

Communications of the Association for Information Systems

Volume 37

Article 38

10-2015

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Recommended Citation

Pauleen, David; Dalal, Nikunj; Rooney, David; Intezari, Ali; and Wang, Wenli (2015) "In Bed with Technology? Peril, Promise, and Prudence," *Communications of the Association for Information Systems*: Vol. 37 , Article 38.

DOI: 10.17705/1CAIS.03738

Available at: <https://aisel.aisnet.org/cais/vol37/iss1/38>

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In Bed with Technology? Peril, Promise, and Prudence

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Abstract:

Are we in bed with seductive information technologies? And what have we begat? This panel, delivered at AMCIS in Auckland on 8 December 2014, resulted in thought-provoking dialog that generated critical reflection on several themes linking technology and practical wisdom that aligned with the conference theme "Integral IS: The Embedding of Information Systems in Business, Government and Society". The panel found common ground, although each author began from a different starting position. The common ground was that neither utopian nor dystopian stances on the value of technology achieve much practical value. Instead, perennial universal insights of wisdom viewed in a contemporary, practical, and scientific context may provide a path in technology research, design, management, and use. We believe the topics addressed during the panel session, which we summarize in this paper, are vital and relevant to the information systems field as a whole. The panel's deliberations hold importance for academics and practitioners alike and have implications that extend to individuals, organizations, and society at large.

Keywords: Wisdom, Big Data, Information, Practical Wisdom, Knowledge, Technological Solutionism, Information Systems.

This manuscript was solicited by the Editor-in-Chief. It was received 04/16/2015 and was with the authors 1 month for 2 revisions.

1 Introduction

Before you become too entranced with gorgeous gadgets and mesmerizing video displays, let me remind you that information is not knowledge, knowledge is not wisdom, and wisdom is not foresight. Each grows out of the other, and we need them all.

—Arthur C. Clarke (Lathrop, 2004, p. 10).

In 2012, three of the authors of this paper presented at a panel session at the Americas Conference on Information Systems (AMCIS) 2013 on the theme: “where is the wisdom we have lost in technology?” (Dalal et al., 2013). The panel’s purpose was to start and stimulate conversations with the IS community on a broad array of individual, organizational, and societal issues at the intersection of practical wisdom and technology. The points the panelists made were well received by the audience, who, in turn, raised new issues and actively participated in an open discussion. Building on the success of the AMCIS panel, in 2013, we proposed a panel for ACIS 2014 in Auckland. The proposal, “In Bed with Technology? Peril, Promise, and Prudence”, was intended to take a critical perspective on technology and the information society that is being constructed around us. While a great deal of thoughtful commentary is available on the interplay of technology and society, we felt that what the IS community is saying is insufficient; hence, this paper and what we hope will begin a critical, necessary and ongoing dialog.

So, are we in bed with seductive information technologies, and, if so, what have we begat? Recent technological advances and technology use have raised many new questions and dilemmas for the IS field. For example, are contemporary technologies beneficial or problematic for individuals’, organizations’, and societies’ wellbeing? Why do we seem to feel more disconnected in an age of technological connectivity? How can organizations reduce technology-induced stresses and find ways to enable the mindful use of technologies? How can organizations, governments, and societies manage the use of technologies wisely? How can responsible IS practitioners and academics develop, manage, research, and teach about new technologies? We need to ask such questions to yield significant insights, increase awareness, deepen dialog, and help redesign a technology-driven future.

Given recent financial crises, corporate scandals, and technology-induced stresses and disruptions, business fields have begun to take practical wisdom seriously (Rooney, McKenna, & Leisch, 2010; Gibson, 2008). Moreover, new conferences such as Wisdom 2.0 (<http://www.wisdom2summit.com/>) have emerged with the support of technology companies such as Google and Facebook. Wisdom 2.0’s focus is on living with awareness and fostering wisdom at work amid the disruption from rapid technological change. Software vendors are developing tools for supporting wisdom. Such developments are the outcome of and reflect a need for improved trans-disciplinary understanding of a) the role of wisdom in a technology-driven world (Dalal, 2008; Pantzar, 2000), and b) the management, design, and impact of technologies in a world crying out for wisdom (Kok, 2009; Sendov, 1997; Markey, 1979).

Practical wisdom draws from many sources—including scientific knowledge—and deals with responding to contemporary challenges creatively, ethically, mindfully, and proactively. Wisdom research is increasingly interdisciplinary and is part of fields such as management, leadership, politics, psychology, sociology, gerontology, biology, neurosciences, marketing, health, and medicine (Intezari & Pauleen, 2014; Gimbel, 2014; Shotter & Tsoukas, 2014; Bangen, Meeks, & Jeste, 2013; Mehta, 2013; Sternberg, 2013; Bagozzi, Belschak, & Verbeke, 2010; Kaldjian, 2010; Meeks & Jeste, 2009; Baltes & Kunzmann, 2003). In this paper, we define practical wisdom as the sum of experience, knowledge, insight, and judgment from the individual and collective consciousness applied to the art and science of the possible to achieve excellent and ethical outcomes with genuine long-term value for the planet.

