

Building a Better World through Information Systems – An Explorative Survey among Leading IS Researchers

Completed Research Paper

Tim A. Rickenberg

Leibniz Universität Hannover
Königsworther Platz 1,
30167 Hannover, Germany
rickenberg@iwi.uni-hannover.de

André Koukal

Leibniz Universität Hannover
Königsworther Platz 1,
30167 Hannover, Germany
koukal@iwi.uni-hannover.de

Michael H. Breitner

Leibniz Universität Hannover
Königsworther Platz 1,
30167 Hannover, Germany
breitner@iwi.uni-hannover.de

Abstract

IS research and practice needs to take on the big questions and global challenges. While the IS community is well positioned to assist in addressing these challenges, IS research has been criticized to lack relevance. We investigate how and to which extent IS can contribute to build a better world, in particular with regard to the Millennium Development Goals (MDGs). We therefore conduct an explorative survey among leading IS researchers on a global scale. Based on 171 responses, we employ qualitative and quantitative analysis methods to synthesize the survey data, document and discuss results, and derive implications. Besides positive aspects, the survey also reveals challenges and critique concerning IS research. We provide a starting point, create awareness, and stimulate further discussions and research. With the right focus and alignment, IS practice and research has the potential to take on the big questions and can help to build a better world.

Keywords: IS research, Millennium Development Goals, survey research, relevance, research impact

Introduction

“Most of our research doesn’t take on the big questions” (Grover 2014). Major global challenges and big questions of our century are defined by the Millennium Development Goals (MDGs) as established by the United Nations (UN). These critical challenges include the eradication of poverty and hunger, universal and affordable access to healthcare and education, environmental sustainability, gender equality, and a global partnership for development (UN 2014a). While the information systems (IS) community is well positioned to assist in addressing these challenges, the underlying research discipline has been criticized to lack transformational impact on issues with high visibility, such as the MDGs (Agarwal and Lucas 2005; Wang et al. 2010). IS have a major contribution on increasing global productivity (Watson et al. 2010) and advancing individual lifestyle and thus can contribute – and are already contributing – to building a better world. However, IS research is still deemed to lack relevance to IS practice (see e.g. Benbasat and Zmud 1999, 2003; Rosemann and Vessey 2008; Straub and Ang 2011).

The IS research community strives for more relevance (Rosemann and Vessey 2008) and for tackling major challenges. For instance, Watson et al. (2010) called for more attention to energy informatics, eco-friendliness and sustainability and demands that IS researchers need to “demonstrate how the transformative power of IS can be leveraged to create an ecologically sustainable society”, see e.g. Seidel et al. (2013) for sustainable practicing. Already in 2006, Desouza et al. (2006a) called for more responsibility and reverberation instead of discussing rigor and relevance and therefore to concentrate on IS research that really matters. Desouza et al. (2006b, 2007) further debate how IS research can make significant impacts to the underserved communities in our society. Most recently, the frequently recurring discussion about the value, impact, and relevance of IS research and an underlying crisis of the domain has been stimulated again (Hassan 2014). Hassan postulates that research needs to be active, original, ask unique questions, and make evident what was not in order to increase the value of IS research (Hassan 2014; Chiasson 2014). Frank (2014) joins the debate and states that the objective of IS research is, apart from truth, the improvement of actual systems with respect to certain goals and thus can help to build a better world. Hassan and Watson (2014) exemplarily state positive actions of IS – such as facilitating communication for accessing education, connecting diaspora, and participation in government, as well as optimizing the production and distribution of food and energy – which are in need of further investigation and research.

To address these topics and set a basic starting point for discussion and further research, we have designed a cross-sectional, explorative survey among leading IS researchers in order to explore in which ways and to which extent IS can help to build a better world. A questionnaire has been created using survey research methodology (Pinsonneault and Kraemer 1992; Babbie 1990; Schutt 2011; Punch 2005) including qualitative and quantitative questions. We have collected 2877 contact details of track chairs of leading international IS conferences, reduced the duplicates and invited the resulting 1506 researchers to participate in the survey, of whom 171 (12%) provided an answer. Within the questionnaire, we investigate how much IS research and practice generally can contribute to achieve the MDGs. Further, we explore how much specific IS research streams can contribute and how much IS (in general and stream-wise) already has contributed. We ask for opinions and examples how specific IS research streams can contribute and already have contributed and, finally, for future-orientated opinions about challenges, risks, and opportunities. Qualitative and quantitative analysis methods (Punch 2005) have been employed on the survey data to synthesize and document results. On the basis of the opinion-forming survey and the generated insights, we derive implications for the IS research community. Our primary intention is not to join the current debate about a crisis in IS research (Hassan 2014; Grover 2014) but to show and discuss that IS – practice and the underlying research domain – has the potential to take on the big questions and can help to build a better world. Accordingly, we explore and pursue the following overarching research question:

How can IS research and IS practice contribute to build a better world?

The remainder of this paper is structured as follows: after this introduction, the research background is addressed, including an introduction to the MDGs with their targets and related work within the IS research domain. Then the underlying research design and the collection of data with an explorative expert survey are presented. On this basis, the general and stream-specific survey results and findings are presented. Within the discussion, key contributions, challenges, and critique concerning IS research are pointed out. Implications for IS research and practice and identified limitations of our study follow. The paper closes with conclusions and an outlook.

Research Background

Millennium Development Goals

In September 2000, the world leaders came together at the so called United Nations Millennium Summit where they made general statements about values, principles, and objectives for the international agenda for the twenty-first century. These statements are summarized in the Millennium Declaration. The striving of the involved nations to a new global partnership aimed at a reduction of extreme poverty and set out a series of time-bound objectives with a deadline of 2015. These objectives have become known as the MDGs and they contain eight goals including 21 targets which are presented in Table 1.

Goals	Targets
(1) Eradicate extreme poverty and hunger	a) halving the proportion of people whose income is less than \$1.25 a day between 1990 and 2015, (b) achieving full and productive employment and decent work for all, including women and young people, and (c) halving the proportion of people who suffer from hunger.
(2) Achieve universal primary education	(d) ensuring that children everywhere, boys and girls alike, should be able to complete a full course of primary schooling.
(3) Promote gender equality and empower women	(e) eliminating gender disparity.
(4) Reduce child mortality	(f) reducing child mortality by two thirds of under five year old children.
(5) Improve maternal health	(g) reducing the maternal mortality ratio by three quarters, and (h) achieving universal access to reproductive health.
(6) Combat HIV/AIDS, malaria, and other diseases	halting and beginning to reverse by 2015 (i) the spread of HIV/AIDS, (j) the incidence of malaria and other major diseases, and (k) achieving universal access to treatment for HIV/AIDS by 2010.
(7) Ensure environmental sustainability	(l) integrating the principles of sustainable development into country policies, (m) significantly reducing biodiversity loss, (n) halving the proportion of the population without sustainable access to safe drinking water and basic sanitation by 2015, and (o) achieving a significant improvement in the lives of at least 100 million slum dwellers by 2020.
(8) Develop a global partnership for development	(p) developing an open, rule-based, predictable, non-discriminatory trading and financial system, addressing the special needs of (q) least developed countries and (r) landlocked developing countries as well as small island developing states, (s) dealing comprehensively with debt problems, (t) providing access to affordable essential drugs in developing countries, and (u) making available benefits of new (information, communication) technologies in cooperation with the private sector.

According to the UN (2013a, 2013b, 2014a, 2014b), several MDG targets have already been reached and substantial progress has been made (UN 2014b), while other targets are subject to insufficient progress, no progress, or even deterioration, see UN (2013a) for progress chart. Although 1.2 billion people are living with \$1.25 a day and 870 million are estimated to be undernourished, target (a) was reached in 2010 and target (c) is within reach. The access to primary education (d) increased within eleven years by 8 percent to 90 percent in 2010. However, in 2011, 57 million children of primary school age were out of school and 123 million youth (15 to 24) lack basic reading and writing skills. The latter befalls with 61 percent especially women (e). The amount of deaths under the age of five (f) declined from 12.4 million in 1990 to 6.6 million in 2012. However, the rate of young children that die during the first month after birth is increasing. The maternal mortality (g) in developing regions declined from 1990 to 2010 by 47 percent to 287,000 but this rate is still 15 times higher than in developed regions. New HIV infections (i) decline in most regions but are still on a high level with 2.5 million new infections each year. Targets (n) and (o) have been met as the share of urban slum residents declined from 39 to 33 percent between 2000 and 2012 and more than two billion people gained access to improved drinking water sources between 1990 and 2010. However, the total amount of slum dwellers increased from 650 to more than 850 million.

To set a common understanding of the term 'better world' and a baseline for our survey, we refer to and employ the MDGs as they address a wide variety of global issues concerning a big majority of all human. Although other goals may lead indubitably to an improvement of certain issues, we chose the MDGs for our study since they are supported by a majority of states and are globally accepted. Thus, achieving these goals can not only from our point of view but also from a general perspective result in a 'better world'.

Related Work

When research is an end in itself, the value of research is questionable. Against this backdrop, a debate about the value and focus of IS research is far from new and still present (Hassan et al. 2013, 2014). The latest discussion occurred in the *Communication of the Association for Information Systems (CAIS)* journal in 2014. Hassan (2014) asked whether there is a crisis in IS research and argued “that the value of IS research is found not in duplicating research already undertaken [...], but in asking questions that other disciplines are not asking or in addressing problems that others are incapable of addressing”. His claim was taken up by others and further examined (Avital 2014; Chiasson 2014; Frank 2014; Johnston and Riemer 2014; Niederman 2014). Grover (2014) did not see a crisis but the need to deal with more important questions of current digital environments. This debate goes in line with a longer discussion about the position of the discipline, the focus of it regarding relevance and rigor, and, most important, the impact of IS research in general (e.g. Agarwal and Lucas 2005; Bhattacharjee 2001; Benbasat and Zmud 1999, 2003; Desouza et al. 2006; Straub and Ang 2011). The discussion can be dated back to the turn of the millennium and shows the diversity of IS researchers’ opinions about how to proceed in the future.

