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Jae Kyu Lee

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Invited Commentary

Reflections on ICT-enabled Bright Society Research

Jae Kyu Lee

College of Business, Korea Advanced Institute of Science and Technology, Seoul 130-722, Korea,
jkleee@business.kaist.ac.kr

Since the advent of the *AIS Grand Vision Project of ICT-enabled Bright Society* (in short, *Bright ICT*), there has been significant excitement as well as confusion about the concept. To resolve ambiguities about the types of research that are consistent with this vision, the notions of *Restorative Bright ICT Research* and *Enriching Bright ICT Research* are defined. In addition, we propose three perspectives that can differentiate Bright ICT research from traditional research approaches to create a disruptive impact on society. To address societal problems that are often global in scope, Bright ICT research recommends taking a holistic design of future society encompassing technologies and policies as well as business models driven by visionary principles. This paradigm can be an extension of design science for the scope of a Macro Information Society.

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1. Introduction

The Council of Association for Information Systems (AIS) adopted the *Grand Vision Project for the ICT-enabled Bright Society* (in short, the Bright ICT Initiative) in December 2014. The goal of the initiative was to prevent undesirable side effects caused by Information and Communication Technologies (ICT) or at the very least, mitigate adverse effects and make future society brighter. The notion of “Bright” is contrasted with the “Dark” effects of ICT, but there is no reason why we should limit the benefit of the initiative simply to the restoration. A typical endeavor of the Bright ICT initiative is the Bright Internet, which particularly emphasizes the prevention and elimination of the sources of cybercrime and cyberterror (Lee 2015).

To identify the problems and research issues that may fit under the umbrella of the Bright ICT Initiative, several approaches were undertaken.

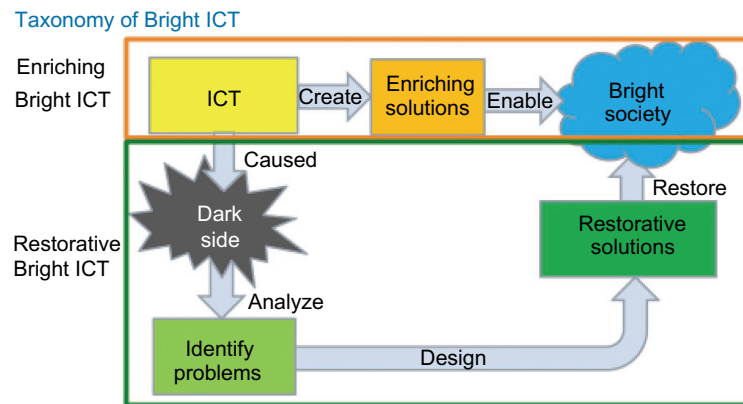
1. *Academic Panels.* Multiple panels were held at AIS Conferences, such as ICIS 2014, ECIS 2015, PACIS 2015, AMCIS 2015, and ICIS 2015. The discussions revealed consensus that the information systems (IS) research community should be at the vanguard of proposing and testing solutions to broad societal problems that are caused by the penetration of ICT. Unsurprisingly, there was also diversity in perspectives and the scope of problems was viewed differently among the panelists.

Several panelists talked about the significance of cyber security and the pressing need to protect individuals and society from cybercrime and cyberterror. They also highlighted the importance of protecting innocent citizens from privacy infringement and children from game addiction, and the need for a green information technology (IT) contribution to mitigate climate change

and other negative environmental effects. However, at AMCIS 2015, Agarwal et al. (2010) presented the potential contribution of remote diagnosis as a future healthcare system for under-resourced regions where medical doctors are not available and other healthcare resources are scarce. Here, the absence of medical doctors was not caused by ICT but rather, ICT presents an opportunity for enhancing social welfare. Likewise, European panelists at ECIS 2015 compared the vision of Bright ICT with the vision of the “United Nations’ Eight Millennium Development Goals” which aims to solve the conflicting, unjust and unsafe problems of today (Lee 2015, p. v).

Further reflection on the panel discussions made it clear that a sharper definition of the concept of Bright ICT was needed, together with better explanation of how it may be distinct from what the IS community is already focusing on. Therefore, we propose to distinguish among two related yet distinct research opportunities: *Restorative Bright ICT Research* and *Enriching Bright ICT Research*.

