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# Assessing IS Research Impact

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# Assessing IS Research Impact

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Abstract:

Based on the International Conference on Information Systems' (ICIS) 2013 senior scholars' forum, this paper shares insights on IS research impact assessment. We define research impact as conducting research that makes a difference to individuals, businesses, industries, and societies. While assessment groups like the Association to Advance Collegiate Schools of Business (AACSB) want scholars to make an impact, sometimes they operationalize impact in ways that may encourage scholars to pursue research goals tangential to making a difference. With this paper, we hope to stimulate thinking in the IS community on creating research assessment techniques that encourage our scholars to make a difference.

**Keywords:** Research Impact, Assessment, IS Field.

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## I. INTRODUCTION

Segments of the public have grown increasingly wary of inaccessible academic research: they wonder what its purpose is, whether it's worth the cost, and how it helps. In a 2014 article in *The New York Times*, Nicholas Kristof laments the state of academic research. Reflecting on scholar' inability to predict the Arab Spring, he comments that academic research has grown increasingly arcane and irrelevant (Kristof, 2014). Referring to IS research specifically, Ginzberg states: "Practitioners do not see IS academics as relevant. They do not turn to us [IS academics] for help with their most significant problems. They do not, in general, read what we write" (Ginzberg, 2012, p. 7).

Public dissatisfaction with academic research combined with rising costs of higher education and reduced government funds are pressuring academics to document how our research benefits society. Already, agencies such as the United Kingdom's Treasury are questioning whether universities are using their funding to make an impact. Rather than allowing external stakeholders to dictate a narrow subset of impacts, in this paper, we define a broad range of potential impacts IS scholars can pursue. We then suggests actions that will encourage IS scholars to pursue research that makes a difference.

This paper is organized as follows. In Section 2, we propose two research assessment models. In Section 3, we share examples of research assessment exercises at the country and industry level. In Section 4, we provide examples of impactful research, and, in Section 5, conclude with action items for the IS community.

## II. HOW CAN WE ASSESS RESEARCH IMPACT?

As we define it, research impact means making a difference. Senior scholars proposed two potential models to assess research impact: Delone and McLean's IS success model (Delone & McLean, 1992) and a research impacts model.

### Adapt DeLone and McLean's IS Success Model

DeLone and McLean (1992) proposed an IS success model to guide research investigating IS's impact. This model was a response to system stakeholders wanting to assess the value that their expensive information systems delivered, a problem that the IS field has faced since its inception, DeLone and McLean's model proposes that system quality and information quality leads to use and user satisfaction. Use and satisfaction lead to individual impact, which leads, in turn, to organizational impact. Using this model as a base, we can transform it from individual to organizational and societal level of analysis with six similar interrelated measures of IS research's publication impact (see Figure 1).. The model proposes that journal and paper quality leads to use of the published ideas and user satisfaction. This use and satisfaction impacts individuals and can then lead to a difference for organizations and society.

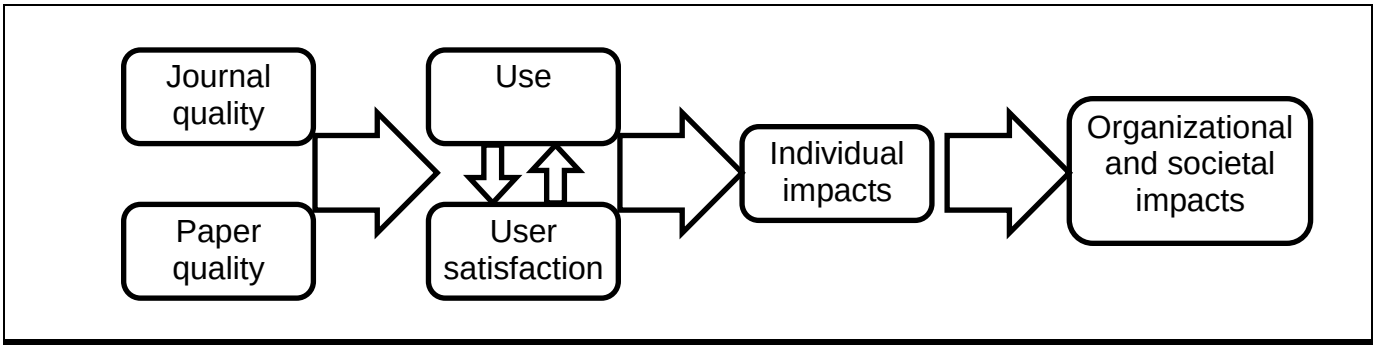


**Figure 1. Adaptation of DeLone and McLean's (1992) IS Success Model to Model Research Impact**

Figure 1 suggests problems associated with measuring research impact that parallel the problems with measuring system impact. A clear problem is that, while stakeholders are generally interested in impacts (i.e., the right side of the model), these impacts are diverse and difficult to assess systematically. Furthermore, there is often a lag between when a paper is published and when the research enters mainstream thinking and makes a difference.