What do we discover when we view the technological landscape from various lenses of practical wisdom? In Section 2, Nikunj Dalal from Oklahoma State University questions the attitude of technological solutionism prevalent today and calls for wisdom instead. In Section 3, Ali Intezari from Massey University makes a positive case for wisdom as an integrator of human qualities and business-oriented technologies that focus on data and information processing. In Section 4, David Pauleen from Massey University and David Rooney from Macquarie University combine efforts to argue that more technology-generated data and information may not only not be the solution to today’s problems but may, in fact, be a cause of them and argue that wise use of information and technology is imperative. Finally, in Section 5, Wenli Wang brings the discussion to a thought-provoking conclusion by arguing that we should not thoughtlessly sacrifice the development of our own innate human “technology” for the shiny convenience and efficiencies of man-made technology.

2 Nikunj Dalal: Technological Solutionism and the Need for Wisdom

New technologies, whether the latest consumer gizmo or the result of fundamental breakthroughs in science, are revolutionizing our ways of living and, more importantly, what and how we think. Technologies are both friend and foe. The promise they offer is undeniable: unfettered freedom, economic efficiencies, social conveniences, and incredible potential to change the world for the better. However, even as we gush about the latest app or device in an ever-advancing frontier of techno-utopia, we should be aware of the trap of solutionism. Solutionism is an ideology rooted in the belief of the existence of simplistic benign solutions to complex problems. In the present context, this means we become aware of the *systemic* dangers of increasingly alluring and seductive technological ideas and products. Specific technological solutions are not all there is. To explore this idea, we must raise our level of analysis from individual technologies and classes of technology to sociotechnological systems. Further, we must assess (wise) integration of technology, economics, environment, and society and then go even further to the inner mind.

As information systems researchers who propose, develop, and study technology, do we have a responsibility to ask critical questions and understand the deeper implications of our technology on society, culture, and the human mind? Now, more than ever, technologies are game-changers, far more than mere contrivances, and it is no longer possible to contain the effects of technological change to a limited domain; information systems touch all aspects of human endeavor. We increasingly face fundamental questions far beyond the typical issues of the dark side of technology and risk mitigation to those involving changes in mindsets and identities with the blurring of boundaries between human beings and their technological extensions. For example, noted scientists and technologists such as Stephen Hawking, Elon Musk, and Bill Gates, warning that robots could wipe out humanity, have called for safeguards on AI.

How do we respond to such questions? Before we rush into responses, we need to know whether we comprehend the questions and the complexity of the underlying problems. Einstein has observed that a problem cannot be solved from the same level of consciousness that created it. The obvious implication is that we, individually, have to dig deeper into our consciousness to understand the issues. Thinking about technology as technologists is not enough. In his insightful book “Technology Matters” (Nye, 2006), historian David Nye concludes that technology is inseparable from being human. Here, I explore our relationship to technology from three levels: knowledge, understanding, and awareness.

2.1 Knowledge of Dangers of Individual Technologies

Most people have some knowledge of the perils of individual technologies. Typically, we glean superficial knowledge from exposure to news stories such as the security and privacy risks of sharing information on Facebook, the dangers of artificial intelligence, the security issues involved in the Internet of things, or the ability of medical devices and trackers to create deeply personal information such as health data. One may obtain even more knowledge about a specific danger if one faces a personal issue with respect to the technology such as addiction to a particular videogame, identity theft, or extreme dependence on watching television. However, the potential exists for knowledge of technologies’ dark side to be informed by understanding and awareness at deeper levels of consciousness (see Sections 2.2 and 2.3).

2.2 Understanding of Systemic Dangers of Technology

Knowledge about specific dangers of a few technologies is quite different from a holistic understanding of the pervasive influence of contemporary technology. Neil Postman coined the term technopoly to describe a state of mind that “consists in the deification of technology, which means that the culture seeks its authorization in technology, finds its satisfactions in technology, and takes its orders from technology” (Postman, 1993, p. 71). Postman believes contemporary society has become a technopoly, a view more recently echoed by Morozov, a self-proclaimed digital heretic, who, in an acerbic critique of digital technologies titled: “To Save Everything, Click Here: The Folly of Technological Solutionism” criticizes our gullibility in the solutionistic belief that technology will provide answers to all our problems (Morozov, 2013). These and other critics have pointed out the naiveté in our reliance on technologies in aspects of human culture and spirit and matters of the heart. This has also led to a tendency to measurement reductionism, which suggests that data is all-important and what cannot be measured is unimportant. Among other things, this has led to a glut of data and information, a development discussed by other panelists. All panelists suggest that there is a need for a healthy skepticism about technology. Are we as

IS researchers guilty of technological solutionism and measurement reductionism ourselves? Have we tried to go beyond the infrequent minitracks and conferences on the dark side of technology to systemically study and critique technological change? If not, why not?