Specific recommendations about research topics that require to be focused have been suggested. According to Boudreau et al. (2009), a global UN study determined sustainable economic development as the dominating issue in the future since the current consumption of resources is unsustainable and results in major environmental problems. The authors aimed to build a better understanding concerning the need for sustainability. In this sense, Watson et al. (2010) called for more attention to energy informatics and eco friendliness. They also proposed sustainability as new dominant logic (Watson et al. 2012). Many researchers established frameworks or provided guidelines, principles, and criteria to support and improve the research and implementation of Green IS (e.g. Boudreau et al. 2009; Elliot 2011; Malhotra et al. 2013; Melville 2010; Rosemann and Vessey 2008; Seidel et al. 2013). Rosemann and Vessey (2008) highlighted that of the three fundamental dimensions of relevance, importance is the most critical dimension for practice. To address this crucial point when internalizing research findings, they suggested to perform applicability checks and provided strategies for the conduct and evaluation. Dedrick (2010) reviewed existing Green IS research and presented a model of IT investment and carbon productivity. Melville (2010) developed a framework with an associated research agenda that aims to encourage IS research activities on environmental sustainability by elaborating questions and critical aspects that should be addressed by researchers in the future. Seidel et al. (2013) focused on a better understanding of IS-enabled organizational change. They developed a theoretical framework that identifies important functional aspects originating in IS. Implications about several concerns regarding sustainable organizations and transformations were described as well. All of these works address the global issue of sustainability and aim to increase impact of IS research. However, vom Brocke et al. (2012) stated that the achievements that shaped Green IS as a subfield in the IS discipline were generally not followed by a sufficient uptake in research.

Beside the publications that aim on facilitating other research to address important issues more effectively, we also identified articles that focus on the improvement of certain issues in the developing world by directly referring to the MDGs (Afridi and Farooq 2011; Calloway 2011; Ditsa and Ojo 2011; Ezenwa and Brooks 2013; Ramiller and Pullman 2008; Wang et al. 2010). For instance, Wang et al. (2010) stated that in the developing world million people die due to poor information management. They illustrated the potential of IS regarding this issue and provide a solution based on a combination of various technologies to improve vaccination management in development countries. Afridi and Farooq (2011) directly addressed goal (5) of the MDGs to improve maternal health by presenting a health tool that uses data mining techniques for a risk classification of pregnant women. The tool can be used to increase the quality of care in rural areas. Calloway (2011) reported about an applied sustainability learning model which relates information and communication technologies (ICT) with the MDGs. Ramiller and Pullman (2008) described their efforts in a project that aimed at building a system to support sustainable community development.

Other IS publications do not refer directly to the MDGs but address related issues or present use cases that help to achieve specific targets of the MDGs. De Zoysa and Letch (2013) aimed to improve the sustainability of ICT projects in development countries by identifying critical relationships in such projects. Mengiste (2013) performed a case study about the implementation of a computerized health IS in the context of the Ethiopian public health care system. To provide underserved communities with better medical services, an analysis of rural tele health innovations was performed by Singh et al. (2009). Rhue and Sundararajan (2012, 2014) examined the effects of digital access on the prevalence of democracy and its

diffusion via trade, geographical, migration and foreign-direct investment. Concerning the sharing economy, internet-based marketplaces enable collaborative consumption in a community which can have a positive impact on economic growth and welfare and thus help to address poverty (Sundararajan 2014). These approaches are some examples from the large body of IS literature that deal with issues regarding the MDGs and provide inspiration for future research.

While there is a discussion in leading journals about the impact and value of IS research and the further direction of it regarding rigor and relevance, to the best of our knowledge, no study exists that focuses on examining the value of IS research regarding humanity's goals by involving a significant number of leading IS researchers from all areas of the domain. As proposed by Mueller in Hassan et al. (2013), the IS research discipline can show its value and impact "in terms of helping to solve some humanity's grand challenges – such as [...] the United Nations' Millennium Development Goals". It is time for the IS community to engage in this challenge and suggest some practical solutions (Hassan et al. 2013).

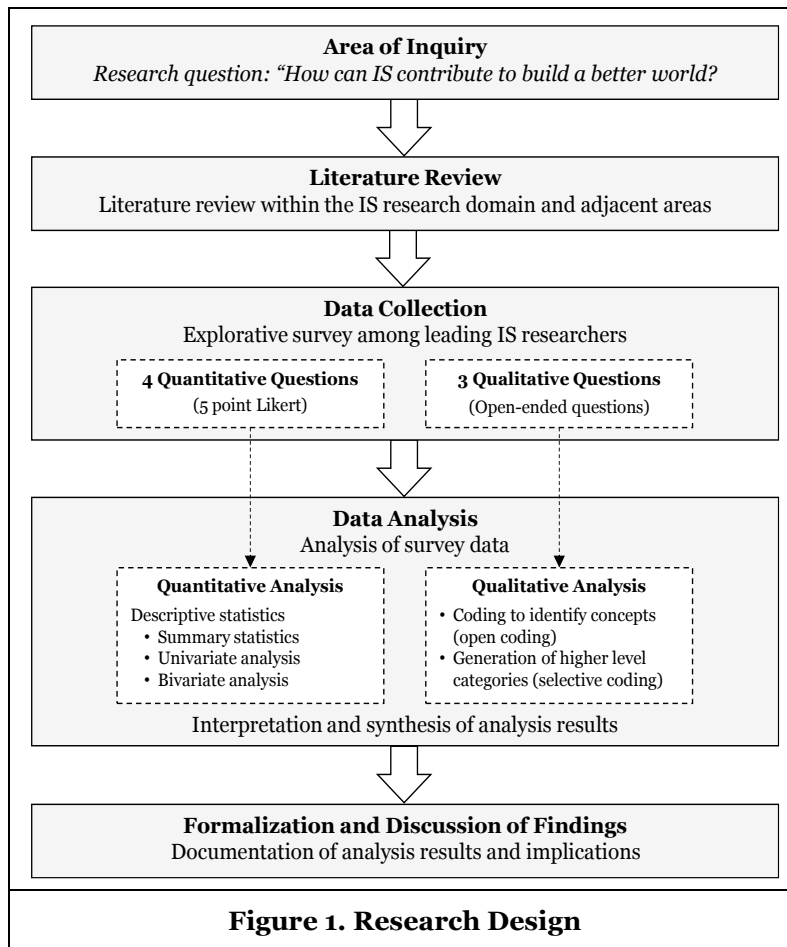
Research Design and Data Collection

Surveys are a popular method used by the IS research community as they epistemologically provide a way to obtain and validate knowledge (Newsted et al. 1998). For empirical exploration, we designed a cross-sectional survey in order to explore in which ways and to which extent IS can help to build a better world. The (online) survey method appeared to be most suitable for our purpose and was chosen because it allows to get an overview of the comprehensive topic and further to collect a relatively large amount of data from a large, dispersed group of people in a standardized and fairly quickly way (El Khatib et al. 2013; Babbie 2013; Schutt 2011). As defined by Pinsonneault and Kraemer (1992), survey research in exploration is used to become familiar with a relatively new topic, to try out preliminary concepts about it, and to discover and raise new possibilities and dimensions. With a wide variety of responses from individuals with varying viewpoints in a loosely structured manner, these surveys provide a basis for developing concepts and methods for more detailed, systematic descriptive or explanatory surveys (Pinsonneault and Kraemer 1992). The resulting research design consists of five phases and is presented in Figure 1 below.

The definition and refinement of the area of inquiry and the problem domain set the starting point of our investigation, from which the formulation of our underlying research question resulted. In order to ensure rigor, we conducted an explorative but comprehensive literature review within the IS research domain and adjacent areas. We therefore used established guidelines for reviewing literature: Webster and Watson (2002) for methodological advice, Levy and Ellis (2006) for effective procedure, and vom Brocke et al. (2009) for the literature search process. A diverse list of search terms was used and probed, such as "contribution of IS (research)", "value of IS (research)", "better world", "Millennium Development Goals", "social activism in IS (research)", "sustainability", "green IS", "responsibility", and so forth. We primarily searched within databases (AISel, IEEEExplore, ScienceDirect, Google Scholar, etc.) and also directly in IS research journals and proceedings of conferences. Additionally we included non-scientific literature such as websites and practitioners' literature as clinical perspective to reduce the gap between practitioners' and scholars' point of view (Grahlmann et al. 2011). Further, the MDGs (UN 2014a) with related literature set an important baseline for our research and the substantiation of the vague term "better world".