These problems draw assessment attention instead to the earlier stages in the model. Unfortunately, paper quality (the left side of the model) is also difficult to assess systematically (as anyone who has had to organize a best paper award can attest) and only a weak predictor of likely impact. Using journal reputation as a proxy for research impact is popular, but it is an ecological fallacy since the quality of papers in a particular journal vary more than the variation across journals.

Given these problems, most current assessment strategies focus instead on the middle of the model (i.e., use and user satisfaction) as proxies for the desired impact. Assessing research use requires designing criteria that consider the different groups that use academic research—academics, students, and organizations. We can assess academic use with citation count and theory reuse. A paper mentioned in a syllabus or textbook shows student use. Practitioners mentioning research findings or papers in feeds, blogs, or reports indicate organizational use.

The model further suggests strategies that IS academics can pursue to improve the impact of our research. First, since students and practitioners may not fully understand research in the form of research papers, we should encourage synthesis papers, which take findings from a body of research and repackage it in a way that is easy for people to act on. This repackaging might include popular press news stories. Second, in many cases, research is inaccessible to people who could use it because much scientific research is published in proprietary outlets run by companies that profit from selling our work to our stakeholders.

## Apply a Research Impacts Model

Given the problems with applying DeLone and McLean's model (1992) to assess IS research impact, another option is to apply a research impacts model (Swanson, forthcoming) (see Figure 2). This model broadly describes how academic research, publication, and education act together to impact professional practice. Research incorporates all aspects of design, execution, and documentation, except its publication. Publication includes traditional journal publication, conference presentations, and Web postings. Education includes incorporating research findings in traditional degree programs, executive education, and business-sponsored programs. Each of these academic activities provides multiple opportunities to directly impact professional practice. For instance, researchers might use action research approach to improve a client organization's business practices. Publication might target practitioner journals and periodicals. Education might include a workshop instructing professionals how to use a new method such as business analytics.

