



## EDITORIAL

# Responsible research and innovation in information systems

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The field of information systems (IS) is characterised by a plurality of positions and approaches that defy simple definitions or characterisations. One aspect that I believe many, if not most, IS scholars can agree on is that IS research aims to describe and understand the use of information and communication technology (ICT) in order to lead to better societal and organisational practices and outcomes. If this hypothesis is correct, then it raises a number of follow-on questions. How can we know what constitutes 'better' rather than 'worse' or, as a condition of answering this question: Can we agree on a shared view of what counts as 'good' in IS?

This is a difficult question which points to an extended history of discussing normative issues, that is, issues of ethics and morality, law and customs, prescriptions and proscriptions. This discourse has pervaded the IS literature from its inception. Questions of implicit and explicit norms concerning the use of information technology can be traced back to Norbert Wiener (1954). They have been discussed ever since (Bynum, 2008). They are reflected in attempts to professionalise the work of ICT and IS specialists as reflected in codes of conduct or codes of ethics by professional bodies, which can again be traced back to the 1950s. In the field of IS, there has been a steady stream of research and publications on normative issues (Mason, 1986; Culnan & Williams, 2009) which has more recently led to more attention to ethics as a specific focus of IS research (Bryant *et al*, 2009; Mingers & Walsham, 2010) and IS education (Harris *et al*, 2011), as well as the role of ethics in particular aspects or approaches to IS (Myers & Klein, 2011; Stahl, 2008).

The purpose of this editorial is not to engage in these substantive discussions. By highlighting the shared concern about normative issues and their history in IS, I have tried to point to the importance of thinking about questions of responsibility in IS. I would like to propose that collectively and individually the field of IS and the researchers and practitioners working within it have an important role to play in ensuring that socio-technical innovations have beneficial consequences. In this editorial, I will lay out what sort of normative challenges the field of IS needs to address and why it is uniquely suited to do so. By looking at the way in which other fields or disciplines currently address such issues, I will return to the question how this can be done in IS and which conditions need to be fulfilled in order for IS to be researched, developed and deployed in a responsible manner.

### **Normative challenges of IS**

A look at any newspaper on an average day will show that there are numerous news items related to normative aspects of ICT. There are husbands who spy on wives using social networks, hackers defrauding bank customers, paedophiles exchanging pictures of child sexual abuse and many others. These problems are not confined to individual misuse of technology, but cover more fundamental and larger scale discussions. In

the U.K., for example, there were the debates about electronic patient records in the National Health Service, the national DNA database or the national Identification Card scheme. There are international concerns about privacy protection of the users of social networks, ownership of the content of large databases and the role of the state in regulating or facilitating the use of networks.

Each of these examples continues to sustain regional, national and even international debates. These often lead to legislation and regulation, which, in turn, raise further debate. A good example of this at the time of writing the present editorial (February 2012) is the European Union's postulation of a 'right to be forgotten', currently proposed by Viviane Reding, European Commissioner for Justice, Fundamental Rights and Citizenship and Vice-President of the European Commission.

These debates are general societal debates of issues that have the potential to affect almost any member of society. Members of the IS field are therefore potential contributors to such debates in their role as members of society. I would like to argue, however, that our knowledge and experience allow us to take a more pronounced stance and, arguably, oblige us to become more visible and offer our expertise to public debates with a broad range of stakeholders, including especially policymakers. The reason for this is that the normative problems outlined above are intrinsically linked to the interplay between technology, individuals and organisations. IS has a long history of researching such issues and therefore a repertoire of methods, approaches and theories that are uniquely suited to shed light on them. To put it differently, IS scholars are in a position to be responsive to other stakeholders, improve understanding of socio-technical capabilities and affordances and explain the history and development path of current IS. This specialised knowledge is important for our societies to choose options that are deemed desirable.

At the moment, public debates and resulting societal engagement are much less visible in the IS field than they are in other fields of research and innovation, such as nanotechnology or synthetic biology. It is an interesting question to speculate why this is so. It may well be that ICT is now so widely spread that people often fail to realise its potential to do good or harm. Furthermore ICT, at least in the form of currently available products for the consumer and corporate markets, does not pose fundamental questions about the nature of reality and humanity as the other fields may do.