2. *Workshop and Special Issue.* The need to distinguish the notions of Restorative Bright ICT and Enriching Bright ICT research was recognized again in the Workshop on the Bright ICT Initiative held at ICIS 2015 in Fort Worth, Texas. Although the majority of speakers investigated the problems caused by ICT, Venkatesh presented the necessity of an ICT contribution to solve the poverty problem, which is also included in the UN Millennium Development Goals. A special issue of the *Journal of AIS* on the topic of the Bright ICT Initiative is currently underway. The guest editors of the special issue also experience the confusion among potential authors between the concept of Restorative

Figure 1 (Color online) Restorative Bright ICT versus Enriching Bright ICT

Bright ICT and Enriching Bright ICT efforts. Recently, vom Brocke et al. (2015) edited a book on *Grand Societal Challenges in Information Systems Research and Education*, where the perspective of Bright ICT is explicitly culled out in the preface.

3. *Delphi Study*. As an effort of identifying the relevant research issues, a Delphi study is currently underway by the task force members of the Bright ICT Initiative. The study engages 182 editorial board members of eight leading IS journals. The outcome of the first round showed the existence of diverse conceptualizations of Bright ICT. One set of issues raised relates to ICT-caused problems such as ICT Security, Privacy, Cybercrimes, ICT Addiction, Overdependency on ICT, Ethical Use of ICT, and Social Problems caused by ICT. A second set of issues identifies opportunities where existing problems were not caused by ICT, but can be improved by ICT such as ICT-enabled Healthcare Systems, Online Educational Systems, and Green by IT to overcome the climate change problem. A final set of issues is a mixture of the two perspectives, such as the changing nature of work, future jobs, and change of lifestyle due to ICT.

2. Restorative Bright ICT versus Enriching Bright ICT

Reflecting on the diversity of conceptualizations associated with Bright ICT, it became abundantly clear that Bright ICT can be broadly classified as Restorative and Enriching Bright ICT (see Figure 1). Restorative Bright ICT research identifies the dark side of ICT, which involves such things as cybercrime and cyberterror, and designs solutions to solve the problems, in much the same way as the Bright Internet does. By contrast, Enriching Bright ICT research creates ICT-enabled value to make society brighter for problems not caused by ICT, such as healthcare, education, and poverty problems. Both types of Bright ICT research are valuable in the sense that they contribute to social welfare.

In addition, we propose to distinguish the emphasis of Bright ICT Research by considering three additional perspectives which may be useful to increase the societal impact for both Restorative and Enriching Bright ICT research. While not all research projects may be able to include all of the three perspectives, it would be instructive for scholars to keep them in mind while crafting their research endeavors. Indeed, these perspectives may help establish a unique identity for and further distinction of Bright ICT research from what has been done in the past.

1. Societal Issues as Macro Information Society Research
2. Visionary Research by Principles
3. Goal Driven Holistic Approach

2.1. Macro Information Society Research

Management information systems for business has been a primary focus of IS research because it addresses the needs of business schools. This type of work is clearly important and will continue to be relevant. From a historical perspective, creating value for business through ICT was a primary way of contributing to society. With the development of the Internet and the ubiquity of devices such as smartphones, the volume of information outside the boundaries of the firm has escalated: no business today can survive without appropriately managing the external information and platform.

While the IT strategy for a company is doubtless important, the IT strategy outside of a company is also critical, as it relates to public policy. It would be useful for the IS community to emphasize the impact of IT strategy on society, and vice versa. These research topics can be broadly labeled *Macro Information Society (McIS)* in contrast to *Management Information Systems (MIS)* for business. The research questions addressed by McIS should deal with how ICT-based business can change society and how policy about ICT influences the society and business. This research paradigm is analogous to Macro Marketing, which studies the

external effect of marketing strategies (Bartels and Jenkins 1997).

For instance, global public policy on the subsidy of remote diagnosis for remote poor regions of the world may redefine global healthcare systems (Agarwal et al. 2010). Online education policies will disruptively change the education system, making high quality content accessible to busy business persons at low cost and at convenient times (Hiltz and Turoff 2005). The impact of these kinds of systems will be more societal in nature, although they will also influence business models. Such changes may require legislation and international agreement to legitimize operations.

Research of a similar type can be found in the area of e-commerce and Internet banking. The traditional genre of IS research on e-commerce and Internet banking focused on the business impact of electronic retailing and banking. However, the research emphasis of McIS should be the study of how the structure of the retail industry changes, how lifestyles and employment types will be transformed by the adoption of Internet-based commerce and banking. In this context, public policy will become important and business needs to understand how the policies should be changed for social and business sustainability. Understanding the interaction of business and policy is essential not only for society but also for businesses.