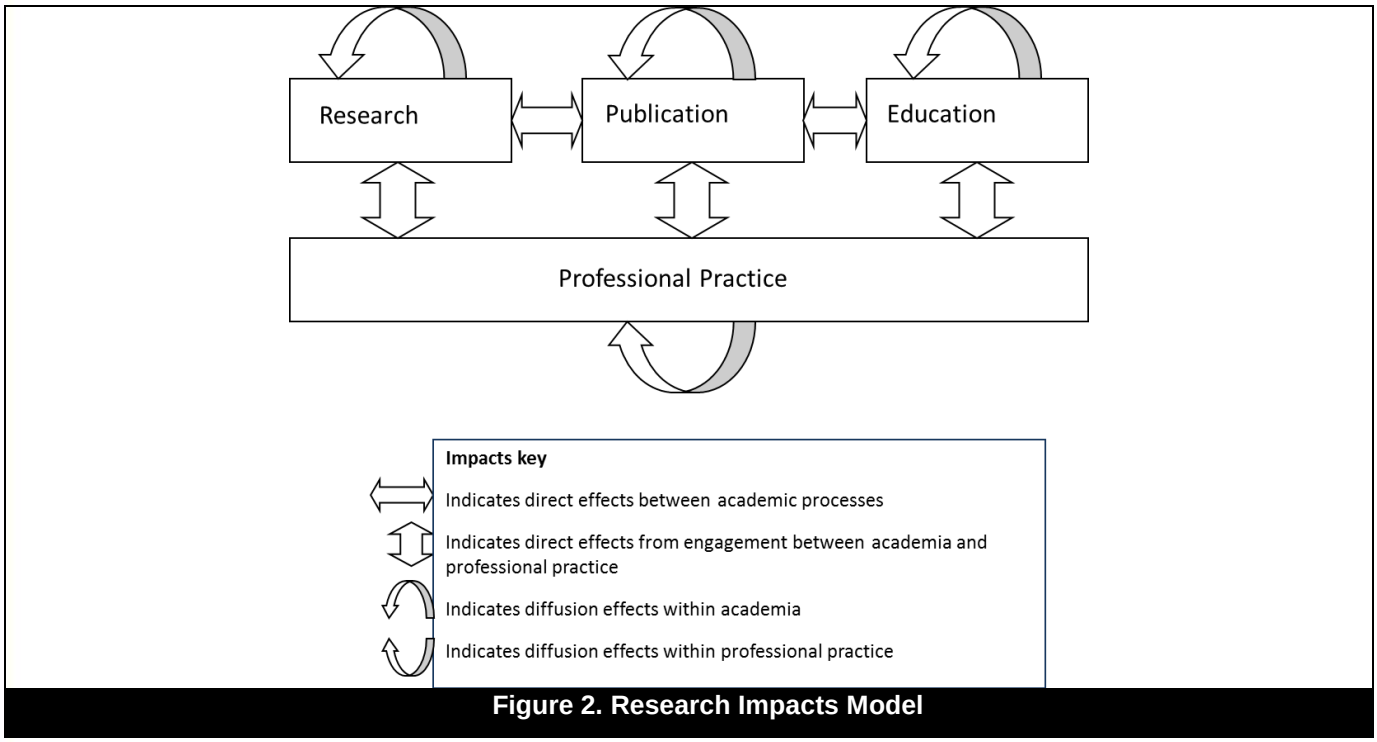


**Figure 2. Research Impacts Model**

In addition to these avenues for direct research effects, Figure 2 recognizes that indirect research effects may occur through the diffusion of both academic and professional practices. Taking academic practice first, in the case of research, a particular form may become popular and spread among research groups, as was well illustrated in research on group decision support in the 1980s. In the case of publication, the traditional citation process underpins and documents the accumulation of effects of each publication on subsequent others that rely on them. It is here

that citation counts have their place. In the case of education, course syllabi, reflecting research findings, are often shared among academics and their institutions. Thus, the extent to which one academic group's research ultimately affects professional practice depends not only on its direct engagement with professionals, but on the diffusion of this research through academic practices themselves. Greater research diffusion will generate more opportunities for research to come to practitioners' attention through widespread direct engagement.

Finally, Figure 2 recognizes that research may have additional impact through diffusion effects in professional practice. For instance, a few professionals adopt a new concept, originally introduced in academic research, and then other professionals may adopt the concept, as was the case with critical success factors in its heyday.

Thus, incorporating academic and professional practice, the model moves beyond simplified notions that practitioners will read published research papers to guide their action and instead maps the multiple avenues through which impacts can and do occur. This model offers an IS research unit the opportunity to assess how this translation presently works in its own case. Because research units may differ in their approaches, so too may their assessments. Consider two simplified cases. One unit engages primarily in action research and can tally up its direct impacts study by study. But do the resulting organizational improvements diffuse more widely, or are they all one-off accomplishments? Are there theoretical contributions that diffuse among other researchers? Another unit engages primarily in economics-based research that makes use of secondary data publically available. It can easily tally up the citations to its work to document its academic diffusion, but does this research come to the attention of practitioners and impact what they think and do, and, if so, how? In each of these cases, by employing the model, there will be a different story to tell. And, in so doing, neither research approach is considered inherently superior to the other. Rather, the research units are appropriately challenged to speak in their own distinct way to the impacts of their respective work.

It is one thing to present models for assessing research, but it is another to observe instances where efforts to assess research have begun. In Section 3, we discuss the United Kingdom's research excellence framework's history, how the framework works, and its challenges. Following this, in Section 4, we provide examples of efforts to generate impactful research at the Birkbeck, University of London's School of Business, Economics and Informatics and the Technische Universität München in Germany.

## III. NATIONAL RESEARCH ASSESSMENT PRACTICES

The U.K. Government funds higher education in many ways. Aside from student funding, it distributes around $2.6bn per annum to universities in "quality-related" research funding in addition to about $5.2bn in peer-reviewed grant funding. Periodically, since 1986, the Higher Education Funding Council (HEFCE) has carried out reviews of research in higher education institutions on behalf of the government. The U.K. higher education system has developed a range of statistics to measure its performance, account for public funding, inform management decisions, demonstrate that academic standards are preserved, and satisfy students, employers, and others of its quality (Bence & Oppenheim, 2005). We need to recognize these research reviews, in their various guises, as part of this requirement to demonstrate worth. Over the last 28 years, the outcome of the research assessments has been a letter, grade, star, or a combination of these items. This research assessment resulted in heavily skewed research funding going towards institutions earning high scores.

As the title of these reviews has morphed from research selectivity to research assessment to the current research excellence framework (REF), so too has their scope has changed. Originally, the government required institutions to put forward five outputs in each of 37 cost centers, and, in the next review, peer review panels evaluated two publications per staff member in 152 subject units of assessment (Bence & Oppenheim, 2005; Jump, 2013). The evaluators also sought information on research student numbers and research excellence framework research income. By 1992, higher education institutions had to submit two publications and two other forms of public output. Four years later, higher education institutions filed up to four publications per academic. By 2001, institutions made 2,600 submissions to 69 units of assessment. In 2008, the government introduced quality profiles and set five quality categories. Explicit criteria assessed applied, practice-based and interdisciplinary research.

For the current research assessment framework, which the government will announce the results of in December 2014, higher education institutions have submitted research from 52,077 academics in 36 units of assessment. This framework marks the first time that an assessment of non-academic impact (which accounts for 20 percent of the overall grade) has been made. This value itself involves an impact statement (20%) and impact cases (80%) that are assessed by expert panels that consider reach and significance. These panels contain academics and research users. Higher education institutions have to submit around one impact case per ten academics.