My guess is that this will change. Recent research, for example, in the European Union 7th Framework Programme's research project ETICA (Ethical Issues of Emerging ICT Applications <http://www.etica-project.eu>, (I served as coordinator of this project)) suggests that emerging ICTs will raise a host of novel ethical issues. In addition to an exacerbation of existing problems such as privacy or intellectual property, novel and emerging information technologies are likely to raise issues that are currently less widely discussed. There are

numerous technologies, such as brain-computer interfaces, neuro-computing or human-machine symbiosis that shed doubt on the traditional distinction between humans and technology. They have the potential to significantly alter the way we individually and collectively view ourselves. New developments in robotics, ambient intelligence, affective computing or the future Internet may change the way we organise fundamental social processes, from leisure to political participation. These technologies are about to raise questions that will need to be answered and the IS field can make important contributions to this.

### **Responsible research and innovation (RRI)**

The concept of RRI is gaining currency in different disciplines. It represents the attempt to provide an answer to the multitude of ethical, moral, legal and other problems arising from the use of technology research and innovation (Von Schomberg, 2011). In addition to technical developments, there are other factors, which render traditional ways of dealing with such issues problematic. On the one hand there is the ever-increasing pace of research and development, which can often lead to technical systems or applications being widely distributed throughout society before any serious thought can be given to their relevance and consequences. These developments furthermore happen on a global scale, rendering them difficult to observe and even more difficult to regulate. This is mirrored by the fragmentation of social authority which leaves existing governance models problematic (Zhang *et al*, 2011).

There have been attempts to proactively address the normative side of technical developments. The probably most notable example of this, at least in Europe, is the attempt to establish mechanisms of RRI in nanotechnology, as represented by the European Commission's (2008) code of conduct for nanotechnology. Further examples come from the fields of synthetic biology (Gutmann, 2011) and, currently debated in the U.K., responsibility in geo-engineering (Macnaghten & Owen, 2011).

What these activities have in common is that they represent attempts to deal with the uncertain, global and fragmented nature of research and innovation. They incorporate aspects of technology foresight with an awareness of the necessity to engage in broader social discussions. Responsibility, etymologically a term referring to communication, requires the ability and willingness to communicate. Different stakeholders need to be engaged and meaningful communications need to be held that have manifest and relevant consequences. This will lead to the definition or reconsideration of novel or established responsibilities. RRI is likely to require a tight network of interlinking and mutually dependent responsibilities.

The rest of this editorial is going to concentrate on two aspects of RRI: (1) what are the conditions, principles and possible implementations of the idea and (2) what is the role that the IS community can play in it?

### Conditions, principles and implementation

In order for RRI to play a significant role in research and development in general and in the area of IS in particular, several conditions need to be met. Some of these refer to higher-level activities in the area of research and industry policy. These include the requirement to develop legal or other regulatory systems that incentivise researchers, industry and organisations to engage with normative questions. In addition, there is a need for support mechanisms that will allow individuals and organisations who deal with this sort of question to find out about current norms and regulations, as well as good practice and successful solutions. In order for such policy development to be relevant and successful, it will need to incorporate the viewpoints and positions of its broad range of stakeholders. Such higher level policy and societal arrangement should then lead to the recognition that responsible ways of addressing ethical issues are in the interest of the researchers and organisations who realise innovation. The engagement with ethical questions will require the development of reflective processes within research, so that norms, their context and application can be understood, predicted and influenced.

It is currently not yet clear in detail how these requirements can be met and what needs to be done in order to render them relevant in daily practice. One way of implementing the first item, the need to incentivise the IS and ICT research communities, may be to establish a more broadly accepted approach to an ethical impact assessment (Wright, 2011). A suggestion that may point the way for an appropriate solution to the second question, the guidance and good practice, is what we have termed the Observatory for RRI. A first prototype of this observatory is currently being constructed in context of the U.K. research project 'Framework for Responsible Research and Innovation in ICT' (<http://www.responsible-innovation.org.uk>).