For the collection of data, a questionnaire was created using survey research methodology (Pinsonneault and Kraemer 1992; Babbie 1990; Schutt 2011; Punch 2005), see also Appendix A in the online supplementary at <http://bit.ly/R8J9ei> for further details. The survey was designed on the basis of our literature review and consists of four closed-ended (quantitative) questions on a five-point Likert scale as well as three open-ended (qualitative) questions, which generally allow more detailed responses and solicit additional information. We broke down the area of inquiry into definite questions concerning the general impact of IS and the impact of specific IS research topics and streams. We therefore asked how much IS in general can contribute concerning the MDGs, how much the specific IS research streams can contribute, and how much IS (in general and stream-wise) already has contributed. Further, we asked for opinions and examples how the specific IS research streams can contribute and already have contributed and, finally, future-oriented statements and opinions were surveyed. In order to minimize conceptual, contentual, and formal flaws, we conducted a pre-test of the survey among research colleagues before it was sent to the expert group. Leading IS researchers were identified as experts concerning the area of inquiry and therefore served as sample for the survey. More specifically, track chairs of international IS conferences were perceived as the most suitable group to conduct the survey with due to (a) their expertise and experience in

IS research, (b) their availability and interest, and (c) the accessibility of contact details in form of their email addresses. They served as experts concerning IS research in general and the themes of their specific tracks in particular. Information and contact details were collected from the websites and archives of the conferences that were included in the survey (AMCIS, ECIS, HICSS, ICIS, PACIS, WI), see also Appendix B in the online supplementary at <http://bit.ly/R8J9ei> for further information.



Data was collected with an online survey tool and directly by replying via email within two month in early 2014. Of the 2,877 email addresses that we collected, 1506 emails were actually sent. Track chairs within the IS domain often chair tracks at different conferences and in different years. In order not to spam the participants with emails, we only sent one email concerning the most recent conference and skipped the other emails for the same person accordingly. While 84 emails could not be delivered, we received a total of 171 answers, representing a response rate of approximately 12%. Additional emails were sent as reminders to respondents who did not answer our first invitation. While 67 participants (41%) provided their name, the rest answered anonymously. In total, 25 participants answered via email. Since none of the survey question was mandatory and the amount of questions was relatively small, all participants who started the survey also finished it. However, a few questionnaires (8) had missing or incomplete answers and had to be excluded partially. Since IS researchers represent a relatively homogeneous group and to allow anonymous answers, we omitted to collect demographics.

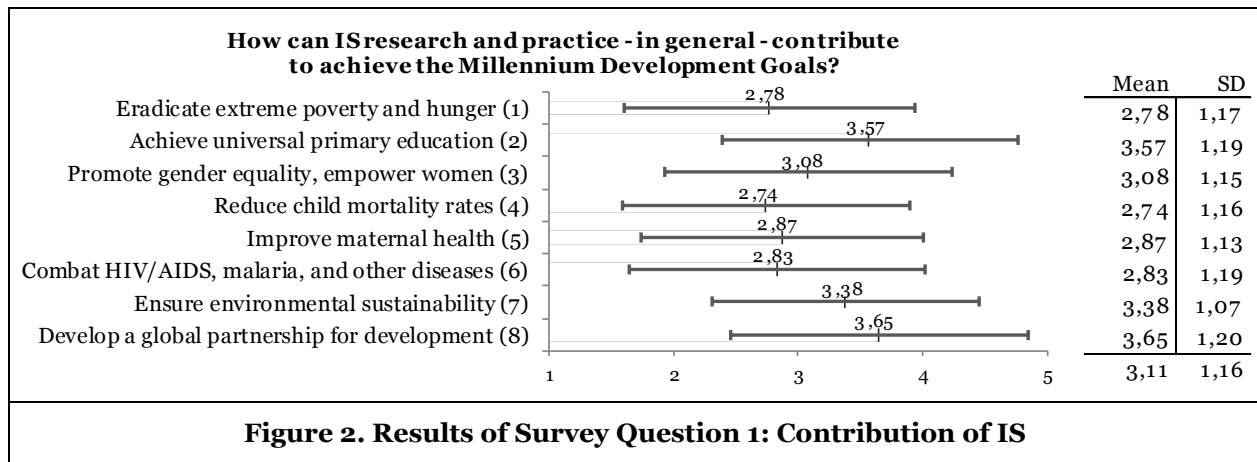
The subsequent analysis of the survey data consisted of two interacting parts in terms of qualitative and quantitative data analysis. To analyze and interpret the responses of the open-ended questions, we used qualitative data analysis (Punch 2005) and coding techniques (Glaser and Strauss 1967; Strauss and Corbin 1998). First, all answers were classified into track clusters according to the topics of the corresponding tracks by means of coding and cluster analysis, see Table 2. Then we performed open coding within the track clusters to identify concepts and attached initial labels to the data. Within selective coding, higher level categories were generated from the descriptive open codes. Based on the coding, aggre-

gated answers for all track clusters were generated. Next to the qualitative analysis of data, we used quantitative data analysis (Punch 2005) and statistics to investigate the responses of the closed-ended questions. We therefore employed standard descriptive statistical methods. Summary statistics and univariate analysis such as the mean for central tendencies, standard deviation and variance for the variation of the data, and frequency distributions were used to gain initial insights. Bivariate analysis such as cross-tabulations and two-variable relationships allowed to explore the dependencies between variables and clusters. The results from the qualitative and quantitative analysis were synthesized and interpreted to complete the phase of data analysis. In the final phase of our research process, the findings were formalized by documenting the results of the analysis and deriving coherent implications.

Survey Results and Findings

Contribution of IS in General

Within the first part of the survey, the participants were asked how much IS – research and practice – can generally contribute to build a better world (Question 1; Q1) and how much it already has contributed (Q2). Concerning the first question, we employed the MDGs to measure the perceived contribution of IS. The results are illustrated subsequently in Figure 2 with the mean and standard deviation with respect to each specific goal and across all eight goals.



The highest perceived contribution of IS on the MDGs is on the goal ‘Develop a global partnership for development’ (3.65), followed by ‘Achieve universal primary education’ (3.57) and ‘Ensure environmental sustainability’ (3.38). Therefore, the highest potential of building a better world through IS regarding the MDGs was rated by the participants concerning the two goals that can be achieved by facilitating access, communication, and participation via IS. The contribution concerning ‘Promote gender equality and empower women’ was rated medium (3.08). The impact of IS on the three goals related to health (‘Reduce child mortality rates’, ‘Improve maternal health’, and ‘Combat HIV/AIDS, malaria, and other diseases’) and the goal ‘Eradicate extreme poverty and hunger’ was estimated below average (~2.8). While the potential of IS in high-tech healthcare is widely considered as high, the impact of IS on these three rather basic but fundamental goals was rated quite low. However, the average impact of IS on these goals was still rated close to ‘3 - medium contribution’. The mean contribution of IS on all goals is 3.11 and therefore between ‘3 - medium contribution’ and ‘4 - high contribution’ while the standard deviation (SD) concerning the particular goals and in general is slightly over one (~1.1). Concerning all goals on average, 75% of the participants rate the contribution of IS as ‘low’ (23%), ‘medium’ (28%), or ‘high’ (24%), while 10% see ‘no’ and 15% a ‘very high’ contribution. This leads to the assessment of the contribution of IS that has actually been realized as shown in Figure 3 below.

Most of the participants rated the amount of how much IS generally already contributed to a better world as medium (34%). In total, 85% of the participants rated it as ‘low’ (21%), ‘medium’ (34%), or ‘high’ (30%), while 5% see ‘no’ and 10% a ‘very high’ contribution. The mean average of the realized contribution (3.17, Figure 3) is higher than the estimation of how much IS can contribute concerning the MDGs (3.11, Figure 2) since the investigated area (IS in general) is wider than the eight MDGs.

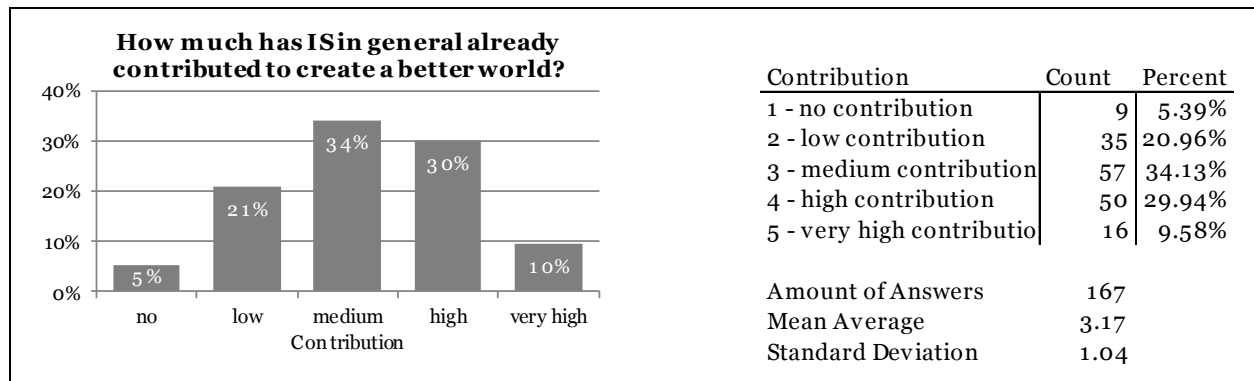


Figure 3. Results of Survey Question 2: Realized Contribution of IS

The graph in Figure 4 shows an initial overview and tendencies about the divergence of participants' perception concerning the contribution of IS regarding the MDGs. As we assigned each participant to one of 20 track clusters in relation to specific tracks of IS conferences, it is of interest to gain insights about the participants' perceived contribution of IS depending on the individual track for each of the eight MDGs. Based on a limited number of data sets within the individual track clusters, the mean results of survey question Q1 in dependence of the track clusters are visualized. The perceived contribution of IS regarding the individual MDGs shows a big divergence. While the overall mean of goal (8) is 3.65, the participants assigned to track cluster 5, 8, and 10 have an average perception of at least 4.0. In contrast, the participants assigned to track cluster 12 have an average perception of not more than 3.0. In addition, very large differences of the participants' perception regarding goal (1) can be recognized. While the mean value is only between 1.5 and 2 for track cluster 1 and 3, it is over 4 for track cluster 2. The other dimension of the graph illustrates the participants' perception regarding the individual MDGs within a track cluster. While the courses of the curves for track clusters 16 and 18 are relatively flat and show only slight peaks regarding goal (3) and (8), a more variable curve characterizes track cluster 1, where e.g. a mean value of lower than 2 refers to goal (1) and another mean value of at least 3.5 refers to goal (8).