Impact, in the assessment exercise, is seen as an effect on a variety of aspects of society, culture, and the economy engendered by changes in understanding, values, and actions (see Figure 3). To have this sort of impact, research must extend itself outside academia. The research excellence framework assesses research quality by having peers peer review publications and submissions about the institution's research environment. The claimed impact must, however, be based on published research; good research is necessary but not sufficient to claim impact. Indeed, Thirunamachandran (one of the HEFCE architects of the current research excellence framework system) forestalled a U.K. Treasury demand for a metrics-based system by offering an assessment of impact: "The Treasury was interested in the not-unreasonable question of 'what does £1.6 billion a year in QR funding buy in practical, lay terms, economically, socially and culturally?' That can only be articulated in terms of impact" (quoted in Jump, 2013, p.2).

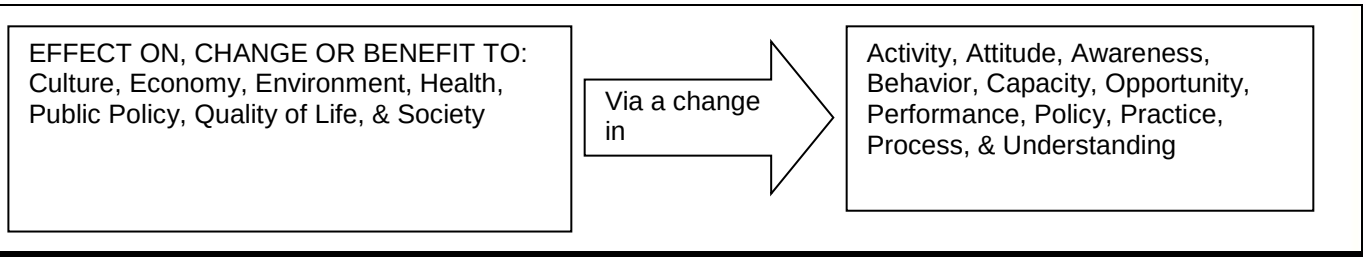


**Figure 3. U.K.'s Research Excellence Framework (adapted from HEFCE, 2014)**

For the funding council to consider an impact case, it must meet several criteria. First, high-quality qualitative or quantitative research published in quality journals form each impact case's foundation. Consulting work such as disseminating research to companies and giving talks is excluded. Second, impact cases must be three pages long and include a 1.5 page story and 1.5 pages of corroborating evidence. This means a researcher has 1.5 pages to demonstrate how their research, for example, saved Iceland from financial ruin, and 1.5 pages for success stories and letters as corroborating evidence. Each impact case includes six references and six corroborating pieces of evidence. Some researchers think this is trivial, while other researchers lament that authors have to distinguish themselves in a page and a half. Each impact cases must address three indicators: meaning, context, and relevance.

While U.K. higher education institutions have extensive experience undergoing research assessments, this is the first time that any have had to provide impact cases. So the expectation is that a variety of practices will emerge and, hopefully, research on the impact cases may reveal much more about impact's nature and scope.

## Impact Challenges

Unfortunately, submitting impact cases to the U.K.'s research excellence framework challenges academics to work beyond their usual incentive system. Academics now have to uncover impact and build goodwill with research users to document this impact. Several factors contribute to academics' struggle documenting impact. First, impact causality is difficult to establish and to evidence. Swinnerton-Dyer, who led the funding council and developed the first research assessment exercise in the UK, feels that impact assessment exercises may be "a license for lying" because the evidence is "uncheckable" (Jump, 2013). For example, conceptualizing specific impacts such as policy change is difficult. How do you show the government did something because of an individual piece of research? Even though legislatures may call academics to testify and legislation may cite journal papers, these occurrences typically comprise only a small element of a constellation of stakeholders involved in political change processes. Furthermore, research topics, methods, and approaches differ in their ability to generate impact and may skew institutions' funding, hiring, or promotions systems.

The second reason academics struggle documenting impact is that much impact is unexpected and unplanned. For example, a researcher investigating peer-to-peer music sharing did not expect to (1) find that Canadians who downloaded music for free continue to purchase the same volume of music (Anderson & Frenz, 2010), and (2) act as an expert witness in a trial. This finding impacted the music industry's distributions decisions. A third impact documentation struggle relates to the time-consuming and problematic nature of gathering evidence. Issues arise with goodwill and academic incentive systems. Researchers must rely on goodwill to develop impact cases. Goodwill issues occur with research users, in collaborative research teams, and when researchers depart one university and join another. The people who use academic research such as companies hesitate to write impact support cases because of confidentiality issues. In cases where researchers work collaboratively across institutions and countries, disentangling impact attributable to one piece of research or the contribution of one party is difficult. Since the government assesses impact at the university level, universities have to build goodwill with departing faculty members to encourage them to write their impact case.

