IoT – Towards a Research Agenda for Information Systems

Panel

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ABSTRACT

There has been different technological innovation wave in history that redefines and reshapes our societal makeup, internet of things (IoT) is emerging with a tendency to be the next wave. The emerging wave of IoT heralds a digital era with impact and influence yet to be fully ascertained. This provides unique opportunity for scholarly enquiry particularly for information system scholars. IS is a domain seating at the junction between technology, business and societal application of IT - which are also three indicative characteristics of IoT innovations. These connections between the field and IoT plus IoT’s potential for significant impact, suggests that studying IoT from an IS perspective is an endeavor worth pursuing. This panel is therefore setup to highlight possible research directions from which IoT can be studied in the discipline. Threats, opportunities, limitations and general implications of IoT are to be explored from both a practice and research perspective.

Keywords

Internet of Things (IoT), Digital Innovation, Information System, Research Agenda

INTRODUCTION

IoT is a concept that describes situations where everyday objects that we use regularly attain the capability to interact with each other independent of the human in the loop. The range of opportunities opened up by these possibilities is enormous. Consider this hypothetical IoT scenario: A #toilet can send cholesterol alert to a heart pacemaker. The #pacemaker can then notify the fridge of the recommended calorie limit for the week. The #fridge then adjusts the grocery list on the #smartphone accordingly. While going grocery shopping on a bike, the #helmet is capable of detecting a fall and calling the emergency services, if necessary. A self-driving #ambulance then uses the address to coordinate the best route with the #traffic systems. While this present a rather simple example of IoT possibilities, its potential extends beyond consumers to other areas of life such as energy, healthcare, manufacturing, transportation, retail and even government among others (Whitmore 2015, Miorandi et al. 2012). The utility of IoT is yet underexplored and the IS community can play a pivotal role in identifying, outlining and driving new and unique application areas for IoT.

Despite the positive promises of IoT innovations and how they can radically improve our lives, they inevitably are also a source of potential problems and challenges. The possibilities and scope for abuse and misuse also rises with the span and depth of IoT within individual lives and business activities (Sicari et al 2015, Dlodlo et al. 2012, Whitmore et al 2015, Li et al 2015). Some of the key areas of concern include security issues and the current limitations of technology (Qin et al 2014). Examples of this can be identified in the hacking of a 2014 Jeep Cherokee and the Nest Learning Thermostat to mention a few. Additionally, reaping the potential of IoT will require that non-energy consuming devices of today to require energy to fulfil their IoT promise. Similarly, the effectiveness of IoT applications rest on the transfer and utility of data. However, the
big data research stream have already highlighted the capacity to store data and our analytic capabilities/resources as one of the challenges for continuous data utility. These are issues and challenges that provides the motivation to stretch the current limit of knowledge in search for ways of overcoming these challenges and limiting the negative consequences of IoT.

**PANEL OVERVIEW AND OBJECTIVES**

From the advent of telephones and automobiles of the previous century to computers and smartphones in recent times, we have witnessed positive and negative consequences of any such innovation wave that goes beyond the hype cycle. Each wave comes with different changes that impact individuals, organisations and the society at large. IoT is emerging with a tendency to be the next wave (Li et al 2015). It is yet to be determined if IoT is another hype or a wave that carries noteworthy significance. A logical question would then be – is it important to give attention to studying IoT? And why? This panel is setup to explore this question and to present a research agenda towards scholarship in this direction with IoT thought leaders in the industry and in the IS field.

A starting point could be to examine the different research streams in IS and to examine how these different streams contribute to knowledge in the IoT domain. For example, can we utilize our years of experience in big data, data analytics, decision science, cloud computing to contribute to the IoT discussion? Perhaps our research on adoption and technology acceptance can offer insights to why an IoT innovation will be successful (or not) in the market. Particularly when we consider case example like the adoption struggles of Google Glass. In addition, can our several SIG’s pool resources together to inform the research community on the societal impact of IoT innovations or draw from prior studies on IS security? Information Systems has also championed methodology perspectives like design science research. Can we leverage on design science to design IoT themed research that has the potential to inform practice? Or can our behavioral research approach provide insights to possible applications of IoT? A plethora of questions and possible enquiry points abound - but first is this worth the buzz?