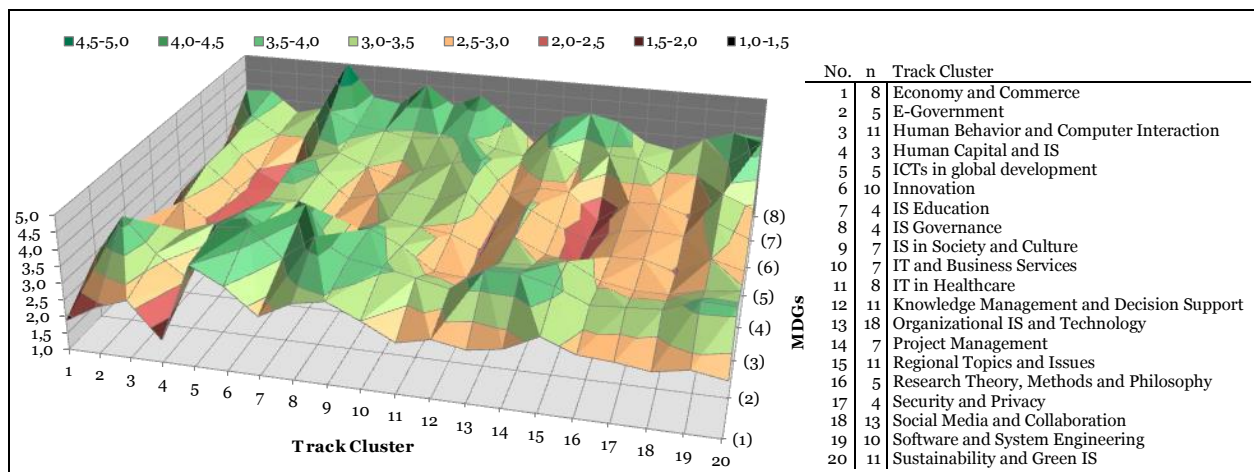


Figure 4. Mean Results of Survey Question 1 according to Track Clusters

Contribution of Specific IS Research Streams and Tracks

Within the second part of the questionnaire, the participants were asked about the general contribution (Q3), already achieved contribution (Q5), and potentials and challenges (Q7) of particular research streams within the IS domain with regard to building a better world through IS. Table 2 shows the aggregated and synthesized results for each track cluster including the amount of answers and the mean of Q4 (how much can the track contribute?) and Q6 (how much has the track already contributed?).

Table 2. Synthesis of Contributions of Specific IS Streams

Track Cluster	Ø Q4	Ø Q6	Contributions, Potentials and Challenges
Economy and Commerce (8 Answers)	2.25	2.38	<ul style="list-style-type: none"> - Digital economy allows greater and global access to information, participation and diversity while reducing transaction costs - Challenge to focus on (global) social dimension and issues rather than on economic issues - Screening increasing amounts of information and its quality is a challenge in practice
E-Government (5 Answers)	3.60	3.20	<ul style="list-style-type: none"> - IS-driven, more efficient government services are resulting in lower costs, increased transparency and can reduce corruption; allows universal access to services and participation in decision making processes resulting in a lower distance to the government - Social media and M-government are potentials, especially digital engagement tools and for developing countries; motivate citizens to adopt and governments to implement services
Human Behavior and Computer Interaction (11 Answers)	3.09	2.64	<ul style="list-style-type: none"> - Contributes with powerful graphical user interfaces and increased usability to allow the use of IT for a broad range of users - Allows to design new ways of working and to embed cultural aspects on the use of IT - Enables understanding of human behavior in networked interactions to influence digital behavior and redesign employed IS - Focus more on human and user aspects on a global scale in human computer interaction (HCI), make HCI more human as well as new device formats represent challenges
Human Capital and IS (3 Answers)	3.33	2.67	<ul style="list-style-type: none"> - Provides insights about training and qualification of IT personnel and IT outsourcing - Helps to promote equality of sexes and underrepresented groups - Challenge to establish human capital research as an legitimate part of IS research
ICTs in Global Development (5 Answers)	4.40	3.60	<ul style="list-style-type: none"> - Illustrates and educates about exemplary use of IT in emerging and developing countries - Expands knowledge and develops competencies related to the use of IT in those countries - Leveraging and adoption of IT to increase competitiveness, economic growth, living quality - Raises awareness (a) about impact and importance of IT and access to IT/IS in developing countries and (b) within IS research to focus on global development issues
Innovation (10 Answers)	3.00	2.89	<ul style="list-style-type: none"> - Contributes by ideas and concepts such as open innovation, crowdsourcing, crowdfunding, open platforms and empowers users to use and participate in these technologies - There is a need to explore how IS can and already contributes to leading edge thinking - Challenge to assess which ideas and approaches are innovative (or dead ends) and which are worth to pursue further research
IS Education (4 Answers)	3.50	3.00	<ul style="list-style-type: none"> - E-learning and massive open online courses (MOOC) enable universal access to education - Critical success factors are standardization and international collaboration of diverse online education systems; Limited network access is a risk for exclusion to MOOC
IS Governance (4 Answers)	2.75	2.75	<ul style="list-style-type: none"> - Enables better decisions on system design and their efficient management, data governance programs improve data quality and management and decrease the impact of low quality data - Need to set research focus less on achieving traditional performance goals but rather on socio-technical and -emotional aspects
IS in Society and Culture (7 Answers)	3.43	2.67	<ul style="list-style-type: none"> - Addresses social justice and emotional aspects in IS-related interactions and fields - Democracy can be empowered by IS, e.g. Arab Spring was facilitated by social media - Challenge to promote interdisciplinary work to connect social, public and technical aspects
IT and Business Services (7 Answers)	3.50	2.50	<ul style="list-style-type: none"> - Improves service quality, efficiency, and innovation; software and infrastructure as a service are available from everywhere and allow new business models and types of collaboration - Need to address societal benefits and social welfare and not only profit of firms - Challenge to standardize and secure the interchange of information between businesses and people while getting a better understanding of Service-Dominant Logic
IT in Healthcare (8 Answers)	3.57	2.71	<ul style="list-style-type: none"> - General contribution is to improve global healthcare systems and therefore clinical, population, and personal health; IT as a potential to decrease costs to manage diseases - Enables systems for health data analysis, portals for medical records, communication and collaboration, patient flow and scheduling - Requires expensive infrastructure, thus the impact depends whether applied to developing or developed populations; alter negative perception of IS from a cost to a benefit in healthcare - Challenge is to promote interdisciplinary research to connect IS with global health community (researchers and practitioners) and to focus less on localized clinical systems but on exploration of systems that impact large segments of the population
Knowledge Management and Decision Support (11 Answers)	2.80	2.55	<ul style="list-style-type: none"> - Enables to timely and effectively gather, store, organize and distribute knowledge on individual, organizational and global scale; DSS and (visual) analytics allow better decision-making - Challenge to increase the scale of knowledge management, link theories with practice, and define purpose, use and success metrics of knowledge systems - Opportunity to increase application of online DSS and mobile systems in the future

Organizational IS and Technology (18 Answers)	3.61	2.67	<ul style="list-style-type: none"> - Opens up opportunities for organizations (e.g. enterprises, government and educational institutions) to increase process efficiency and effectiveness, improve decision making, and facilitate coordination and communication - New access channels, e.g. ubiquitous and mobile systems, allow direct and earlier reaction on issues by constant monitoring and instant data analysis - Put focus on independent work platforms and virtual businesses rather than on organizations - Complex and interrelated IS networks can be vulnerable for attacks and can represent a risk - Challenge to create, adopt, standardize and collaborate with powerful yet affordable integrated systems, recognize trends and organizational changes early and direct research accordingly - Challenge to balance relevance and rigor: research about organizational implementations should be considered as more important since implementation is what will bring change - Limitless opportunities, contingent on IS research moving towards practice and diffusion
Project Management (7 Answers)	3.29	2.50	<ul style="list-style-type: none"> - Contributes that projects can be managed efficiently and completed successfully - Challenge to focus on project management that is applicable to developing and emerging countries; develop frameworks and tools for both scales: micro businesses and global projects
Regional Topics and Issues (5 Answers)	3.00	2.75	<ul style="list-style-type: none"> - Allows to consider and discuss local needs and characteristics dependent on culture and behavior; use technologies to create a community spirit - Challenge to engage and involve researchers from underrepresented areas
Research Theory, Methods, and Philosophy (11 Answers)	2.73	2.18	<ul style="list-style-type: none"> - Creates and improves foundations, paradigms, and methods to develop valid, trustworthy knowledge through rigorous research - Challenge to create more general interest in research theory and methods, encourage young faculty members for philosophical issues; address ethical and moral consequences of IS usage
Security and Privacy (4 Answers)	3.50	2.25	<ul style="list-style-type: none"> - Sets information security policies, enhances security protocols, processes, and system designs - Achieve a broader view of IS security aspects by interdisciplinary research - Reconsider how security is regarded: open doors to information that is actually needed instead of restricting access to information; determine who should be in charge of privacy - Address challenging issues about (a) national governments disregarding security and privacy, (b) organizations exploiting security or privacy, and (c) individuals exploiting their own privacy
Social Media and Collaboration (13 Answers)	3.45	2.92	<ul style="list-style-type: none"> - Enables to link people and organizations all over the world and share ideas across the globe – bottom-up and top-down; promote (gender) equality, overcome prejudices, address social problems, participate in democratic political developments by communication and networking - Allows disaster recovery through communities and social media - Contributed by pervasive and embedded collaboration systems e.g. Google Docs, Skype, etc.; adoption of social media in enterprises has potential to transform how work is performed - Complexity of the world's problems and lack of time require to use structured collaboration - Develop an understanding of negative aspects of social media in the future - Risk that businesses and governments take over networking and collaboration
Software and System Engineering (10 Answers)	3.22	2.38	<ul style="list-style-type: none"> - Contributes by promoting methods for more acceptable and usable software meeting real world requirements, also for developing countries - Depends on reliable and networked infrastructure in order to facilitate trustful collaboration - Software engineering methods can create a sustainable and better workplace for developers - Though at the core of the IS discipline, interest of the IS community is decreasing and lacking
Sustainability and Green IS (11 Answers)	3.40	2.36	<ul style="list-style-type: none"> - Helped to show and create awareness about negative impact of technology on environment - Creates awareness that (Green) IS actually can increase sustainability in certain domains - Helps to create policies and laws to responsabilize organizations for their actions and internalize them as well as motivate individuals towards green thinking and acting - Increases efficiency of energy consumption, save resources, reduce emissions, and create transparency about its (negative) consequences; creates understanding how to balance generation of energy by volatile renewable sources and its demand in energy demand management - Challenge to connect to people in developing countries to achieve sustainability goals there; lack of political support in some countries – especially of major polluters; address social dimension and impact of IS research and create solutions with design-oriented research approaches
163 Answers	3.25	2.63	