2.3 Awareness of Personal Relationship with Technology

Sections 2.1 and 2.2 address particular technologies and holistic understanding of the systemic effects of technology in general, respectively. A progression to wisdom demands that we take these understandings to a yet deeper plane and become personally aware of our own individual responses to technology. What kind of mind are we bringing to the table? Awareness goes beyond information, knowledge, and intellectual understanding to encompass how one personally and existentially relates to technologies. It includes awareness of one's personal beliefs, attitudes, emotions, and behaviors that underlie technologies and technological change and an understanding of identity (the "who am I?" question) in a world of social networks and artificially intelligent robots. As an example of our awareness or the lack of it, consider how technology may redefine or change the meanings of words almost imperceptibly or subconsciously. A case in point is the term "memory", originally defined as a faculty by which the mind stores information, which later came to include RAM and secondary storage. With recent technological advances, one may ask what is human memory when digital photos can define what is remembered or when spatial memory is replaced and augmented by GPS systems. As one reflects on the meaning of commonly used terms, one may find some agreement with Postman (1993, p. 8), who observes that "technology imperiously commandeers our most important terminology. It redefines 'freedom', 'truth', 'intelligence', 'fact', 'wisdom', 'memory', 'history'—all the words we live by. And it does not pause to tell us. And we do not pause to ask.". Greater awareness may give us pause so that new contextualized meanings emerge. Awareness offers the potential to enable us to see the traps of technological solutionism and measurement reductionism and to help us go beyond solutionism to mindfully and creatively understand the problems we face as individuals, organizations, and societies.

In this section, I identify some fundamental issues in the human-technology relationship from the perspective of knowledge, understanding, and mindful awareness. This is a first step. Ultimately, wisdom inquiry may lead us to a realm far beyond questions of techno-utopia and techno-dystopia. We have to ask whether technology despite its good intent is shaping and being shaped by a clever utilitarian, optimizing, instrumental, materialistic mind—a mind that is so caught up in its intellect and measurement that it is ever harder to realize truth and freedom.

3 Ali Intezari: From Technological Solutionism to Integral Solutions

Technology helps individuals make faster and more informed decisions, facilitates social communication and interactions, and enhances individual and organizational productivity. However, contemporary socio-environmental, political, and financial crises show that technology cannot prevent or solve all the problems that we face. Nevertheless, the presence of technology in almost every aspect of our life and work often leads us to look to technology as a panacea and to underestimate the role of people in developing solutions.

Avoiding using technology is neither possible nor desirable. The fundamental question is how people and organizations can wisely use technology in a world with myriad socio-environmental and techno-political problems. Solving complex problems requires integrating technological features and human competencies. Technology, particularly information systems, supports reasoning and cognition by providing relevant and reliable information and the ability to analyze big data, while human competencies such as judgment, emotions, and empathy direct technology toward more sustainable and socially respected ends. Wisdom theory provides insight into how one can integrate technological features and human competencies to solve complex problems.

Practical wisdom is linked to how one makes decisions and then puts decisions into action. Effective decision making is critical in business: a perfect place to examine the inter-relationship between wisdom and technology. Making wise decisions requires a seamless integration of the capabilities offered by technology and the critical competencies and qualities that reside in the human mind (e.g., a priori and posteriori knowledge, judgment, insight, problem-finding and -solving, empathy, and social responsibility). Wisdom provides integration (Intezari, 2014) in several ways:

- By incorporating self- and situational awareness into using technology in dealing with problems. Wisdom involves:

- being able to judge the veracity and applicability of any available technology and information
- recognizing what data and information may be missing
- being aware of one's (the technology user's) (in)abilities, skills, and knowledge to use technology and available information to solve the problem, and
- the capacity to understand the nuances and complexity of problems in terms of multi-dimensionality, their causal multiplicity and interconnectedness, the context, and the user. Central to this understanding is whether and to what extent the technology user/decision maker themselves are part of the problem and solution.
- By using a multi-perspective consideration in articulating complex problems and identifying the alternative ways that technology can effectively address the causal diversity and multi-dimensionality of complex problems. The multi-perspective consideration allows for the inclusion of:
 - a wide range of data sources
 - the vulnerability to variety, inconsistency, inconstancy, and bias when interpreting, communicating, and operationalizing data and information
 - the diversity of stakeholders and expectations, and
 - the short- and long-term consequences of any particular decision and use of technology.
- By implementing knowledge to identify and address problems. The knowledge includes both:
 - a priori knowledge, and
 - posteriori knowledge.
- By enhancing the reflective capacity to:
 - question core assumptions self, technology, and the world, and
 - (re)evaluate our perception of the nature and criticality of problems.