**PANEL LAYOUT/DESIGN**

- Panel presentation phase - 20 minutes
- Panel interaction phase - 20 minutes
- Open question and answer - 20 minutes

Panelists are required to give a 5 minutes presentation with 5 slides each. The presentation should present the position and viewpoint of individual panelist. The focus of each presentation would be the core areas of each panelist. At the end of the presentation phase, participants should have a general understanding of the a) key constructs, relevant examples, historical background b) practical perspectives, future and current trends c) theoretical and research perspectives, relationship to research methods.

The panel interaction phase would be a moderator facilitated session with preplanned questions to be discussed among the panelist. These questions will be hinged on the presentation contents vis-à-vis its relation to the Information Systems field. The four defining categories for the questions will be a) trends and future implications b) practical implications c) theoretical implications and d) implications for research design.

The third and final phase will involve an open floor questions and answers session which will be guided by the panel moderator. The session is planned to be an avenue for interactions and for participants to stimulate further discussions.

**PANEL PARTICIPANTS**

Viswanath Venkatesh

Viswanath Venkatesh is a Distinguished Professor and George and Boyce Billingsley Chair in Information Systems at the Walton College of Business, University of Arkansas. His research focuses on understanding the diffusion of technologies in organizations and society. For over two decades, he has worked with several companies and government agencies, and has rigorously studied real world phenomena. He is one of three scholars to have published more than 15 papers in MIS Quarterly (MISQ). From 2005-’14, he is the most productive in terms of publications in the premier journals in information systems, i.e., Information Systems Research and MISQ. He is widely regarded as one of the most influential scholars in business and economics, with about 43,000 citations in Google Scholar. Since 2012, he is serving as a Senior Editor (SE) at MISQ. From 2008 to 2011, he served as an SE at ISR. He is expected to contribute theoretical insights and opportunities for future research to the panel among others.
Brian Donnellan

Brian Donnellan is Professor of Information Systems Innovation at Maynooth University, Academic Director of the Innovation Value Institute and Lead Investigator in the Irish Software Research Centre, where he is leading research projects on Smart Cities and Internet-Of-Things. Prior to becoming an academic, he spent 20 years working in the ICT industry where he was responsible for the provision of Engineering Information Systems to support New Product Development. He is an expert evaluator and reviewer for the Commission of the European Union and has been guest and associate editor of several leading IS academic journals. He has published over 150 peer reviewed papers and articles in IT journals and conferences. *He is expected to highlight historical, present and future trends and related practical insights to the panel.*

Said Tabet

Said Tabet is the Technology Lead - IoT Strategy and Industry Standards Strategist in the Corporate Office of the CTO at EMC. Said is a member of the Object Management Group Board of Directors and the principal EMC representative to the Industrial Internet Consortium. He is Chair of the INCITS CS1 Secure Cloud Computing Ad-Hoc Group, and a member of the US delegation to ISO SC27. Said spent over two decades driving and contributing to various international standardization activities. He continues to work on challenges around Cloud Computing adoption, IoT, Cloud SLA and security SLA automation, Big Data Analytics and security, cyber security and best practices, Industrial Internet of Things, and Semantic Data Collaboration. Dr. Tabet is a regular speaker and panelist at industry conferences and an author/editor of book series and articles. *He is expected to relate the panel discussions to practical examples and future applications.*

Heikki Topi

Heikki Topi is Professor of Computer Information Systems and Director of Bentley Data Innovation Network at Bentley University in Waltham, MA His research focuses on human factors and usability in the context of enterprise systems, information search and data management, and the effects of time availability on human-computer interaction. His research has been published in journals such as European Journal of Information Systems, JASIST, Information Processing & Management, International Journal of Human-Computer Studies, Journal of Database Management, Small Group Research, and others. He is co-author of a leading data management textbook Modern Database Management. Heikki has contributed to national computing curriculum development and evaluation efforts in various leadership roles since early 2000s, and he is currently co-chair of the MSIS 2016 revision process. He has been a member of ACM's Education Board since Spring 2006 and has represented first AIS and then ACM on CSAB's Board since 2005. In 2015, he received the AIS Outstanding Contribution to IS Education Award. *He is expected to bring research design perspectives to the panel and contribute possible IoT research agenda.*

**EQUIPMENT REQUIREMENTS**

For an effective conduct of the panel session, the following equipment will be beneficial if available.

- A projector
- Sound system - Microphones and Speakers – (depending on the size of the allocated venue)

**REFERENCES**