These developments will require the collaboration of a broad range of organisations and individuals with different experiences and backgrounds. As indicated, earlier, I believe that the IS community is in a unique position to contribute to these developments.

### The role of the IS community

There are several reasons why individual IS scholars and the IS community as a whole can and should contribute to these debates around RRI. The first one is the breadth of experience and knowledge that IS as an academic field has developed during the last 40–50 years. Theories, methodologies and approaches to understanding and influencing their relationship between information technology, organisations and society have been well developed in the IS. The interdisciplinary nature of the field allows its members to easily communicate with members of other fields. One driving force behind the entire debate concerning RRI is the recognition that in modern societies technology and its development can no longer be left to technical experts, but needs to be scrutinised,

understood and accompanied by society at large. While it is open to debate how this can be achieved in detail, it is quite clear that participative technology assessment (van Eijndhoven & van Est, 2002) and development will need to play a significant role in this process. There is a richness of knowledge and experience of participation in technology development built up over decades (Mumford & Henshall, 1978) that the IS field could use to contribute to the broader societal debate about technology.

IS researchers and practitioners could thus be sought-after contributors to these debates. In addition to this they would also benefit in many respects by being involved in these current discussions. One can argue that, due to the changes of the nature and use of technologies, the focus of IS research should move from organisational and commercial environments towards a broader societal engagement. Web 2.0, social networks, ubiquitous mobile computing and so on require a broader outlook by IS researchers (Baskerville, 2011). Instead of just observing these technical and social developments, the IS community has the unique opportunity to participate in shaping them. By making their expertise available to stakeholders and policymakers, the IS community could fulfil its broader social responsibilities and help achieve what arguably should be its core mission: to improve our individual and collective lives by making the best possible use of available technologies.

### In this issue of *EJIS*...

We introduce very diverse articles concerning cutting edge technologies (online gaming, RFID) new concepts and related empirical works (legitimation, ECM, 3C's and IS architecture). This issue will also stimulate IS studies in areas like technology non-assimilation and technology addiction such as that witnessed among adolescent online game players. Both the first and last articles explore their proposed models in China.

In the first article, '*A case study of the legitimation process undertaken to gain support for an information system in a Chinese university*', the researchers: Donal Flynn from University of Manchester and Yongqin Du a business analyst at Shell's IT Application Development & Projects division explore the Legitimation Acceptance Model (LAM) and its associated activities and strategies through an in-depth case study analysis focused on the introduction of a multi-function smartcard at a Chinese University. The research findings set forth previously unexplored LAM activities and strategies associated with the three legitimation processes (gaining, maintaining and repairing legitimation). In addition, the research points out to the dynamic nature of the LAM, which has been approached in a static view in most researches so far. The article's main contribution is therefore a finer comprehension of the LAM dynamic framework that underlies IS implementation, diffusion and adoption.

In the second article, '*Negotiating language barriers – a methodology for cross-organisational conceptual modelling*',

the authors Gunnar Dietz and Martin Jührisch from Dresden University of Technology introduce a generic algorithm for meta business modelling called the Description Kit Approach that promises to overcome domain conflicts. The domain conflicts typically arise from different language concepts, divergent cultural backgrounds and different levels of technical developments. Thus, such conflicts prohibit transposing the use of the conceptual models to other domains and gaining on modelling automation and cross-organisational comparisons. To resolve this problem, the researchers suggest a middle-modelling layer that introduces guidelines as mediators between language definitions and uses. The suggested algorithm is clarified through rich examples and although it imposes a preliminary codifying effort for the guidelines middle layer, it promises more flexible and adaptive modelling concepts and expanded uses for inter-organisational, outsourcing and multiple business contexts. Such meta modelling is particularly relevant in the IS area.