Self-situational awareness: awareness of self refers to the extent to which an individual or organizational user of technology has a thorough understanding of their own (in)abilities, strengths, weaknesses, knowledge and lack of knowledge, personal values and beliefs, and their underlying assumptions about their interactions with the external world. Awareness of self and situation provides the decision maker with a deep comprehension of the interconnectedness of the decision maker (the technology user), the surrounding environment, and the technology, and it is critical in understanding what can and what must be done (Ardelt, 2004; Hays, 2010).

Multi-perspective consideration: wisdom reflects an understanding of multiple perspectives and multiple data sources. Wisely using technology to solve complex problems engages the recognition, evaluation, and syntheses of a) alternative information and data sources, b) multiple interpretations of the data and information and multiple approaches to analysis, c) diversity of stakeholders and expectations, and d) short- and long-term consequences of using technology. Wisely using technology requires a certain level of not only knowledge of how to use technology but also knowledge about the most appropriate use of technology in terms of the impacts of its use on individuals' wellbeing.

Knowledge capacity: effective decisions about a complex problem require one to accurately evaluate and understand it, its causes, context, possible alternatives, and any likely consequences of each alternative. To gain an accurate evaluation and understanding requires one to not only factually and rigorously analyze the problem and the decision circumstances but also to apply a priori and posteriori knowledge. A priori knowledge is independent of one's particular experiences, whereas a posteriori knowledge derives from experience (Kitcher, 1980). Wisely implementing technology and data and information analysis to deal with complex problems allows for one to incorporate a priori and posteriori knowledge into problem-finding and -solving. Knowledge capacity engages reflective capacity to learn from experiences and to apply lessons learned from experiences to decision situations.

Reflective capacity: in addition to self- and situational awareness and multi-perspectives, wisely using technology requires a high level of reflective capacity. Reflective capacity can help the decision maker avoid taking any important assumptions, practices, and experiences for granted. The reflective capacity refers to the extent to which one questions the core assumptions underlying their beliefs and perspectives about the relationship between the technology user, technology, the problem, and other people. This includes whether individual and communal assumptions must be fortified or revised and fundamentally

reformed. Reflective capacity enables the user to (re)evaluate their perceptions of the nature of the problem and whether the individual and communal assumptions about the veracity and applicability of the available technology and information are correct. Wisely using technology relies on using reasonable caution about where and how the technology is likely to fail and, therefore, on planning to pre-empt this. Reflective capacity can enhance self- and situational awareness and multi-perspective consideration.

Interweaving technological features (in terms of ubiquitous information, big data, and analytical abilities) with human competencies (e.g. judgment, intuition, and empathy) via awareness, multi-perspective consideration, and reflective capacity provides multiple points of entry for one to critically evaluate a) the incorporation of technology and information systems in decision making, and b) the consequences of decisions. Wisdom fosters an integrative and holistic understanding of self and the world around us.

3.1 Conclusions

Effective decisions in the volatile business world rely on technological abilities and human competencies. Contemporary problems, being socio-environmentally, economically, and politically interwoven, are too complex to address by solely relying on technology and information or human competencies. Recognizing and incorporating these two sets of technological capabilities and human qualities into decision making and practices requires an overarching integrative framework. Wisdom as a process of practice and development (Intezari, 2014) enables business leaders and policy makers to adopt such a framework through engaging a deep awareness of self and the surrounding environment, considering multiple perspectives and a priori and posteriori knowledge, and critically reflecting on core assumptions and practices. Individuals can more effectively address complex problems when applying such an integrative approach is applied as opposed to solely relying on either technological abilities or human competencies. The interwoven nature of social, economic, environmental, and political concerns at the local and global levels highlights the need to pause and look beyond technological solutionism to integral wisdom.

4 David Pauleen and David Rooney: In Bed with Questionable Company? Why Managers Need to Wise Up about Technology-generated Data and Information

“The very possibility of fallibility seemed to be discounted because of the way the entire rating process was enshrouded with images of “rocket science” and quantitatively rigorous analytical methods”
(Carruthers, 2010, p. 166).