The perceived contribution of the track clusters varies considerably. Based on Table 2, track clusters with a high or low perceived ability to contribute (Q4), a high or low perceived already realized contribution (Q6), and high and low differences between these figures are pointed out. While the overall mean concerning the contribution of a track (Q4) is 3.25, it is lower (2.63) for the already achieved contribution (Q6). The highest perceived ability to contribute shows 'ICT in Global Development' (4.40) with a large gap to the next track clusters ('Organizational IS and Technology', 'E-Government', ~3.6). 'ICT in Global Development' is also closely connected with goal (8) of the MDGs which is to develop a global partnership for development. The lowest perceived ability to contribute shows 'Economy and Commerce' (2.25) fol-

lowed by 'Research Theory, Methods, and Philosophy' and 'IS Governance' (~2.7). Particularly the contributions of 'Research Theory, Methods, and Philosophy' to build a better world through IS are of indirect nature, as also indicated by participant #86. Concerning the perceived contribution that has already been realized, 'ICT in global development' (3.60), 'E-Government' (3.20) also show the highest values followed by 'IS Education' (3.00). This indicates that, as proposed by Hasan and Watson (2014), facilitating communication for accessing education and participation in government are opportunities to build a better world through IS. The lowest perceived realized contribution is shown by 'Research Theory, Methods, and Philosophy' (2.18), 'Security and Privacy' (2.25), and 'Sustainability and Green IS' (2.36). With regard to the largest gap between the ability to contribute and the already realized contribution, 'Security and Privacy', 'Sustainability and Green IS', and 'IT and Business Services' show a gap of one or more (≥ 1). Due to recent violations of privacy rules, e.g. by the US National Security Agency (NSA) with the PRISM program (De Goede 2014), the perceived realized contribution of 'Security and Privacy' is low (2.25) – even though the general ability to contribute was rated high (3.50). The IS research team 'Sustainability and Green IS' is still in its early stages which results in a remarkable gap between the ability to contribute (3.40) and the realized contribution (2.36). As opposed to this, 'Economy and Commerce', 'IS Governance', and 'Innovation' show a marginal gap (~0). While the ability to contribute and the realized contribution is equal (2.75) for 'IS Governance', the gap is negative for 'Economy and Commerce' (-0.13), which suggests that the heyday of this area is over. While it is widely accepted and often stated by the participants that 'Knowledge Management and Decision Support' and 'IT in Healthcare' can significantly contribute to build a better world, the perception of the domain experts is lower (2.80 respectively 3.57).

Discussion

Key Contributions, Challenges, and Critique of IS Research

The aim of this study is not to provide final solutions of how to build a better world through IS, but to set a basic starting point, create awareness, and provide a basis for further discussion and research. We therefore synthesize certain relevant topics from the answers of the participants concerning (1) areas with high contribution, (2) general challenges, (3) negative aspects and risks of IS, (4) the indirect impact of IS, (5) value of conferences in IS research, and (6) critique about IS research and IS conferences.

The participants widely stated that facilitating communication, delivering information, and promoting knowledge as well as supporting healthcare are opportunities to contribute to a better world through IS. They further see a lot of potential in IS, but also challenges, with regard to the development of a global partnership and the achievement of environmental sustainability. Concerning facilitating communication, the participants state that with access to a network, education and trainings as well as knowledge and information in general can be pushed by an innovative use of technology (participant #54). The distribution of knowledge can be facilitated by mobile IS and the underlying IS research field through case studies and by encouraging new ideas and approaches (#62). Knowledge management and IS have the potential to create significant impact on individuals, organizations, and countries by gathering, storing, organizing and disseminating knowledge in effective ways (#25, #76), as shown e.g. by Wang et al. (2013). In general, development of knowledge is the "key to creating a better world – through IS and in other applied domains as well" (#122). The impact of information and knowledge management is often mentioned by the participants with regard to a certain application field, in particular healthcare, see e.g. Wickramasinghe et al. (2007). Accordingly, IS has already contributed and further contributes to knowledge management in the health domain by providing applications for health and sustainable behaviors, e.g. by facilitating evidence-based clinical decision-making in the US healthcare sector (Alavi et al. 2010), as well as architectures and solutions of healthcare IS that can bring a big global impact (#51, #91, #118), as e.g. proposed by Le Rouge and Niederman (2006) or Cripps and Standing (2010). Specific applications and solutions in healthcare are, next to providing knowledge, patient flows, scheduling, and medical portals (#38) as e.g. shown by Muhammed and Wickramasinghe (2014), ubiquitous healthcare for monitoring and detecting of unwanted situations (#82, #83) as examined e.g. by Sneha and Varshney (2006), and global healthcare systems in general that improve clinical, population, and personal health (#61). IS also enriches communication and collaboration of healthcare practitioners (#25). The impact of IS on the improvement of healthcare is very high which is in particular a result of information and knowledge sharing, especially public health information, via modern technologies (#19). However, as stated above, the possible contribution of IS concerning health-related MDGs (goals 4-6) and the realized contribution of the correspond-

ing track cluster 'IT in healthcare' were rated, quite contrarily, rather low. This supports the statement that the potential of IS in healthcare is high, but the actually realized contribution is lower and does not tap the full potential so far. With regard to this topic, participants stated that, for example, the IS research community "is fairly isolated from the global health community" (#25) and interdisciplinary research needs to be promoted (#61). Overly localized clinical systems are an issue and thus, IS research should focus on systems that have an impact on large segments of the population instead (#164). It is interesting that 10% of the participants rate the already realized contribution of their own track higher than the realized contribution of IS in general. Another 38% perceive the contribution as equal and about half of the participants (52%) rate the realized contribution of the corresponding track lower as of IS in general.

As stated in the introduction, IS research needs to take on the big challenges (Grover 2014). While the UN MDGs certainly represent some of humanity's grand challenges, it is suggested to post further "grand challenges and offer a prize for solving them" (#114). The participant further stated, that a key challenge for the next years will be to assure individual freedom and protect it from attacks by overzealous governments. Another challenge is to measure the betterment of the human condition not only with economic criteria. Almost all measures for strategic and operational success are focused on economic gains or cost reductions, such as the technology acceptance model (TAM). There is scope for IS to improve the human condition but a change in focus is required towards human-centered goals (#132). Big challenges require socio-technical approaches that address both the technical and organizational aspects (#52) and underlying interdisciplinary research. The resulting technical advances must then be examined concerning the social – and even spiritual – implications (#65). Research results must be translated into application and then application experience must be translated into new research thrusts (#43). Especially long-term problems with numerous, interrelated components require systematic approaches and problem solving from a systemic framework (#52). The development of a detailed research agenda and deriving concrete actions from it allows to address these long-term issues and tackle major challenges (#115).

Next to the contributions of IS and key challenges in general, negative aspects and risks concerning building a better world through IS were mentioned. One main argument of the participants is that technology and IS can be used to build a better world but also for bad. "IS is amoral – could be used for good or bad" (#162) and IS and automation "tend to be used for good and ill in about equal measures" (#1). For example, technology can be used for bad when (rich and powerful) people or groups use technology gaps to maintain an advantage (#41). IS can be used and actually is used for political control and oppression (#104) and for surveillance in terms of violating privacy (#23). Further, scientific knowledge can be misused to coerce or deceive people (#51). In this sense, no research track and stream can claim to be completely positive (#104). Another aspect that was mentioned is that the impact of IS towards building a better world is quite low and not as high as it could be. High failure rates and low adoption are mentioned as reasons why IS in general did not have the impact it could have (#164). One participant puts it more radically: "We are deluding ourselves if we think that IS makes the world better" (#23). IS has helped a lot to improve certain things (e.g. health, education, etc.), but the impact is much smaller than it could be (#122). A possible reason for the perceived low contribution of some participants or a negative perception towards it is that IS can only contribute if other factors are in place and preconditions are fulfilled. Additional steps outside of the control of IS are required, such as will and generosity (#1). In particular, IS does not reach the really poor and minimally educated since it does not contribute much unless one has access to the internet and computers (#72).

