model (see figure 1); that the model should be multi-dimensional rather than two-dimensional. It also recognizes that the impact of a product of research is not based solely on its communication channel, i.e. where it is published, but rather on the accessibility to and acceptance of that channel by the target audience, and that the product of research has properties that are aligned to the audiences' needs. Hence, the impact frontier model again denotes the importance of having a clear conception of the target audiences.

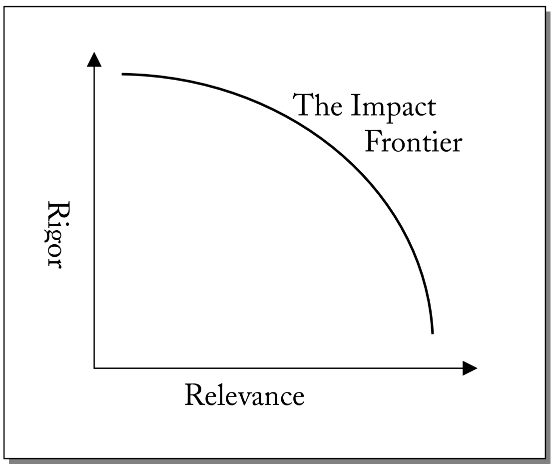

Figure 2. The impact frontier model
(Davenport & Markus, 1999)

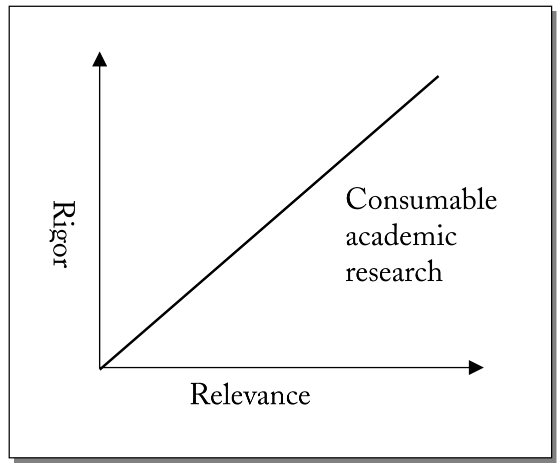

Figure 3. The consumable research model
(Robey & Markus, 1998)

8.1.3 The Consumable Research Model

The main idea behind the consumable research model, proposed by Robey & Markus (1998) is to break the conception of rigor and relevance as dialectical dimensions. They believe that assumption is dangerous, because it *"deceives us into thinking that we have to choose between rigor and relevance"* (p. 9). The curve entitled consumable academic research in figure 3 suggests that there is no "either or" relationship between rigor and relevance and it is indeed possible as well as desired to increase both simultaneously, thus achieving the goal of consumable research as previously introduced.

8.2 A Richer Model of Rigor and Relevance

8.2.1 The model

The model presented in this section is intended to constitute a richer model of the relationship between the concepts of rigor and relevance than those introduced earlier. What should make this model "richer" is that it includes the distinction between the process and the product of research, that it includes a representation of the intended audience, that it shows how relevance is established, that it shows how rigor is influenced and that it makes visible the role of the publication channel.