Utopian and dystopian narratives of technology are both equally flawed, so let's try a wisdom narrative of technology instead. In the above quote, Carruthers (2010) sums up one of the key failings of management during the recent global financial crises: the lack of a critical perspective on technology-generated information. In this section, we caution against over-relying on technology-generated data and information and propose wisdom as a source of comparative advantage in what is rapidly becoming a technology-dominated society.

Our questions are will strategic advantage based on data, information, and knowledge erode quickly (as Carr (2003) has argued was the case with IT) and is wisdom a new source of strategic advantage?

4.1 Business Data, Information, and Knowledge

We suggest that information, along with big data, has become another commodity, ubiquitous and available for a price (Antonelli, 1998). And, yet, an overweening reliance on data, information, and knowledge has helped to create its own problems such as the global financial crisis (Rooney, Mandeville, & Kastle, 2013). Furthermore, even as the age of ubiquitous information and specialized knowledge is upon us, the obvious challenge is being able to judge what data, information, and knowledge is valuable and what is not. An equally important challenge is knowing when and what important information is missing. How can companies get the right information and knowledge to meet the specific needs of clients, corporate social responsibility, and their own internal challenges? How can companies select the useful from the not while recognizing critical gaps in information and apply information in ways that change for the better their corporate strategies?

For the last ten years or so, knowledge management (KM) has helped create, diffuse, and apply knowledge. Its proponents claim KM leads to innovation, organizational learning, and competitive

advantage. In KM, knowledge is usually defined as a kind of “value-added information”. In a world of ubiquitous information, anything that can add value to information is a good thing. However, even more valuable to organizations is that KM often involves finding and sharing the information and knowledge that resides in employees’ heads. This knowledge is potentially unique and valuable, particularly when it involves the kind of abstract knowledge that leads to creativity and innovation and that can be applied to challenging business problems.

Even if high-quality knowledge in the form of highly-qualified employees and state of the art information systems reside in a company, this knowledge may be inadequate for the challenges faced in an ever more complex environment. Moreover, expert knowledge workers may be powerful and use their knowledge for political purposes, further complicating workplaces (Graham & Rooney, 2001). Moreover, knowledgeable people do not automatically have good judgment, insight, or wisdom (Shotter & Tsoukas, 2014).

A rarely noted limitation of codified knowledge is that it is built on information and experience from the past. In this sense, knowledge is, by definition, old news. Meanwhile, the world is turning and the future is unknowable. As most things seem to continue on a linear trajectory, an important predictor of the future is the past and “old news” knowledge continues to have utility: if people bought your products yesterday and today, they are likely to do so tomorrow unless, of course, something unexpected happens, such as a “black swan” event. The top 100 companies of the last decade are not the same this decade. The subprime mortgage crisis took most by surprise and ongoing global financial challenges continue to befuddle policy makers (Rooney & McKenna, 2008). In our characterization of it, codified knowledge did not help leaders predict or prevent the global economic turmoil of recent years, nor apparently was currently available information and knowledge on its own enough to see us through this crisis. Codified knowledge on its own is not enough to guide leaders to lead when challenged by major economic change and the unpredictable in general (McKenna, Rooney, & Boal, 2009).

Some argue that much codified knowledge is developed through detailed empirical research and is used to build predictive models of aspects of reality and, thus, dismiss our “old news” position. A remarkable aspect of knowledge-intensive service providers is the extent to which they have fallen head over heels in love with abstract, predictive modeling to anticipate the future. Our response to this view is that abstract predictive modeling may work in a linear environment but it has a poor record with black swan events. Some, such as Taleb (2007), have written extensively on major failings of modeling in the financial sector. Moreover, predictive algorithmic knowledge is subject to bias or even censorship that can omit vital information and knowledge from the calculus. Censorship and omission may be deliberate such as when companies such as Google make deliberate choices about what to include or exclude in search engine results (Morozov, 2013). However, missing information is also likely to be the result of various cultural and cognitive biases, inconsistencies, and limitations, which all of us are subject to various degrees (Kahneman, 2011). When bias and censorship are built into predictive systems, the results are potentially devastating.

So what are we left with if information and data, the power of abstract predictive modeling, and knowledge in general have serious limits in an unpredictable world? Is there an alternative?

4.2 Wisdom

Social practice wisdom (SPW) (Rooney, 2013) is a practical form of wisdom with important implications for responsibly dealing with technology, ubiquitous information, and the unpredictable futures. What follows are some specific and applicable aspects of SPW.

SPW (Rooney, 2013) distills Aristotelian and contemporary approaches to life that incorporates intellectual nous and ethical virtues to create excellence in thought and action. Fundamental to SPW is the ability to use one’s knowledge, skills, ethics, insight, and judgment and yet remain open to new ideas, experiences, and critique and deal with the particular situation at hand. Thus, adapted to the business world, SPW allows for an appropriate integration of cognitive and personal qualities that can generate insight, composure, and motivation to deploy the resources needed to act successfully and with integrity in a complex, emergent world.