Many of the participants state that the contribution of IS – research as well as practice – to build a better world is mostly indirect. This particularly remains true for 'Research Theory, Methods, and Philosophy' since the focus of this track is on theories in general (#86). While no direct contributions are made concerning humanity's grand challenges, theory lays the foundations to facilitate others in addressing these challenges and goals. Similarly, 'Project Management' only indirectly contributes to build a better world as it generally serves as a service function (#165) and as it has only the characteristic of a small initiative (#69). One participant states that "other than indirect benefits [...], I am afraid my track has done nothing to ameliorate the conditions that prevail in the world" (#146). Others state it more drastically and argue that "it would be massive spinning to claim that IS research has done much toward attaining progress on these commendable idealistic liberal goals. I think IS practice has tools that have contributed a great deal [...] but as a supporting tool, not a driver" (#162). According to this, the contribution of IS research is fairly low while IS practice contributes to achieve these goals – yet in an indirect way. Technology is not able to build a better world on its own as "it is the people who actually use technology and achieve the goals"

(#151). In fact, IS is likely to be the easiest part. A similar point of view is represented by one participant (#104) who states that IS “don’t make a better world, people do” and emphasizes the importance of human commitment. To build a better world, individuals, organizations, and governments have to be engaged and committed (#138). The often stated indirect contribution can be outlined as (1.) IS research provides the basis, (2.) IS practice provides the tools, but (3.) people need to address the goals.

The importance and value of conferences within the IS research domain was highlighted by numerous participants. Using this platform, new and important topics can be presented and discussed on a timely basis which is especially important in a fast-paced field such as IS and for pressing problems and recent issues. Conferences are an important outlet because the time to publish an article is relatively short while it is typically considerably longer for major, prestigious journals, see also next paragraph. Following the primary objective of conferences as a platform to present the latest research and create a forum for discussions and debates, the participants state that conferences allow to show current trends, getting researchers together, form communities, networks, and alliances of researchers for future research endeavors and programs, and enable collaboration. Beyond that, conferences enable a better understanding as well as increased visibility (#10) and awareness (#114, 115) of important topics. Finally, sharing and dissemination of knowledge to research and society represent a benefit for the general public.

The participants express critique about IS research and IS conferences. As conferences provide a forum for researchers to present their publications, a majority of the presented papers only deals with new technology products which shows researchers’ preference of addressing preferably hype topics and not focusing on core societal issues (#23). A resulting challenge is to change the mindset of reviewers to set a stronger focus on the value of submitted papers regarding the creation of a better world and not only on theoretical development (#12). This is strengthened by one participant’s perception that teaching and industry research have a stronger impact regarding the goal of a better world than IS conferences (#29). Thus, allowing to combine academic and practitioner research papers could increase impact and productivity of conference tracks, e.g. IT in healthcare (#19). Such a change in focus could further be addressed by inviting more real-world practitioners to the conferences (#149). However, one participant outlines the current disillusionment of practitioners regarding IS conferences: “Ever seen a practitioner at an IS conference? I have – ‘disappointment’ would be an understatement” (#29).

The participants also give critical comments regarding relevance and rigor. However, we originally did not intent to address the critique and discussion about the relevance and impact of IS research and the so-called crisis (Hassan 2014), but we include this topic due to the huge amount of participants taking up this issue. One participant states that in respect of the opportunities that IS researchers were able to provide papers regarding relevant problems, the goal of building a better world was already achieved (#8). Further statements can be divided into two groups: One group of participants sees the key to success and a higher impact of IS research in a stronger focus on practical topics and practical research. One participant argues that the IS discipline is characterized by a maniacal attention to methodology and only little attention to relevance, which causes that the IS field is not taken seriously (#137). Consequently, real world problems cannot be solved when generic and tested theories are in the focus because such research is too unspecific and superficial to be of any help (#8, #29). Instead, the focus should be set more on (practical) problems and their solutions and not on methods and methodologies (#120, #137). Additionally, one participant criticizes that IS research shows not only slight emphasis on practical applications or impact in the world, but also a large bureaucratic exercise with e.g. great emphasis on form, academic justifications, and citations (#21). However, academics are less inclined to encourage too much practical research (#19). This goes in line with the argumentation of the participants of the second group. They criticize the excessively strong focus on practical research of “narrow-minded scholars, [who are] focusing on business applications only” (#130). For them it is a challenge to keep research rigorous when it deals more with relevance as data is messier to analyze (#31). Concerning the majority of participants who argue for more relevance, addressing the MDGs is seen as a challenge in the light of the academic status quo (#137).

While it is important to gain interest of researchers not only on mainstream but also in niche topics (#145), results are more difficult to publish, e.g. philosophical research as empirical research tends to force it out of the picture (#6). However, if a topic does not get acceptance in major scientific outlets, researchers’ interest of contributing to such research areas could radically decrease (#51) and respective tracks on conferences could be cancelled (#129). One participant states that real impact can only be achieved through long-term research programs (#64). Against the background that such programs take at

least a few years, long reviewing cycles of 2-3 years are another big issue, because this is too long for dealing with pressing problems (#118). Consequently, it is a challenge to convince the IS community of short reviewing cycles and open-minded reviewers who should accept break-through ideas and revolutionary thinking as papers (#118) not only from people who are “godified in the 'IS World'” (#135). Besides, research methods on this scale are generally not obvious for the average low-funded researcher (#100).

A general bleak picture of the current situation of IS research is painted by some participants. They express their disillusionment when stating that IS research cannot contribute to build a better world considering how the discipline has positioned itself (#117) and that the “IS community continues with a new reductionist quasi post positivist mentality at the exclusion of all else” (#104). However, an analysis of the current situation in a more differentiated way can reveal opportunities for an improvement of certain issues. Some participants identified the transformation of research results into applications and services as a challenge. As pure academic discussions do not bring the solutions to use, it is important to build up relationships with companies and politics (#118). Additionally, existing technology is already able to address many issues and the MDGs as well, but the transfer to applications is not so widespread and researchers should be pushed more into this direction (#82). A subsequent but also important challenge is the transformation of application experiences into new general research impetus (#43).

Implications and Recommendations

Several implications and recommendations can be drawn from the survey and the findings. Based on the survey results, we were able to show that the perceived contribution of IS concerning particular MDGs is lower than for others, for instance for the three goals related to health (‘Reduce child mortality rates’, ‘Improve maternal health’, and ‘Combat HIV/AIDS, malaria, and other diseases’). It is important to further investigate (a) why the contribution of IS is rather low concerning these goals and (b) how the impact of IS with regard to these goals can be raised. Based on the quantitative results from the survey, we indicated that some IS research track clusters have a lower perceived impact on building a better world through IS than others. The MDGs or a ‘better world’ are complex and high-level goals which are certainly not the main goals to be addressed by all IS research streams. We still argue that it is necessary to (a) analyze why the impact on these goals is lower of certain streams and (b) take action to raise the contribution of these streams corresponding to the track clusters. Similarly, we showed that some IS research streams do not tap the full potential yet. For example, ‘Sustainability and Green IS’ can, according to the participants of the survey, contribute a great deal to build a better world, however, it was not able to contribute heavily yet. This untapped potential should be exploited through appropriate, targeted research.

‘Money makes the world go around’ (see e.g. Agnew 2010) and even in research, many aspects still focus on financial gains and not the societal value which leads to the detriment of all other objectives. However, it is assumed that “science must ultimately serve humanity” (vom Brocke et al. 2013). Especially to tackle the big questions, grand challenges, and humanity’s goals, holistic approaches are needed that are not centered on economic aspects. This implies that we, as IS researchers, need to promote the use of social and sustainable goals and metrics to measure the impact and contribution of our research instead of using common economic metrics. Consequently, we recommend to consider additional review criteria next to rigor and relevance: social impact and sustainable development. These criteria can be applied for IS conferences and journals that aim to create a sustainable impact on society, humanity, and environment. Our recommendation is supported by many survey respondents. They stated that we need to provide solutions for larger, global societal issues (#57), emphasize societal benefits and human welfare (#122, 131), promote ethical and moral foundations (#6) and social good in general (#122). Along with the statement of Grover (2014) in the introduction, one participant argued that “this survey is an eye-opener for me. I must confess that we have been rather myopic in our endeavors [not focusing] on outcomes that one could achieve through good practices and a conceptualization of broader goals to better the world” (#146). Another implication that can be derived is the need of interdisciplinary approaches. These broad goals (‘better world’) and challenges (MDGs) cannot be accomplished by single research disciplines on their own.

To really take on the big questions, we further recommend that our community needs to address root causes and question established infrastructures, practices, habits, and structures of the (IS) research field including review, editorial, publication, promotion, and grant processes and policies. This suggestion can help to tap the full potential of our research domain and builds upon the general critique about IS research from the participants as stated in the discussion section. Based on these provoking thoughts, we

pose exemplary questions that should be broken down and investigated in future research: *How can we tackle root causes to move forward and increase research community effectiveness? Do we need to shift the valuation and rating criteria for research from underlying financial gains towards societal value? How can we motivate this possible change and finally achieve it?* Eventually, “new ventures are an opportunity to rethink established practices” and move towards more effectiveness (vom Brocke et al. 2013).

Based on our responses, we also suggest to create alliances (#64, 118) and interdisciplinary collaborative partnerships (#99) with NGOs to address a wide range of social and environmental issues more effectively. Especially charities and faith-based organizations (#108), such as the Red Cross, Alliance for Climate Protection, and the UN, represent important potential partners for research activities. They are also a possibility to overcome funding problems (#164) for broad research programs that impact large segments of the populations. These research programs can have a large impact, however, no single (profit-oriented) organization is likely to fund (#164) these efforts since no financial benefits are gained to justify the investment. These potential alliances and partnerships are also a means to transfer research results into practice (#95) and address the gap between practice and academia. Further, researchers need to be rewarded and acknowledged for operational implementation (#30), concrete actions and initiatives (#115), and successful transfers into practice. While we certainly support this aspect, we argue that we still need to keep IS research rigorous. This implies that concerning theoretical and fundamental research, the focus should be put on rigor to create valid and reliable foundations. Applied research should have a focus on relevance while building on valid foundations from theoretical research to achieve quick wins and impact.