To further complicate impact assessments, academic incentive systems do not consider impact. Research plans, which are part of academic funding requests, seldom ask researchers to craft a systematic strategy for generating impact, although impact is given more prominence by non-governmental funders. When academics submit their research to journals, reviewers are concerned about implications not impacts. Implications, which journal editors and reviewers require, differ from impact. Furthermore, years can pass before a publication, and the research underpinning it, has an impact, and finding impact is unrewarded and unsupported. Universities rarely consider research impact in promotion criteria. However, if periodic impact assessment becomes embedded, then promotions and hiring systems will change to reflect this. Generating impact requires that academics repackage their work for non-academic audiences by, for example, writing blogs and publishing white papers. Unfortunately, this takes time away from publishing papers in academic journals.

Finally, there is the potential for impact assessment to skew the use of different research methods. In the run up to the research excellence framework, there was discussion that quantitative research with its greater capacity to permit generalization of research findings offers more scope for generating and reporting impact. An unintended consequence of a move to assess impact might be to engender a retreat from qualitative research.

## IV. ASSESSMENT CASE EXAMPLES

Despite these challenges, universities are successfully assessing research impact beyond academia. In this section, we provide examples of impactful research from Birbeck, University of London in the UK and Technische Universität München (hereinafter TUM) University in Germany. Birbeck provides examples of impact cases submitted as part of the U.K.'s research excellence framework. TUM provides examples of impactful research occurring as part of an automotive industry collaboration.

### Research Excellence Framework Cases

Birkbeck, University of London's School of Business, Economics and Informatics comprises four academic departments and contains three research excellence framework units of assessment: business and management studies, economics and econometrics, and computer science and informatics. Birkbeck is a research-intensive institution in the top 1 percent globally. Research excellence framework funding comprises around 11 percent of total income with another slightly larger amount deriving from other peer-reviewed research bids. Hence, performing well in the research excellence framework is vital for Birkbeck.

**Table 1: Birkbeck's Research Impact Case Examples**

| Impact area | Example |
|---|---|
| Culture | Expert witness in peer-to-peer music sharing trials |
| Economy | Rescued Iceland by informing the Icelandic Monetary Policy Committee<br>Improved government advice and guidance to firms on product and process innovation<br>Stochastic modelling for complex option pricing and commodity forward curves, and applications in corporate trading and hedging<br>Improving standards of governance in the U.K. sports industry |
| Environment | Developed an application that reduces the cost of counting bats<br>Participatory cyber physical computing<br>Intelligent constructionist environments |
| Health | Remotely captured Parkinson's disease severity—using the Web and algorithms<br>Classified protein structures and functions |
| Public policy | Developed U.K. sports governance codes<br>Effects of committee structure and gender-composition on effectiveness and accountability of monetary policy committees<br>Impact of applied demand analysis on competition policy<br>Regional economic development policies: using lessons from high-tech economies<br>Allowing for model uncertainty and data revisions in central banks' forecasting and policy analysis |
| Quality of life | Preventing workplace bullying<br>Life science informatics |
| Society | Intelligent tools for teachings teenage math |

Institutions can decide which academics to submit to the assessment and into which panels. Information systems might fit into either business and management studies or computer science and informatics. To prepare for the research excellence framework, Birbeck sought a variety of impact cases from its academics. These cases then went through assessment at the unit, school, and research committee levels before being submitted to external assessors. This process identified the strongest cases with the best evidential support. Birbeck developed and



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elaborated these cases further. Through this process, Birbeck pursues the strategy of demonstrating, with the cases, various types of impact, on different categories of stakeholders, derived from a variety of types of research—qualitative, quantitative, case study, action research, and so on. This breadth best shows the value of the unit's research. Table 1 below outlines examples of the cases submitted across the three units of assessment by dominant impact area.

As Table 1 illustrates, notable impact cases deal with the economy, the environment, and public policy. Birbeck researchers rescued Iceland by being members of the Icelandic Monetary Policy Committee, which dealt with Iceland's financial system crash. The researchers showed the research the IMPC used and how it helped Iceland recover from its financial problems. By developing an application that reduced the cost of bat monitoring by 90 percent, Birbeck researchers impacted the environment. The researchers measured impact by calculating the cost of monitoring bat populations prior to and after the application's use. The Bat Conservation Society uses the application in the indicator bats biodiversity-monitoring program initiated by the United Nations' convention on biological diversity. In a third example, Birkbeck's research shaped sports governance codes by devising policy codes for all amateur sports. Governing bodies in the UK now accept this.

## Automotive Industry Impact

Technische Universität München (TUM) University in Germany illustrates how industry-university collaboration can create impact. TUM has established a joint-collaboration agreement between two car companies, Audi and BMW, which are located 30km on each side of TUM. This collaboration affects the way TUM constructs its research programs and it creates a feedback loop for impact issues. Figure 4 below shows the engaged scholarship model that guides TUM's research program.