Narges Kasiri from SUNY Oneonta, Ramesh Sharda from Oklahoma State University and Bill Hardgrave from Auburn University introduce in the third article, *'A balanced scorecard for item-level RFID in the retail sector: a Delphi study'*. This study benefited from the contribution of 12 experts and consultants from various backgrounds to the formulation of a retail's RFID balanced scorecard. It established a ready-to-use RFID balanced scorecard for managers. The consensus reached by these experts on the balanced scorecard measures, but also their divergent viewpoints that are revealed through this Delphi study, show which aspects and/or measures of RFID at item level need to be emphasised and are rendered important in particular situations. Last but not least, this study has the uniqueness of adopting item level RFID balanced scorecard measures across different retail perspectives: marketing, merchandising and supply chain (store execution). A variety of perspectives is a cornerstone for their model and was rare to find in a single study so far.

In the fourth article, *'Reviewing Enterprise Content Management: a functional framework'*, the five authors Knut R. Grahlmann from Ernest & Young Advisory in the Netherlands; Remko W. Helms from Utrecht University; Cokky Hilhorst from Tilburg University; Sjaak Brinkkemper from Tilburg University; and Sander van Amerongen from PricewaterhouseCoopers Advisory in the Netherlands research the literature on a clear definition and scope of what is exactly meant by Enterprise Content Management (ECM). Because of the literature inconsistencies, they perform a meta-literature review and propose a comprehensive definition of ECM that could be useful for future IS studies. They also point out why ECM should not be considered as an under discipline of knowledge management, but rather an adjacent field on its own and finally they propose a functional ECM framework (FEF) that could be used by practitioners to assess their ECMs and take future ECM investment

decisions. The methodology consists in investigating in three organisations, their proposed framework by following up on ECM functionalities. The interest of the article is that their work brings closer the views of IS scholars and those of IS practitioners. It is pragmatic in the sense that they suggest a ready-to-use visual representation tool of all captured ECM functionalities in their FEF.

The fifth article, *'An empirical study of IS architectures in French SMEs: integration approaches'* co-authored by Marc Bidan and Frantz Rowe from Université de Nantes and Duane Truex from Georgia State University, proceeds first in clarifying an important theoretical construct often used but in different senses: the IS architecture. Then, it attempts to establish IS architecture taxonomies with clear recognisable characteristics applicable on the medium size firms through a study conducted over 143 French SMEs. Through a multivariate statistical analysis tool, it identifies the Silos Architecture category, the Partially Standardized Architecture category and the Mixed Architecture category. Finally, it uncovers paths by which SMEs work on integrating their IS architecture. This article's importance is twofold. First, its theoretical contribution towards a better understanding of what is exactly meant by IS architecture will hopefully help researchers in this field. Second, it presents new insights on how SMEs integrate (or not) their IS artefacts, in contrast with the previously established integration paths adopted by large sized firms.

The sixth article co-authored by three colleagues from Louisiana State University: Andrew Schwarz, Sonja Wiley-Patton and Colleen Schwarz along with Yoohyuk Jung from Ulsan National Institute of Science and Technology and Benoga Perez-Mira from Northwestern State University entitled *'Towards an understanding of assimilation in virtual worlds: the 3C approach'* discusses factors influencing the non assimilation on virtual world platforms with a special emphasis on Second Life. In their study, the gap of assimilation is practically viewed as the lack of use after signing up. The research teaches us that not only the discontinued use of the virtual world technology is influenced by technology class factors and by community class factors, but also by user class factors, hence the article's title the 3C's (three classes). The model expands on the TRA (the theory of reasoned action) that takes into account both the volitional and evaluative components and the normative influence component that drive the individual's behaviour. This article is undoubtedly a beginning in a series of investigations and research aiming at: (1) validating the model by extending it to other technologies and (2) exploring the comprehensiveness of the suggested factors in each class of non-assimilation impacting factors.