Numerous of the above mentioned aspects also apply for IS practice. A stronger focus on sustainability in general, as well as on social, cultural, and environmental dimensions rather than on economic metrics can raise the impact of IS practice regarding the MDGs. Increased awareness about the targets of the MDGs enables decision-makers and companies to pursue with their business and simultaneously contribute to a ‘better world’, especially when investing or operating in developing countries. A better adoption of scientific results into practice is an additional but necessary step as it can contribute to address and achieve the MDGs and its individual targets.

Since we investigated an abstract and complex topic, the implications and prescriptions of our study for IS research and IS practice are rather broad. A more detailed research agenda is required to break down the goal to build a better world through IS and the resulting implications into more specific and tangible actions. The broad social implications need to be translated to concepts in action (Grover 2014). For instance, for each track cluster, the corresponding contributions, potentials, and challenges need to be addressed and substantiated. The results and findings in Table 2 provide a starting point for this. To complete our implications and recommendations, we invite thought leaders of the research community to develop more specific guidelines for the domain based on our initial insights, results, and suggestions.

Limitations

We identified certain limitations with regard to the survey and its explorative character. Due to the limited amount of responses (n=171), there is only a decent amount of responses for each track cluster. With approximately eight responses for each track cluster on average, there are several clusters with a high amount of answers (‘Organizational IS and Technology’, 18 answers) and some clusters with quite few answers (‘Human Capital and IS’, 3 Answers). The results for clusters with a lower amount of answers are less representative. However, the answers generally formed a consistent overall first impression and overview of the clusters and the underlying research streams. With regard to the responses, a bias cannot be excluded due to three reasons. First, some groups of researchers are more likely to volunteer to be in the sample than others. In general, systematic selection biases are inherent in non-probability samples and cannot be excluded here. Second, we intentionally only asked IS researchers to participate in our survey. Other groups most likely have different perceptions of the contribution of IS to build a better world. Using comparative assessment and surveying other fields, such as public health and policy, education, medicine, and other business disciplines could show the difference between the internal and external perception and understanding of the IS field. Third, our sampling decision only included leaders of the IS research field, because of their high expertise and experience. However, other stakeholder groups such as junior IS scholars or practitioners such as chief information officers (CIOs) could represent a counterpoint and contribute new and innovative ideas, optimism, and fresh insights. Therefore, future surveys should involve other stakeholder groups and fields.

Concerning the understanding of the survey, not all respondents were familiar with the MDGs. A short introduction and a reference would have helped to build a better understanding for participants less familiar with this topic. Additionally, some participants stated that 'building a better world' is a relatively vague idea which sounds like a marketing slogan and is too broad to be discussed in a direct way. We certainly agree that this is a rather broad and complex construct and that the open and broad questions are complex and far from trivial to answer. However, this is owed to the explorative and intentionally broad character of the study. Based on numerous high-quality answers within the survey, we argue that a subsequent study is useful to substantiate our initial results. Further, few participants found the distinction between IS research and practice not sharp enough and that an answer concerning the impact of IS research is almost unrelated to an answer about IS practice. We asked for answers that concern both, IS research and practice, since relevant IS research needs to address important topics of IS practice and deepen the understanding of it. Concerning the perceived contribution of IS, a small number of participants answered with regard to the actual conference track and not regarding the underlying research stream.

Conclusions and Outlook

Within this paper, we investigated how IS research and IS practice can contribute to build a better world. We therefore conducted an explorative survey among leading IS researchers. Based on the 171 responses, we employed qualitative and quantitative analysis methods to synthesize the survey data and document results. While the impact of IS is largely perceived as indirect, the impact on certain MDGs is stronger than on others. According to this, IS can contribute a great deal to universal education, environmental sustainability, and a global partnership for development. The perceived contribution of the specific IS research streams varies considerably. Next to the positive aspects, the survey also revealed challenges and research critique that goes hand in hand with the current debate about a crisis in IS research (Hassan 2014). Based on the generated insights, we derived implications for the IS community. Our intention of the study is to provide a basic starting point, create awareness, and stimulate further discussions and research. We conclude that with the right focus and alignment, IS – practice and the research domain – has the potential to take on the big questions and can help to build a better world. However, we are currently mediocre at best. Significant improvement and stronger impact regarding the MDGs or other high level goals can only be reached within an incremental progress. Next to research agendas and macro-research questions, structural changes to the IS research domain and the involved institutions can facilitate IS researchers to really take on the big questions and build a better world. To this end, we as IS researchers need to step up and challenge established practices and habits.

In the future, additional survey responses will allow more comprehensive statistical analysis (e.g. using SPSS) which enables further generalization of the findings. The variance and fit between the track clusters and the corresponding answers can be analyzed by using ANOVA. Due to limited space, explicit examples of IS applications named by the participants that can help to build a better world cannot be reported here. We intend to enrich and extend these important answers and results by involving more IS researchers with the use of an online portal. This can facilitate and encourage discussion similar to the living scholarship approach of Newsted et al. (1998) on the AIS website (<http://aisnet.org/?MISSurvey>). Additionally, other fields and disciplines can be included in future surveys to set up a differentiation of the IS field perspective and the external to the field perspective. Next to senior scholars, other stakeholder groups, such as doctoral students and practitioners, can bring fresh and important insights, represent a counterpoint, and should therefore be considered in future sampling decisions. Based on the results of our explorative survey, a systematic descriptive or explanatory survey is useful (Pinsonneault and Kraemer 1993). Discussions with other IS researchers will allow to further develop and extend the implications for IS research and to derive recommendations, prescriptions, and guidelines for future research. The Sustainable Development Goals (SDGs) generally serve as universal post-2015 development agenda (UN 2014b) and should form an important foundation for the future development of the IS domain in general. These means can help to create a strong and sustainable impact of IS research towards building a better world.

Acknowledgements

We thank the participants of our survey for their contributions and valuable input, which made this paper possible at all. We also thank our colleague Sören Meyer who contributed suggestions and the review team for their constructive comments, especially concerning the future development of this work.

References

- Afridi, M. J. and Farooq, M. 2011. "OG-Miner: An Intelligent Health Tool for Achieving Millennium Development Goals (MDGs) in m-Health Environments," in *Proceedings of the 44th Hawaii International Conference on System Sciences*.
- Agarwal, R. and Lucas, H. C. 2005. "The information systems identity crisis: focusing on high-visibility and high impact research," *MIS Quarterly* (29:3), pp. 381-398.
- Agnew, J. 2010. "Money games: Currencies and power in the contemporary world economy," *Antipode* 41, pp. 214-238.
- Alavi, M., Johnson, S. L., Willey, T. R. N., and Yoo, Y. 2010. "IT-Enabled Knowledge Management in Healthcare Delivery: The Case of Emergency Care," in *Proceedings of the 31st International Conference on Information Systems*.
- Avital, M. 2014. "Constructing the Value of Information Systems Research," *Communications of the Association for Information Systems* (34:1), pp. 817-822.
- Babbie, E. 1990. *Survey Research Methods, 2nd Edition*. Wadsworth Inc. Fulfillment, Belmont, CA.
- Babbie, E. 2013. *The practice of social research, 13th Edition*. Wadsworth Inc. Fulfillment, Belmont, CA.
- Benbasat, I. and Zmud, R. W. 1999. "Empirical research in information systems: the practice of relevance," *MIS quarterly*. pp. 3-16.
- Benbasat, I. and Zmud, R. W. 2003. "The Identity Crisis within the IS Discipline: Defining and Communicating the Discipline's Core Properties," *MIS Quarterly* (27:2), pp. 183-194.
- Bhattacharjee, A. 2001 "Understanding and Evaluating Relevance in IS Research," *Communications of the Association for Information Systems* (6), Article 6.
- Boudreau, M. C., Chen, A., and Huber, M. 2008. "Green IS: Building sustainable business practices," *Information Systems: A Global Text*, pp. 1-17.
- Calloway, L. J. 2011. "Teaching Sustainability Concepts: Information and Communications Technologies and the United Nations Millennium Development Goals," *Proceedings of SIGGreen Workshop. Sprouts: Working Papers on Information Systems* (11:8).
- Chiasson, M. W. 2014. "Let's Start Fooling Ourselves: Strategies for Manoeuvring Within the Micro-Political Influences Surrounding Our Research Practices," *Communications of the Association for Information Systems* (34:1), Article 46.
- Cripps, H. and Standing, C. 2010. "The Implementation of Electronic Health Records: Initial Findings from Ngaanyatjarra Lands," in *BLED 2010 Proceedings*.
- De Goede, M. 2014. "The Politics of Privacy in the Age of Preemptive Security," *International Political Sociology* (8:1), pp. 100-104.
- De Zoysa, M. R. and Letch, N. 2013. "ICT4D Project Sustainability: An ANT-based Analysis," in *Proceedings of 19th Americas Conference on Information Systems*.
- Dedrick, J. 2010. "Green IS: Concepts and Issues for Information Systems Research," *Communications of the Association for Information Systems* (27), pp. 173-184.
- Desouza, K. C., Ein-Dor, P., McCubbrey, D. J., Galliers, R. D. and Myers, M. D. 2006b. "Social Activism in IS Research: Making the World a Better Place," in *Proceedings of the 27th International Conference on Information Systems*.
- Desouza, K. C., Ein-Dor, P., McCubbrey, D. J., Galliers, R. D. and Myers, M. D. 2007. "Social Activism in Information Systems Research: Making the World a Better Place," *Communications of the Association for Information Systems* (19), Article 13.
- Desouza, K. C., El Sawy, O. A., Galliers, R. D., Loebbecke, C. and Watson, R. T. 2006a. "Beyond Rigor and Relevance Towards Responsibility And Reverberation: Information Systems Research That Really Matters," *Communications of the Association for Information Systems* (17), Article 16.
- Ditsa, G. E. and Ojo, S. O. 2011. "E-Health Technologies in Attainment of the Millennium Development Goals for Africa Healthcare System," in *Proceedings of the 22nd Australasian Conference on Information Systems*.
- El Khatib, V., Trang, S. and Reimers, K. 2013. "The Role of Motivational Factors in Distributed Software Development Teams: An Empirical Investigation," in *Proceedings of the 21st European Conference on Information Systems*.
- Elliot, S. 2011. "Transdisciplinary Perspectives on Environmental Sustainability: A Resource Base and Framework for IT-Enabled Business Transformation," *MIS Quarterly* (35:1), pp. 197-236.