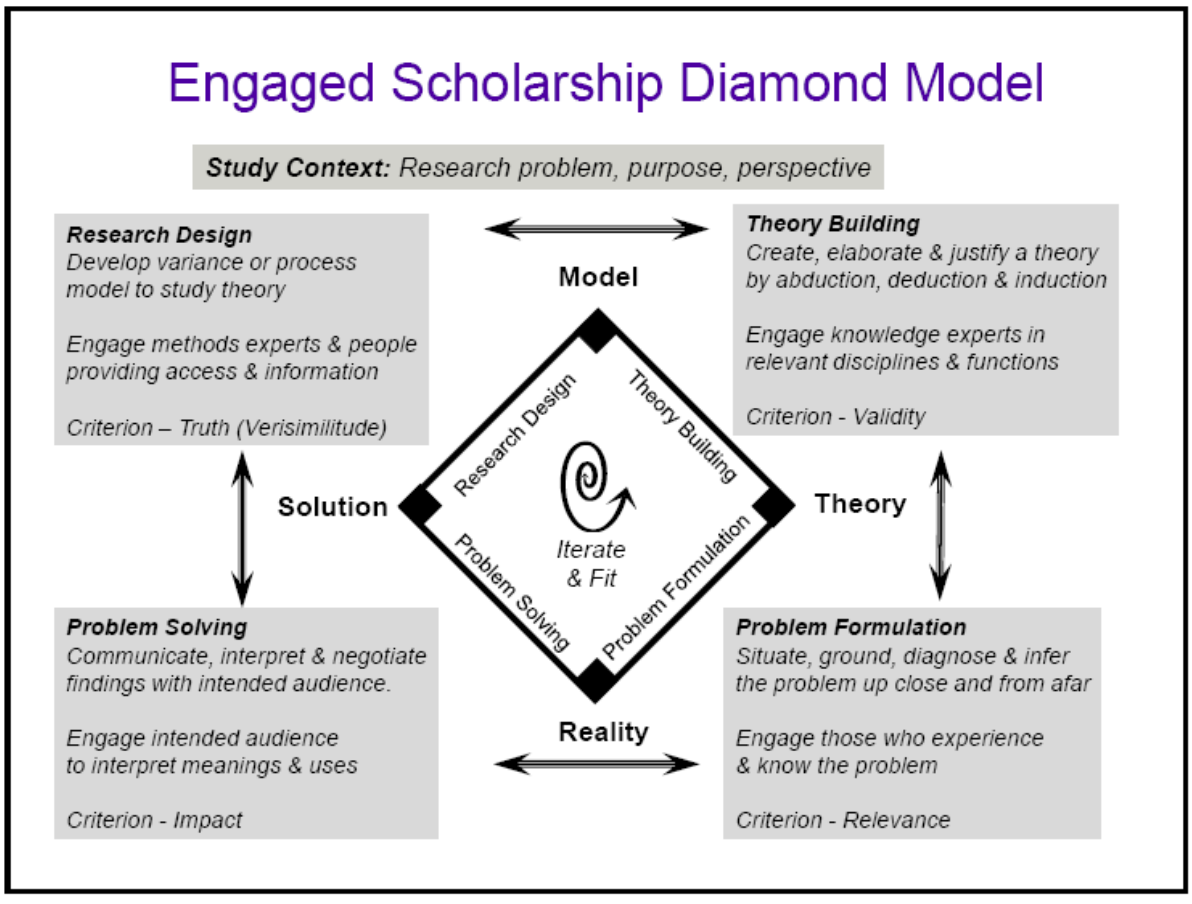


**Figure 4. Engaged Scholarship (Van de Ven, 2007)**

Leveraging the engaged scholarship model to guide industry collaborations, TUM has acted to build impact into its research programs. First, TUM emphasizes an overarching research program. TUM refrains from research in specific area, single-project studies, or research with the goal of a single publication. Second, TUM emphasizes


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teamwork rather than lone-ranger research on a personalized data set. Working in teams provides a continuous flow of talent, skills, and tools to address the continuous stream of problems that arise in industry collaborations.

Balance is the third way TUM builds impact into its research programs. TUM understands that its programs are reality driven, its projects are funding driven, and its publications are outlet driven. To deal with the reality that its partner organizations' top management changes threaten to ruin its research programs, TUM maintains its industry collaboration as part of a research portfolio. TUM does not design all of its programs around a single industry collaboration and TUM rejects industry funds that do not support its mission. Two actions that foster TUM's industry collaboration are fostering student involvement and deemphasizing publications. In many cases, businesses will be more receptive to interacting with students (in order to contribute to their learning experiences) than to professors. Therefore, TUM emphasizes student learning in its collaborations with industry partners rather than producing publications. TUM values its partners' quarterly reports. The quarterly reports dictate their partner's goals and TUM's projects.