In the seventh article, *'Online game addiction among adolescents: motivation and prevention factors'*, the authors Zhengchuan Xu from Fudan University in Shanghai, China; Ofir Turel from California State University; and Yufei Yuan from McMaster University in Canada propose a model of antecedent factors impacting online game addiction. The

antecedents not only rely on motivating factors that push towards game playing addiction, but also take into consideration prevention and harm reduction efforts exerted to reduce online game addiction. The model is tested on some 623 adolescents in China and achieves more than 40% of factors contributing towards game addiction explanation. The implications of this study are of prime importance since it can help teachers, parents, governments and regulators control and prevent online game addiction which have been established to cause harm both physically and psychologically to those involved in this activity, as well as to their surrounding communities. The similarities and differences found between the last two articles are interesting to observe: one discusses the problem of technology non-assimilation, while the other researches technology addiction. Both articles relate to virtual world technologies, which is a growing technology area and

definitely worth studying to uncover its related ambiguities. While both articles start by drawing on Yee's article 'Motivations for play in online games' (2006), they broaden their research perspectives by relying on variant IS and non-IS literature.

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### References

- BASKERVILLE R (2011) Individual information systems as a research arena. *European Journal of Information Systems* **20**(3), 251–254.
- BRYANT A, LAND F and KING JL (2009) Editor's introduction to the special issue on ethical issues in IS research. *Journal of the Association for Information Systems* **10**(11), 782–786.
- BYNUM T (2008) Computer and information ethics. [WWW document] <http://plato.stanford.edu/entries/ethics-computer/> (accessed 4 December 2008).
- CULNAN M and WILLIAMS C (2009) How ethics can enhance organizational privacy: lessons from the ChoicePoint and TJX data breaches. *Management Information Systems Quarterly* **33**(4), 673–687.
- EUROPEAN COMMISSION (2008) *Commission Recommendation on 07/02/2008 on a Code of Conduct for Responsible Nanosciences and Nanotechnology* (No. C (2008) 424 final) European Commission, Brussels.
- GUTMANN A (2011) The ethics of synthetic biology: guiding principles for emerging technologies. *Hastings Center Report* **41**(4), 17–22.
- HARRIS AL, LANG M, YATES D and KRUCK SE (2011) Incorporating ethics and social responsibility in IS education. *Journal of Information Systems Education* **22**(3), 183–189.
- MACNAGHTEN P and OWEN R (2011) Good governance for geoengineering. *Nature* **479**(7373), 293.
- MASON RO (1986) Four ethical issues of the information age. *MIS Quarterly* **10**(1), 5–12.
- MINGERS J and WALSHAM G (2010) Towards ethical information systems: the contribution of discourse ethics. *MIS Quarterly* **34**(4), 833–854.
- MUMFORD E and HENSHALL D (1978) *Participative Approach to Computer Systems Design*. Halsted Press, New York.
- MYERS MD and KLEIN HK (2011) A set of principles for conducting critical research in information systems. *MIS Quarterly* **35**(1), 17–36.
- STAHL BC (2008) The ethical nature of critical research in information systems. *Information Systems Journal* **18**(2), 137–163.
- VAN EIJNDHOVEN J and VAN EST R (2002) The choice of participative technology assessment methods. In *Participatory Technology Assessment: European Perspectives* (Joss S and Bellucci S, Eds), pp 209–234, Centre for the Study of Democracy, University of Westminster, London.
- VON SCHOMBERG R (Ed.) (2011) *Towards Responsible Research and Innovation in the Information and Communication Technologies and Security Technologies Fields*. Publication Office of the European Union, Luxembourg.
- WIENER N (1954) *The Human Use of Human Beings*. Doubleday, New York.
- WRIGHT D (2011) A framework for the ethical impact assessment of information technology. *Ethics and Information Technology* **13**(3), 199–226.
- YEE N (2006) Motivations for play in online games. *Cyberpsychology & Behavior* **9**(6), 772–775.
- ZHANG JY, MARRIS C and ROSE N (2011) *The Transnational Governance of Synthetic Biology – Scientific Uncertainty, Cross-Borderness and the 'Art' of Governance*. London: London School of Economics and Political Science. BIOS Working Paper (No. 4). [WWW document] <http://www2.lse.ac.uk/BIOS/publications/Working%20Papers/WP4TransnationalGovernance.pdf> (accessed 6 October 2011).