Another example of McIS can be found in the research on Green IT, both Green of IT and Green by IT (Jenkin et al. 2011), which will significantly influence and will be influenced by national carbon emission policies and global agreements. Smart Grid and Energy Management Systems will be empowered by ICT to enable a two-way communication infrastructure between power generators and consumers (Farhangi 2010). In this regard, the research scope that McIS deals with can be a unique characteristic of ICT-enabled Bright Society whether it is Restorative or Enriching Bright ICT.

2.2. Visionary Research by Principles

In general, the expectation is that research in IS would make a theoretical as well as empirical contribution, hence, researchers tend to limit the research scope to fit the lens of scientific validation. As noted by Benton and Craib (2011), such a piecemeal approach by the scientific research in the social sciences alone may not always warrant to grasp the entire spectrum of the social problem. This is particularly true when we need to design IT-based social systems for the future, where it may not be possible to demonstrate the validity of the new system ahead of its inception. For instance, when the concepts of supply chain management systems (Blanchard 2010) and customer relationship management systems (Kumar and Reinartz 2012) emerged in the 1990s, the solutions were not fully developed. At

that stage, there could be no empirical data to test their validity.

However, vision has driven the development and widespread adoption of supply chain management (SCM) and customer relationship management (CRM). To design such new systems, we need to articulate design principles that are essential to fulfill the envisioned goals. Although the importance of design science research is emphasized these days, reviewers and editors continue to ask for theory and data. As a consequence, authors tend to steer away from design research and focus their attention on empirical testing with well-established theories. According to the survey by Lee et al. (2015), 64% of hypotheses of IS research in the top journals deal with empirical testing of axiomatic theories that do not really need empirical testing. They argue that repeated proofs of axiomatic theories, while doubtless valuable for the progress of science, may create limited novel value for the IS profession and for society.

Research for the Bright Internet can be regarded as a typical example of visionary research with six principles (Lee 2016). The aim of Bright Internet is to eliminate the motivation for creating malicious code and illegitimate access by establishing the Principle of Origin Responsibility. We can ask the opinions of netizens whether they feel the global society needs to adopt this new Principle of Origin Responsibility to build a more safe Internet of the future (Cho and Lee 2016). However, the principle of origin responsibility alone cannot fulfill this goal because 90% of spam mails are created at compromised computers (i.e., zombie computers) (Kohavi 2014). That is why the subsequent principle, the Principle of Deliverer Responsibility, is necessary.

Furthermore, even while the IP address of origin may be identified, the users name may be anonymous. To identify the real name, the third principle, the Principle of Traceable Anonymity is necessary: It would allow the appropriate authorities to access the real name if the user has committed crimes or terrorism. However, if the fake webpage origin is likely to disappear within 24 hours as 71% of domain names do (Ostrovsky and Browker 2014) and is located in another country, we need to issue a digital search warrant in real-time to monitor millions of messages per day which should be effective across borders. That is why the fourth principle, the Principle of the Digital Search Warrant, is necessary and it requires international agreement. The above four principles are necessary to fulfill the original goal—Origin Responsibility. On the other hand, we need to design the Bright Internet without sacrificing the privacy of innocent netizens which drives to the Principle of Privacy Protection.

Finally, we need one more principle because netizens are afraid of the illegitimate surveillance by the

government. To protect citizens from such abuse of governmental power, Microsoft announced that it would report government-led hacking to the victims because netizens are very sensitive about such threats from the government. Cyber terrorists from malevolent countries are another serious threat to the security of nations and citizens. Therefore, we need the Principle of Internet Peace, which should be declared by all participating countries, and states that “Internet is a platform of peaceful communication among global inhabitants and should not be abused as a weapon for attacking other countries” (Lee 2016). If the global governance of the Bright Internet adopts this principle in agreement with all nations, we can prevent illegitimate cyberattacks by hostile countries at least during peacetime and retaliate against cyber terror countries by expelling them from use of the Internet connection (Shin and Lee 2016).

As such, a design based on these principles can be the foundation of the innovative design of visionary systems. This type of research can be creative, provocative, and generate a potentially profound impact on society. We need to adopt a paradigm of Visionary Research by Principles to support the development of the grand vision.

2.3. Goal Driven Holistic Approach

IS for business require the design of technology and strategy. Similarly, McIS for a global societal system such as the Bright Internet needs the design of technology, public policy, and international agreement. However, the academic disciplines tend to partition the technical research from policy research because each type of research requires different skills and knowledge.