TUM's collaborations with automakers have resulted in the joint design of several automotive mobile services platforms. This includes services that tell drivers where the next restaurant is located or read things to drivers. Mobile Automotive Cooperative Services (MACS) and the Avatar based Virtual Co-driver System (AviCos) provide two examples. MACS started in 2001 as a research project funded by Germany's federal government. Aimed at helping drivers recover commuting time, MACS provides services drivers can use while driving. These include personalized news, entertainment, and MyOffice, which consists of email, a calendar, and to-do lists. AViCoS arose out of TUM's collaboration with Audi, a German car company north of Munich. Audi lamented that it had invested significantly in its innovative car design, but with little return because potential drivers did not know how to use these features. For example, running the air conditioner requires understanding three user elements. To address these problems, TUM helped Audi design an avatar that explains the goals of these innovations derived from TUM's projects.

Projects such as MACS and AviCos impact academia, society, industry, and policy. While academic impacts typically include papers and citations, TUM's experiences suggests that only some direct impacts culminate in publications, research papers, and citations. Rather, real impact requires studying the direct impact of a university on an industry over time with multiple publications. TUM's collaborations have resulted in several direct impacts. Policy impacts include new and better regulations and policy advisory. For example, most human-computer interaction research is built for regulation. Human-computer interacation research could investigate how to keep cars on the road without the innovation (e.g., radio, navigation, office tasks) hurting others. Societal impacts include actor perception changes (e.g., academics, practitioners, suppliers, and customers) over time regarding the role of platforms and prototypes. Industry impacts include new product features, new implementation processes, new suppliers (e.g., startups, spinoffs, and business units) and new ecosystems (e.g., standardization, transindustry-associations). Unfortunately, many of these impacts are difficult to measure and attribute to academia. For example, when automakers introduce new product features, society recognizes the people who market the innovation to the public rather than academic researchers.

## V. ACTION ITEMS

The impact TUM has had on the automotive industry and Birbeck University's experience submitting to the U.K.'s research excellence framework provide examples of generating and documenting research impact. These examples and the preceding discussion offer several actions the IS community needs to consider as we asses our scholars' impact. These action require cross-field integration, research promotion, resource incentive alignment, impact mindfulness, and help from others.

### Action 1: We Need Better Mechanisms to Recognize New Knowledge Created in IS

We argue that our field produces a significant amount of new and practical knowledge, even if much is presented in technical language that is opaque to practitioners. Most of us (perhaps all of us) are hardly aware of the full range and detail of just what is produced in IS research. Too often, content about the value of IS (from economics-oriented literature) is invisible to the design-science builders, while the new techniques, approaches, models, and evaluation techniques are not foremost in the mind of our behaviorists. We do not excel at informing our colleagues in and outside the IS domain about the full range of potentially impactful new knowledge that we create. While competition may stimulate healthy and energetic activities, it can also keep us from collaborating as effectively as possible in valuing and promoting the collective work of IS researchers. Specialization may be necessary to grasp the full range of content in a narrow domain, but we might need to view our own field more broadly to achieve synergies from the diversity that we already exhibit. It may be worth thinking about mechanisms in our literature (perhaps something akin to an abstracting service akin to the one-page summaries of papers at the beginning of *MIS Quarterly*, but across venues) and during conferences for celebrating and recognizing the new knowledge created in the field, successful research streams, individual projects and papers.

## Action 2: IS Research Outcomes, Results, Theories, and Lessons Need to be Better Packaged and Promoted

It is axiomatic that even the most insightful research will have little impact if it is not disseminated. As a field, we have an interest in moving our findings and accumulated knowledge into the broader practitioner domain. However, it is one thing for a community to have responsibilities and opportunities and another to exploit them. For the most part, we act as individuals conducting and communicating about our own research. To some extent, we each might take some responsibility to package and promote this work through both teaching channels (e.g., adding to our courses and curriculum) and community channels (e.g., presenting at practitioner events such as SIM meetings and discussing informally with practitioners). However, such efforts tend to be idiosyncratic (we are not all very good at this) and difficult to accumulate into a format that highlights the diversity, penetration, and collective influence of this body of research. We would argue it is still worth doing.

On the other hand, we also need to explore institutional channels for packaging and promoting our collective accumulation of knowledge. This might include investigating and filling gaps from research study to practitioner awareness. It might include greater efforts for summarizing and packaging results through publications such as *MIS Quarterly Executive*. We might also write systematic columns or papers in purely practitioner outlets such as *CIO magazine* and even *Computerworld*. Additional sources outside the IS domain may include publication in *Harvard Business Review*, *California Business Review*, ACM and IEEE outlets, and CIO and consultant blogs (e.g., Forrester, Gartner, etc.). We could further disseminate our research by contributing to emerging electronic media with blogs, social network pages, and other broadcasting. Initiatives might include journal editors writing editorials reflecting on the research impact of a research stream and using digital design methods such as Reddit, TedTalks, and YouTube to promote our research. In some countries and universities, interaction with media such as television interviews also contribute significantly to research's cumulative impact. Incentives for such work might include expanding the range of research valued at "top" institutions. Recognition and encouragement of such work can be a priority of the IS community represented by AIS and the senior scholars to supplement the benefits to individuals in both institutions that do and do not adequately reward such efforts.