The SPW approach contains five important aspects that one must be willing to incorporate into one’s thinking and behavior:

1. Qualities of mind: an aware and actively open mind with habituated dispositions that support innate inclinations for positive social action. This involves mindfulness, equanimity, and self-

- knowledge needed to understand uncertainty and situated relativities of life, including values, culture, and politics.
2. Knowledge, insight and reason: using knowledge (including self-knowledge, social, cultural, economic, and political knowledge) and transcendent ability (imagination, creativity, insight, foresight, hindsight, etc.) towards reflecting and reasoning for achieving social excellence and creating well-being.
 3. Ethical and moral skill: pro-social behavior. This includes moral skill, careful consideration and understanding of people's emotional, social, and material needs, empathy, and compassion to find the right and ethical (virtuous) thing to do.
 4. Praxis or wise action: esthetic ability, creativity, skill, experience, understanding, mastery, and judgment for responsibly using knowledge, power, and communication. This involves knowing why, how, and when to adapt to the environment and why, how, and when to change it.
 5. Creating positive and sustainable outcomes for long-term change to the conditions of life: this involves being a galvanizing leader and artful communicator who effects pro-social change with exceptional outcomes. Creating positive, pro-social cultures and communities is a central element of this.

Contrary to what the data-information-knowledge-wisdom hierarchy implies, wisdom is not created by having more data, information, knowledge, or intelligence; indeed, Boddy (2011) has proposed corporate psychopaths can possess a great deal of knowledge and enormous amounts of information and, with it, create wide swaths of destruction. Wisdom, rather, results from the integration of the five principles of SPW. One can be wise without the advantage of long years of formal education or a high IQ.

Precipitating the global financial crises, generalized agency models based on historical data were used to calculate the default rate of subprime mortgages (Carruthers, 2010). However, the data used was insufficient and was, therefore, an unreliable input for the investment decisions. This led to highly destructive misjudgments. In this instance, the overwhelming reliance on abstract analysis overshadowed human judgment. Leaders need wisdom to enrich abstract knowledge with meaning and perspective. Only then will abstract knowledge lead to more prudent and sustainable decisions, which can result in wise outcomes (Rooney et al., 2013).

4.3 Discussion: So, Who Are You in Bed with?

Through acquiring and analyzing big data, the advocates of these technologies not only promise real-time understanding of events but also hope to offer solutions before problems even materialize. The attraction is seductive. However, the analysts are less than perfect and are prone to error, technical limitations, incompetence, manipulation, and malfeasance: not good bedfellows, as it turns out. This means all of us must be prepared to be critically engaged, insightful—even prescient—and to act responsibly, prudently, and wisely when decision making and action taking are intimately connected with technology-derived inputs. Information and knowledge on their own cannot provide managers with these abilities. Ultimately, practices that are the human embodiment of wisdom—the qualities of mind, reasoning, virtues, and praxis noted as SPW—are exemplary everyday human practices. Moreover, we also believe that these abilities are beneficial not only in terms of business intelligence and for selecting and applying information but also (and more importantly) for understanding and building relationships with people. People are the ones who have trust, insight, judgment, and knowledge—not databases or algorithmic knowledge (Dunne, 1997). People are the basis of social networks, the importance of which is growing exponentially due to communications technology. These networks, when used prudently, are the conduits for the free flow of information and the knowledge that its interpretation creates (Rooney et al., 2013).

One must choose their bed companion wisely. We argue that the intellectual, logistical, social, and ethical demands of working in a global knowledge economy are considerable and can only be enhanced by wisdom.

We believe that much of the difference between merely talented or intelligent business leaders and those who excel through wisdom lies in what goes on in their minds, particularly with respect to factors such as how they view and use information and knowledge, their attention to building skills in judgment, whether they make ethical decisions, whether they develop openness to new ideas, and their emotional intelligence, communication skills, and balanced self-esteem (Vago & Silbersweig, 2012). To have wisdom, one must have particular attitudes toward knowledge (Tsoukas, 2005), people, and responsibility (and this is where KM tends to fall short).

These attitudes are reflected in the kinds of working epistemologies, ontologies, and axiologies that business leaders use (Flyvbjerg, 2001). Integrated epistemologies (ideas about knowledge), ontologies (assumptions about reality), and axiologies (understandings of value and values) (Eikeland, 2008) are rare. In practical terms, integration manifests in wise people as the cohesiveness and coherence of their experience, empathy, insight, creativity, and judgment with each other and reality. We suggest that the capacity to integrate well across all these dimensions is important in an unpredictable world and is inextricably linked to wisdom. The over-abundance of information makes this ability more important.