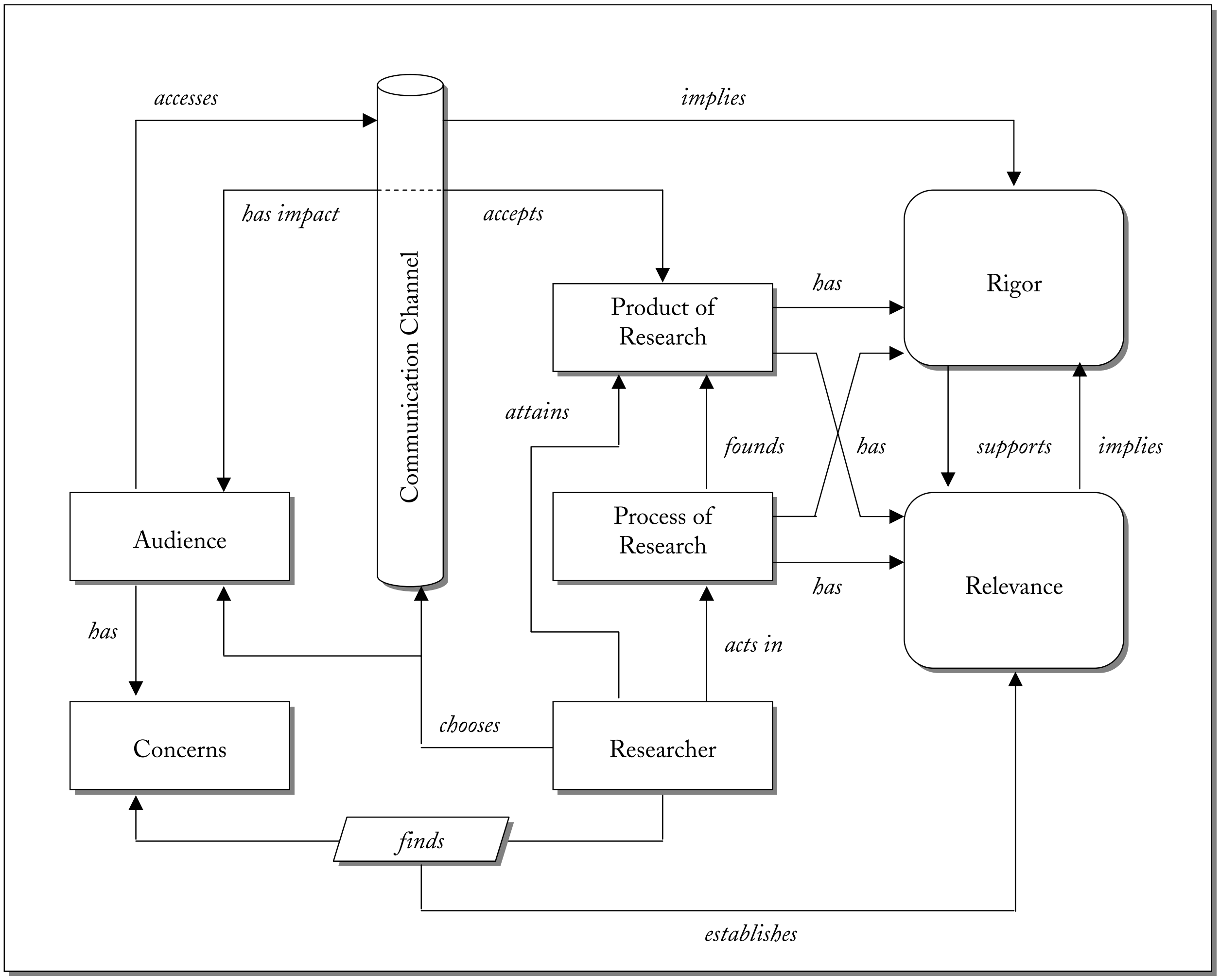

Figure 4. A richer model of rigor and relevance

8.2.2 The interpretation

Here, the relationship between rigor and relevance is not that of a dichotomy. Rather, it suggests that relevance implies rigor, in consent with the opinion of Keen (1991). Relevance is established through the researcher choosing an audience that has specific concerns. The research should find these concerns, and the thoroughness by which the researcher is able to find and uphold these concerns have been termed *rigor of relevance* earlier. Finding these concerns establishes relevance for the chosen audience.

Relevance implies the rigor of both the product and the process of research. Specific concerns of a target audience suggest how the researcher should approach the world to learn more. The researcher should not decide on methodology, and then look for issues to solve, rather the research topic that comes from thee audience's concerns should suggest the way the researcher approach the answer. Issues of methodology, hence, should be decided according to a perceived issue, and not be an end in itself. The fact that relevance should imply rigor has been termed *relevance of rigor* earlier. However, once relevance is established, rigor is in support of relevance.

The model also introduces the role of the communication channel, which relate in different ways to the audience, to the researcher, to the product of research, and to rigor and relevance. A potential problem here is that the communication channel suggests a style of rigor, which sometimes may be contradictory or unaligned to the rigor suggested by the established relevance. That is to say, that the rigor of e.g. an academic journal may not be the same level of rigor needed by the audience. If the rigor does not correspond to the standards of the journal, the product of research may not become published and hence not accessible to the audience. If the product of research is aligned with the standards of the communication channel, and that this standard is not the level of rigor searched for and implied by the audience through rigor of relevance, the product of research have a lesser degree of relevance of rigor and thus may have less impact on the audience than would a product of research with a high degree of relevance of rigor.

9. Conclusions

This paper has introduced the relevance versus rigor discussion within IS research and questioned the view of rigor and relevance as a dichotomy. Existing models of the relationship has been examined and questioned, and a new and richer model of the relationships and dependencies between the concept of rigor and relevance has been introduced. Two main issues have been revealed. First, for the rigor versus relevance discussion, it is important to separate the process of research from the product of research. Second, it is important to be specific about and to know the target audience and their concerns, which establish relevance.

In the paper, working definitions of the concepts introduced by different authors have been produced. *Relevance* has been defined as the act of making efforts into research issues that is of concern to a perceived audience. *Rigor of relevance* has been defined as the rigor by which researchers are able to find out and answer to the concerns of their perceived audiences without drifting in order to achieve other goals. While *rigor* denotes a structured and controlled way of planning, carrying out, analyzing, evaluating and producing products of research, *relevance of rigor* denotes the level to which the researcher is able keep the decided-upon level of thoroughness suggested by relevance.

10. Refererences

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