## Action 3: Better Align Resources and Incentives with Impactful Research

To the extent that impact is embedded in or exhibited by individual work, both scholarly associations and universities need to develop resources and incentive systems that recognize researchers for their delivering impactful research. This alignment requires recognizing impact when we look for it. Institutions, especially the Association for Information Systems (AIS) and related groups such as the Academy of Management , ACM, and others, could originate tools that recognize and measure research impact. As individual schools and scholars develop such tools, these institutions could have a hand in promoting them for internal use among ourselves and among funding agencies and regulators such as AACSB. If you follow the argument that such funding and accreditation agencies will eventually enact these tools, it is worth our while to be involved and possibly lead the way in developing intelligent measures rather than accepting whatever anomalous, inconsistent, and tangible, immediate only measures these groups propose.

## Action 4: Build More Potential for Impact Into All Our Research Projects

Much of our research is about understanding the interaction of people, processes, and technology rather than solving immediate business problems. This, however, does not exclude the potential for seeing how (perhaps with additional knowledge that is known to be missing) such abstract knowledge can be applied. For example, fundamental knowledge about the diffusion of technology and people's reactions to particular categories of features can provide insight for building particular interfaces. The scholars of such fundamental knowledge may not be held to this second phase in application, but the statement of such a linkage may in itself create impact value. It can do this by showing the way for others to create such application knowledge. By the same token, we can create reward and prestige for those who generate this application-oriented knowledge. Applying results from prior studies in new situations and testing their value when instantiated serves as a valuable link between "pure" or fundamental research and practical significance. We cannot expect scholars to undertake such studies if they are unpublishable or if they are treated as secondary and unimportant.

## Action 5: Focus More on Research Units and Streams and Their Diverse Impacts

The IS field may face danger from misplaced evaluation. We tend to evaluate the lowest level unit (e.g., the individual worker) under the hidden assumption that the outcomes of the group are the sum of contributions of each individual. It is arguable whether there is value in such evaluation (e.g., at best, it may stimulate some individuals to higher levels or particular types of performance), but it is clear that, for instance, if we want an assembly line to function effectively, it requires a level of organization beyond the individual performance of each employee. We must keep in mind techniques for allocating the benefits of research streams, research communities, and the IS field overall if we do want to show how individual work has value as part of a larger pattern in addition to its unique

effects. Both AACSB in the US and the Funding Councils in the UK require that individuals demonstrate the effects of journal papers, so we cannot ignore the individual study level of performance evaluation. AACSB is particularly interested in top journal publications, whereas academic impact in the UK is necessary but not sufficient. U.K. academics have to show how their research impacts individuals, governments, and society. The research assessment techniques that we propose should consider both direct and indirect impacts such as impact in the classroom and curriculum (in conjunction with other studies to formulate and test larger units of knowledge) and in the laboratory (in terms of reflecting how we perform research and evaluate new understanding).

### Action 6: Let Others Help Us

Research impact assessment spans beyond the IS community. Others in many of our universities are engaged in the struggle for good processes and measures. Our field needs to leverage these opportunities. For example, all schools in Birkbeck and many in other U.K. institutions now employ "impact managers" who assist academics in ensuring that their research has impact and that the evidence of that impact is systematically collated. Funders are now requiring impact plans, and institutions are devoting financial resources to impact.

### Lesson 7: Undertake More Joint Activities with Practitioner Organizations

Having former or current PhD students work in industry can help extend the impact of our research. Some strategies may be executive doctoral programs and placing PhD students in industry collaborations. The executives that executive doctoral programs cater to can take the frameworks and theories introduced in class and implement them in the workplace. TUM's industry collaborations with Audi and BMW provide an example of how PhD students can begin a research project during their PhD program and work on implementing the project as an employee. This project implementation may move beyond academic ideas and impact industry.

## VI. CONCLUSION

As IS academics, we want our research to make a difference and positively impact individuals, industry, and society. Yet, increasingly, our stakeholders (i.e., funding agencies, governments, accreditation agencies. and taxpayers) want proof that the millions of dollars they provide are funding relevant research. This paper has shared some ideas on how the IS field can assess the impact of our research.

As a field, we need to self-regulate and develop assessment techniques rather than allowing stakeholders to impose assessment on us. A paper entitled "Measuring faculty impact" in the September/October issues of BizEd shows the momentum impact measurement is gaining (Shinn, 2014). By proposing our own assessment techniques, we can highlight the difference IS research makes and hopefully avoid diverting precious time to non-value added tasks. It is our contention that, even if one believes that our field's impact is already sufficient or at least equivalent to other fields (for example, do we ask art history to have an impact on society?), it is difficult to argue that we aren't all better off with more impact and better communication about the impact that we do have.

We hope this panel write-up stirs scholarly debate on assessing research impact and leads the IS field to continuously reflect on the contributions we have made. We are confident that the field is generating useful and impactful work; we are certain that it can and likely will be doing more in the future.

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