Wisdom needs abstract knowledge to be integrated with the particular conditions a manager faces in a particular time and place. Generalized, impersonal knowledge, therefore, is not anathema to wisdom, but it should be integrated and also be informed by empathy and social and emotional intelligence. As such, we call for a balance between abstraction, personal engagement, and reflexively purposive action in a specific context (Tsoukas, 2005). An example where personal engagement and reflexivity is absent and the harm is evident is computer-driven capital market trading that relies on massive information and data sets and abstract theoretical knowledge (algorithms). Most of the recent financial meltdown can be understood as the triumph of uncontrolled abstract knowledge over prudence, empathy, and social intelligence. Clearly, a knowledge-based economy requires more than just information and knowledge (Graham & Rooney, 2001).

While there is no shortage of knowledge or know-how, theory, or practical experience in the world of management, it is integrating quality of wisdom that is scarce. Those who excel through wisdom are likely to have a clearer and more sophisticated sense of what is right and wrong, a clearer vision of what is happening around them, sharper insights about the future, better ideas, and a better capacity to translate their ideas into excellent practice. Given this situation, management for wisdom could never simply be concerned with databases, facticity, and information, nor with acquiring “stocks” of knowledge or even abstract predictive power; rather, it is about advice giving, decision making, and action that is responsible, prudent, and wise.

4.4 Conclusions

While information still matters, it is not enough. Even knowledge is not sufficient when change is inevitable, fast-paced, and unpredictable. Being prepared to successfully meet an unpredictable future, a company may rely on outsourcing to specialized firms or developing in-house talent. However, outsourcing can't work for everything, and making decisions in a difficult and uncertain market will always need more than information and numbers on a spreadsheet: managerial wisdom is the rare commodity that gives a genuine and inimitable competitive advantage.

Turning to wisdom is not for the faint of heart. Those who are afraid that it might be too touchy-feely or too vague for the hard-nosed business world are out of touch. It may also frighten those who fear they may be exposed as “unwise”. However, it is pure folly to dismiss the best of humankind's thinking and excellence in practice. In the end, more and more information, more and more knowledge, and more and more expertise have proven to be insufficient to deal with the problems the world faces. Our best hope is to adopt wisdom as a social practice.

A critical, open appraisal of the points raised in this section should convince even an obdurate skeptic of the need to look to the evolved human qualities inherent in wisdom before jumping into bed with big data and predictive algorithmic software to cope with a complex unpredictable future.

5 Wenli Wang: Technology and Wisdom: Passive Seduction and Thoughtful Resistance

A person is tempted by seduction only when an underlying desire or desires exist. The technology industry arouses consumers' desires for newer “improved” gadgets by advertising and creating accelerated obsolescence of still-functional ones. If one has practical wisdom about what one truly needs and is vigilant about watching their desire(s), one would not be lured easily into the technology industry's sales pitch; rather, there would be a space of freedom to set and maintain appropriate consumption/use boundaries. Everyone is different—where to draw the boundaries depends on one's own needs. There is no need to argue about whether technology is useful or not as many people benefit from it; the question is how pervasive should technology be in one's daily life?

To know what technology is truly needed, people can reflect on this question: what is the most important pursuit in my life: spiritual awakening or material riches? Love for humanity or fame and fortune? Peace at all times or victory at all times? Perhaps these are not simplistically binary choices but, once a person's overall objective is clear, one becomes more aware of the meaning of their daily life and, subsequently, one's relationship to technology.

There are benefits and opportunity costs of using technology. Pursuing objectives requires time and energy. Life is a race against time: there is only so much time in one's life. What percentage of it can be labeled as "quality time" spent achieving one's life purpose? What percentage of it is "wasted" on transitory pleasures? Does technology provide a bigger playground for time wasting or should it reduce unnecessary waste and increase efficiency of handling necessities so that more time is saved for achieving meaningful life purposes?

There is no doubt that technology facilitates human interaction: making a phone call, writing a text message, or googling an answer to a question saves time. However, handling calls or texting with no substantial meaning can waste time. How many times a day does one reply to a message with "ok"? One must question the instances where such usage is clearly a waste of time for both sender and receiver. If such time gets totaled up for everyone in the world with a cell phone, what would be the person hours wasted that could have been used for more productive meaningful endeavors? And this is just for simple "ok" messages. Think of all the funny pet videos watched, chain emails read and forwarded, advertisements carelessly clicked on or involuntarily watched, and spam glanced at and deleted? Using half an hour a day to process meaningless information does not seem to be much; however, such waste adds up significantly over time.