For the Bright Internet, the principles drive the requirements for protocol and technology design and guide the evaluation of developed systems. If we regard the design problem as a constraint satisfaction problem (Ghedira 2013), the variables for the design of a global system are technologies, protocols, national policies, and international agreements, which need consistency among them. If these issues are studied without appropriate coordination, the problem of Internet security will never be solved. Thus, a holistic approach to the design factors is recommended.

To validate the adequacy of the design, we need to set the criteria for performance evaluation which can also be derived from the principles and subsequent goals. A prototype and test bed will be necessary to demonstrate the system and to simulate the effects of design parameters. This kind of experimental system will allow the IS research community to establish the platform of a futuristic social system design.

The parameters for sensitivity analysis in the experiments can be technology, policy, and global agreement. Widening the scope of research variables will expand the view of IS researchers and create the potential for

contribution for society. Naturally, such efforts will require multi-disciplinary collaboration between IS researchers, computer scientists and engineers, and policy researchers. As the IS research community initiates such a research, they will become a hub of holistic research.

To the extent that such activities may precede industry research and policy making, a plausible outcome is that IS research will be able to have a meaningful impact on society, and industry professionals and policy makers will be more willing to collaborate with IS researchers.

3. Closing Thoughts

We have proposed a conceptual framework for Bright ICT research by identifying two distinct categories of research: Restorative Bright ICT and Enriching Bright ICT, depending on whether the root cause of the problem being addressed is ICT. In addition, we also proposed three perspectives that can differentiate Bright ICT research from the traditional research topics, which are essential in order for ICT to create a disruptive, positive influence on society. The core foundation of the Bright ICT initiative is the visionary principle-driven holistic design of future society encompassing technology and policy as well as business models. This paradigm can be regarded as the extension of design science toward the scope of a McIS. Design research in the spirit of Bright ICT can create rich research opportunities for the next stage of analysis in an experimental and empirical setting to significantly impact society.

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References

- Agarwal R, Gao G, DesRoches C, Jha AK (2010) Research Commentary—The digital transformation of healthcare: current status and the road ahead. *Inform. Systems Res.* 21(4):796–809.
- Bartels R, Jenkins RL (1977) Macromarketing. *J. Marketing* 41(4):17–20.
- Benton T, Craib I (2011) *Philosophy of Social Science, The Philosophical Foundations of Social Thought*, 2nd ed. (Palgrave Macmillan, New York).
- Blanchard D (2010) *Supply Chain Management Best Practices*, 2nd ed. (John Wiley & Sons, Hoboken, NJ).
- Cho D, Lee JK (2016) Social norm about the principles of Bright Internet. Unpublished manuscript, KAIST, Seoul, Korea.
- Farhangi H (2010) The path of the smart grid. *Power Energy Magazine* 8(1):18–28.
- Ghedira K (2013) *Constraint Satisfaction Problems, CSP Formalism and Techniques* (Wiley & Sons, Hoboken, NJ).
- Hiltz SR, Turoff M (2005) Education goes digital: The evolution of online learning and the revolution in higher education. *Comm. ACM* 48(10):59–64.

- Jenkin TA, Webster J, McShane L (2011) An agenda for green information technology and systems research. *Inform. Organ.* 21(1):17–40.
- Kohavi L (2014) Internet threats trend report. (October). Report, CYREN, McLean, VA, http://www.cyren.com/tl_files/downloads/CYREN_Q3_2014_Trend_Report.pdf.
- Kumar V, Reinartz W (2012) *Customer Relationship Management, Concept, Strategy and Tools*, 2nd ed. (Springer, Heidelberg).
- Lee JK (2015) Research framework for AIS grand vision for the Bright ICT initiative. *MIS Quart.* 39(2):iii–xii.
- Lee JK (2016) Theory of bright Internet. Unpublished manuscript, KAIST, Seoul, Korea.
- Lee JK, Park J, Gregor S (2015) Axiomatic theory for information systems research. KAIST Working paper, Seoul, Korea.
- Ostrovsky D, Browker D (2014) Blue coat reveals security risks from “One-Day Wonders.” *Blue Coat* (August 26), <https://www.bluecoat.com/company/press-releases/blue-coat-reveals-security-risks-one-day-wonders-websites>.
- Shin Y, Lee JK (2016) Preventing state-led cyber-attacks by the Bright Internet approach. Unpublished manuscript, KAIST, Seoul, Korea.
- vom Brocke J, Stein A, Hofmann S, Tumbas S (2015) *Grand Societal Challenges in Information Systems Research and Education*. Ideas from the ERCIS Virtual Seminar Series (Springer, Heidelberg).