- Ezenwa, C. and Brooks, L. 2013. "Using Mobile Technology to Facilitate the Health Agenda in Nigeria: Issues and Opportunities," in *Proceedings of the UK Academy for Information Systems Conference*.
- Frank, U. 2014. "Higher Value of Research by Promoting Value for Researchers." *Communications of the Association for Information Systems* (34:1), Article 43.
- Glaser, B. G. and Strauss, A. L. 1967. *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Aldine Publishing Company, Chicago, IL, USA.
- Grahlmann, K. R., Helms, R. W., Hilhorst, C., Brinkkemper, S. and van Amerongen, S. 2011. "Reviewing Enterprise Content Management: a functional framework," *European Journal of Information Systems* (21:3), pp. 268-286.
- Grover, V. 2014. "Value of IS Research: Let's Not Talk Crisis – but We Can Do Better," *Communications of the Association for Information Systems* (34), Article 45.
- Hasan, H. and Watson, R.T. 2014. Conference Theme Track: Building a Better World Through IS. Available online at: <http://icis2014.aisnet.org/index.php/submissions/tracks/01-conference-theme>.
- Hassan, N. R. 2014. "Value of IS Research: Is there a Crisis?," *Communications of the Association for Information Systems* (34), Article 41.
- Hassan, N. R. et al. 2013. "Benefitting from IS Research -- Who and How? A Panel on the Value of IS Research," in *Proceedings of 19th Americas Conference on Information Systems*.
- Johnston, R. B., and Riemer, K. 2014. "On Putting the Score ahead of the Game," *Communications of the Association for Information Systems* (34:1), Article 47.
- King, W. R. and He, J. 2005. "External Validity in IS Survey Research," *Communications of the Association for Information Systems* (16), Article 45.
- Le Rouge, C. M., and Niederman, F. 2006. "Information Systems and Health Care XI: Public Health Knowledge Management Architecture Design: A Case Study," in *Communications of the Association for Information Systems*, (18), Article 9.
- Levy, Y. and Ellis, T. J. 2006. "A systems approach to conduct an effective literature review in support of information systems research," *Informing Science* (9), pp. 181-212.
- Malhotra, A., Melville, N. and Watson, R. T. 2013. "Spurring Impactful Research on Information Systems for Environmental Sustainability," *MIS Quarterly* (37:4), pp. 1265-1274.
- Melville, N. P. 2010. "Information systems innovation for environmental sustainability," *MIS Quarterly* (34:1), pp. 1-21.
- Mengiste, S. A. 2013. "Globalization and ICTs: Potentials and Challenges to the Public Health Sector of Developing Countries," in *Proceedings of 19th Americas Conference on Information Systems*.
- Muhammad, I. and Wickramasinghe, N. 2014. "A National Patient-Centered E-Health Solution—The Experience from Down Under To-Date with the Personally Controlled Electronic Health Record (PCEHR)," in *Proceedings of the 20th Americas Conference on Information Systems*.
- Newsted, P., Huff, S. and Munro, M. 1998. "Survey Instruments in Information Systems," *MIS Quarterly* (22:4).
- Niederman, F. 2014. Responding to Three Issues in Hassan (2014). *Communications of the Association for Information Systems* (34:1), Article 44.
- Pinsonneault, A. and Kraemer, K. L. 1993. "Survey research methodology in management information systems: an assessment," *Journal of Management Information Systems* (10:2), pp. 75-105.
- Punch, K. F. 2005. *Introduction to Social Research*. Sage, London.
- Ramiller, N. C. and Pullman, M. 2008. "Good Works and Networks: Information System as Nexus for the Promotion of Sustainable Community Development," in *Proceedings of the 14th Americas Conference on Information Systems*.
- Rhue, L. and Sundararajan, A. 2012. "Digital Access, Political Networks and the Diffusion of Democracy," in *Proceedings of the 33rd International Conference on Information Systems*.
- Rhue, L. and Sundararajan, A. 2014. "Digital access, political networks and the diffusion of democracy," *Social Networks*, 36, 40-53.
- Rosemann, M. and Vessey, I. 2008. "Toward Improving the Relevance of Information Systems Research to Practice: The Role of Applicability Checks," *MIS Quarterly* (32:1).
- Schutt, R. K. 2011. *Investigating the social world: The process and practice of research*. Pine Forge Press.
- Seidel, S., Recker, J. and vom Brocke, J. 2013. "Sensemaking and Sustainable Practicing: Functional Affordances of Information Systems in Green Transformations," *MIS Quarterly* (37:4), pp. 1275-1299.
- Singh, R., Mathiassen, L., and Mishra, A. N. 2009. "A Theory of Rural Telehealth Innovation - A Paradoxical Approach," in *Proceedings of the 30th International Conference on Information Systems*.

- Sneha, S., and Varshney, U. 2006. "Ubiquitous healthcare: a new frontier in e-health," in *Proceedings of the 12th Americas Conference on Information Systems*.
- Straub, D. 1989. "Validating Instruments in MIS Research," *MIS Quarterly* (13:2), pp. 147-169.
- Straub, D. W. and Ang, S. 2011. "Rigor and Relevance in IS Research: Redefining the Debate and a Call for Future Research," *MIS Quarterly* (35: 1), pp.iii-xi.
- Strauss, A. and Corbin, J. 1998. *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*, 2nd Edition. Thousand Oaks: Sage Publications.
- Sundararajan, A. 2014. "Peer-to-Peer Businesses and the Sharing (Collaborative) Economy: Overview, Economic Effects and Regulatory Issues," Written testimony for the hearing titled 'The Power of Connection: Peer-to-Peer Businesses' at the United States House of Representatives, available online at http://smallbusiness.house.gov/uploadedfiles/1-15-2014_revised_sundararajan_testimony.pdf
- UN – United Nations 2013a. "Millennium Development Goals: 2030 Progress Chart," available online at http://unstats.un.org/unsd/mdg/Resources/Static/Products/Progress2013/Progress_E.pdf
- UN – United Nations 2013b. "The Millennium Development Goals Report 2013," available online at <http://mdgs.un.org/unsd/mdg/Resources/Static/Products/Progress2013/English2013.pdf>
- UN - United Nations 2014a. "United Nations Millennium Development Goals," available online at <http://www.un.org/millenniumgoals/>
- UN – United Nations 2014b. "The Millennium Development Goals Report 2014," available online at <http://mdgs.un.org/unsd/mdg/Resources/Static/Products/Progress2014/English2014.pdf>
- vom Brocke, J. M., Simons, A., Niehaves, B., Riemer, K., Plattfaut, R. and Clevén, A. 2009. "Reconstructing the giant: On the importance of rigor in documenting the literature search process," in *Proceedings of the 17th European Conference on Information Systems*.
- vom Brocke, J. M., Watson, R. T., Dwyer, C. Elliot, S. and Melville, N. 2012. "Green Information Systems: Directives for the IS Discipline," in *Proceedings of the 33rd International Conference on Information Systems*.
- vom Brocke, J., Fridgen, G., Hasan, H., Ketter, W., and Watson, R. 2013. Energy informatics: designing a discipline (and possible lessons for the IS community)," in *Proceedings of the 34th International Conference on Information Systems*.
- Wang, W., Elliot, S., and Williams, M.-A. 2010. "An IS contribution to the UN Millennium Development Goals: Next Generation Vaccination Management in the Developing World," in *Proceedings of the 21st Australasian Conference on Information Systems*.
- Wang, Y., Meister, D. B., and Gray, P. H. 2013. "Social Influence and Knowledge Management Systems Use: Evidence from Panel Data," *MIS Quarterly*, (37:1), pp. 299-313.
- Watson, R. T., Boudreau, M. C., and Chen, A. J. 2010. "Information systems and environmentally sustainable development: energy informatics and new directions for the IS community," *MIS Quarterly* (34:1), pp. 23-38.
- Watson, R. T., Lind, M., and Haraldson, S. 2012. "The emergence of sustainability as the new dominant logic: implications for information systems." in *Proceedings of the 33rd International Conference on Information Systems*.
- Webster, J. and Watson, R. T. 2002. "Analyzing the Past to Prepare for the Future: Writing a Literature Review," *MIS Quarterly* (26:2), pp. xiii-xxiii.
- Wickramasinghe, N., Bali, R., Lehaney, B., Marshall, I., and Naguib, R. 2007. "Knowledge Management: The Hidden Power Behind Network-Centric Healthcare," in *Proceedings of the 13th Americas Conference on Information Systems*.