People instinctively know about time's preciousness. Empirical research has shown that users in online spaces are more likely to respond to simpler messages, generate simpler responses, and even terminate active participation in overloaded mass interactions (Jones, David, & Rafaeli, 2004). Information overload seems to be the norm—not the exception. Technology makes access to information easier and, hence, more tempting to fall into. It also enlarges one's pool of diversions/distractions to include those of Facebook friends and the not-all-that-relevant world happenings repeatedly reported in the public media and social networks. However, there is a limit to how much information one can or should really process.

Time is limited and so is one's energy. User activities via technology consume energy; no matter how diligently physical ergonomics are attended to, users still typically get eye strain, shoulder and back pain, and other forms of adverse effects from too much time spent sitting and reading from computer screens. We know that a sedentary lifestyle is hazardous to our health but still find it difficult to resist the seduction of the small screen (or even multiple screens). No one has said that working in front of computers is rejuvenating. It could be entertaining, informative, useful in getting things done or producing income, but all of these things come with concomitant costs of energy consumption and detriments to health. To balance this, we should apply practical wisdom to choosing rejuvenating activities away from the screen(s). Texting, hanging out in Facebook, or watching meaningless YouTube videos, while still sitting and staring at the screen, is not an active break from cubicle computer work.

Interestingly, do people consume technology or does technology consume people? For some, technology has become a part of everything they do, say, and think. But should it be this way and, if so, to what extent? Google can provide a factual answer but cannot truly answer the big questions. Technology can both shorten and widen the distance between people. Soldiers serving in the military far away from home can see their child walk. Teenagers sitting at a family dinner can connect to their friends via smartphone but may miss the quality time with their loved ones right across the table. Technology should only enhance but not replace real human interactions. After all, human life and interactions are natural and sacred; technology is not. The advice "everything is good in moderation" includes technology, too. One may embrace the necessities and efficiencies of technology but should never get lost in technology and forget one's life purpose(s). It is the living in the real world of nature, rather than the virtual world of artifacts, that can make life perfect.

IS practitioners and academics, as the architectural designers of the "digital earth" for its net-citizens, have the undeniable responsibility of mindfully creating safe, productive, and sustainable digital environments that encourage ethical, peaceful, and natural user experiences. As French philosopher Voltaire (1832) has put it, "with great power comes great responsibility". One should have the freedom and the practical wisdom to discern the role of technology in one's life; the IS community should, through IS design, respect

and support the pursuit of such individual freedom and wisdom and lead the net-citizens with collective practical wisdom rather than tempting seductions.

6 Conclusions

The panel session involved considerable discussion with audience members who were from both academia and industry. We believe the panelists have collectively found a common ground, although each author began from different starting positions. The common ground is that neither utopian nor dystopian stances on the value of technology achieve much practical value. Our thoughtful response to this observation is to take the wisdom path in technology research and use. There are many perils in technology and also much promise; what we don't know is how much prudence there is. Now is the time to begin a global research program in the IS field that assesses the prudence of IS technology and to use those assessments to chart the "sociotechnical" path forward. Practical wisdom provides an overarching framework with which the IS field can explore the design, management, implementation, use, and impact of IS artifacts. In Table 1, we offer some areas in which research can take place and possible research questions to pursue.

Table 1. Suggested Research Areas and Questions

Suggested areas of research	Wisdom perspectives and technology: setting a research agenda
Technological solutionism	What sorts of problems can technologies best address and for what issues may technological solutions be limited or limiting in significant ways?
Interdisciplinary perspectives	How do Western and Eastern wisdom traditions, theologies, and spiritual approaches affect our relationship with and use of technologies?
Organizations & technology	What new organizational forms may be needed in a technology-driven world?
Philosophy & technology	How can technologies be developed and implemented through an integrative contribution of phronesis, sophia, and episteme?
Learning & technology	How can issues dealing with wisdom and technology be discussed and incorporated in educational curricula?
Emergent technology	How can we critically understand new phenomena emerging in a technology-driven world?

We believe the topics addressed during the panel session and summarized in this paper are vital and relevant to the information systems field as a whole, of importance to academics and practitioners alike, and have implications that extend to individuals, organizations, and society at large. The discussion identifies new areas of study for interested scholars and sheds light on new aspects of the human-technology relationship. In addition to scholars, practitioners, and technology users, our discussion has implications for technology developers by suggesting new directions in designing and developing technology. While the rational reasoning underlying the design and development of technologies has profoundly shaped the implications of technology, we argue that the use of technology requires a critical review. We hope that any positive changes in the use of technology to enhance human well-being can also inform the design and development of technology for ethical, effective, creative, and mindful contributions to individual, organizational, societal, and planetary challenges.

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