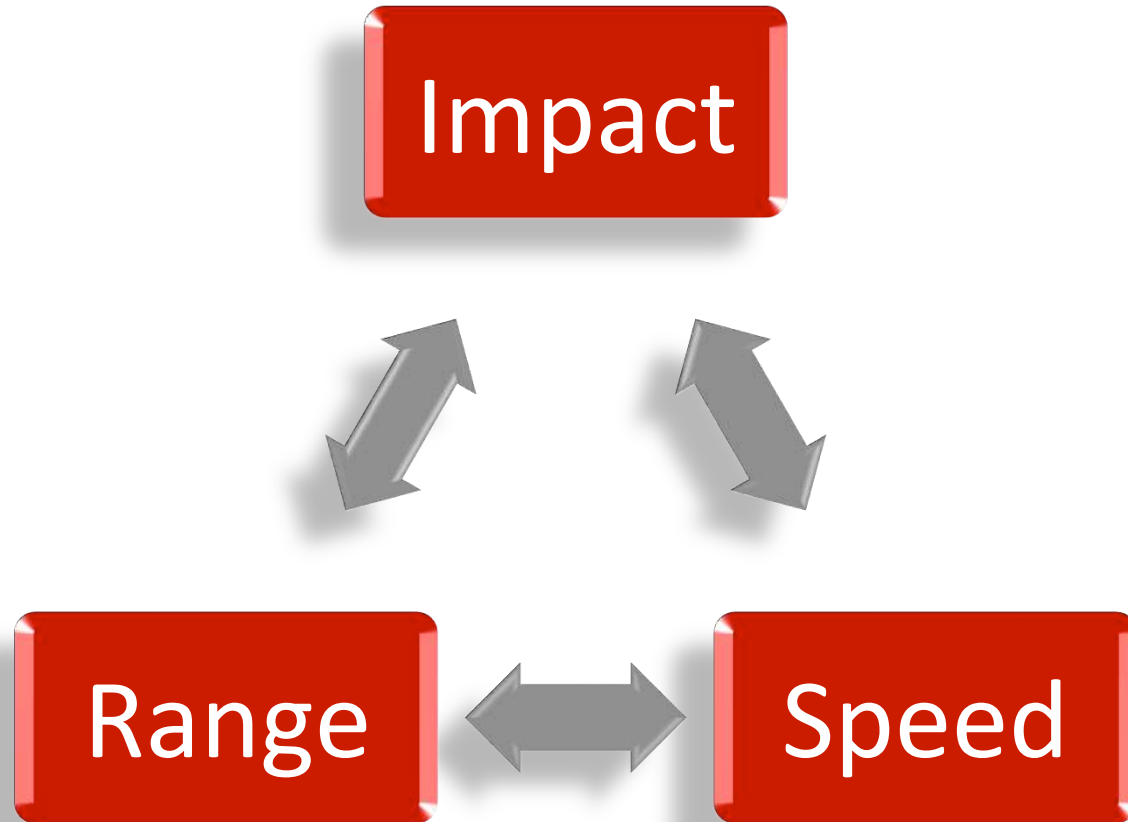


Avoiding Type III Errors: Formulating IS Research Problems that Matter

Arun Rai
Georgia State University

Presented at
National University of Singapore
June 21, 2017

The MIS Quarterly Trifecta





EDITOR'S COMMENTS

Avoiding Type III Errors: Formulating IS Research Problems that Matter

When Do Type III Errors Happen

**A researcher answers
the wrong question
using the right
methods**

Mitroff, I. I., and Silvers, A. 2009. *Dirty Rotten Strategies: How We Trick Ourselves and Others into Solving the Wrong Problems Precisely*, Stanford, CA: Stanford University Press

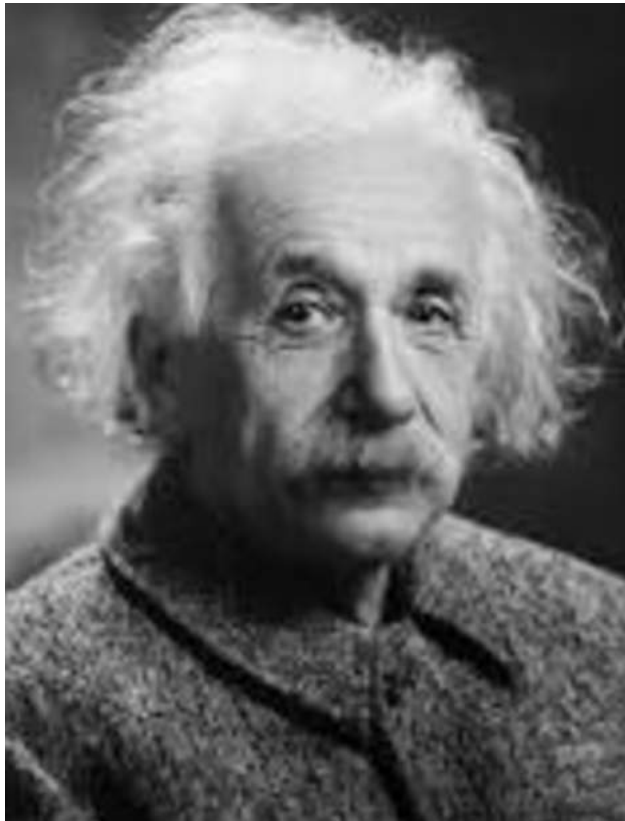
What's Worse

The wrong solution to the right problem

OR

The right solution to the wrong problem

Formulate the Research Problem So the Answer to the Question Will Matter



Albert Einstein

“The formulation of a problem is often more essential than its solution, which may be merely a matter of mathematical or experimental skill”

Important Vs. Interesting Problems



Any scientist of any age who wants to make important discoveries must study **important** problems. Dull or piffling problems yield dull or piffling answers. It is not enough that a problem should be interesting—**almost any problem is interesting if it is studied in sufficient depth ... the problem must be such that it matters what the answer is—**whether to science generally or to mankind.

P.B. Medawar

Nobel Laureate in Medicine and Physiology, 1979

Types of Value that the Answer to the Research Question Can Create



H.A. Simon
Nobel Laureate in Economic Sciences, 1978

1. **Scholarly**, advancing the area under study in fundamental ways that influence future progress
2. **Practical utility**, changing the state of affairs in the world
3. **Aesthetics**, arising from *powerful simplicity*

Simon, H. A. 1991. "Random Thoughts on Methods of Research," Unpublished Manuscript, Carnegie Mellon University, Pittsburgh, PA.

MISQ Expectations on Value

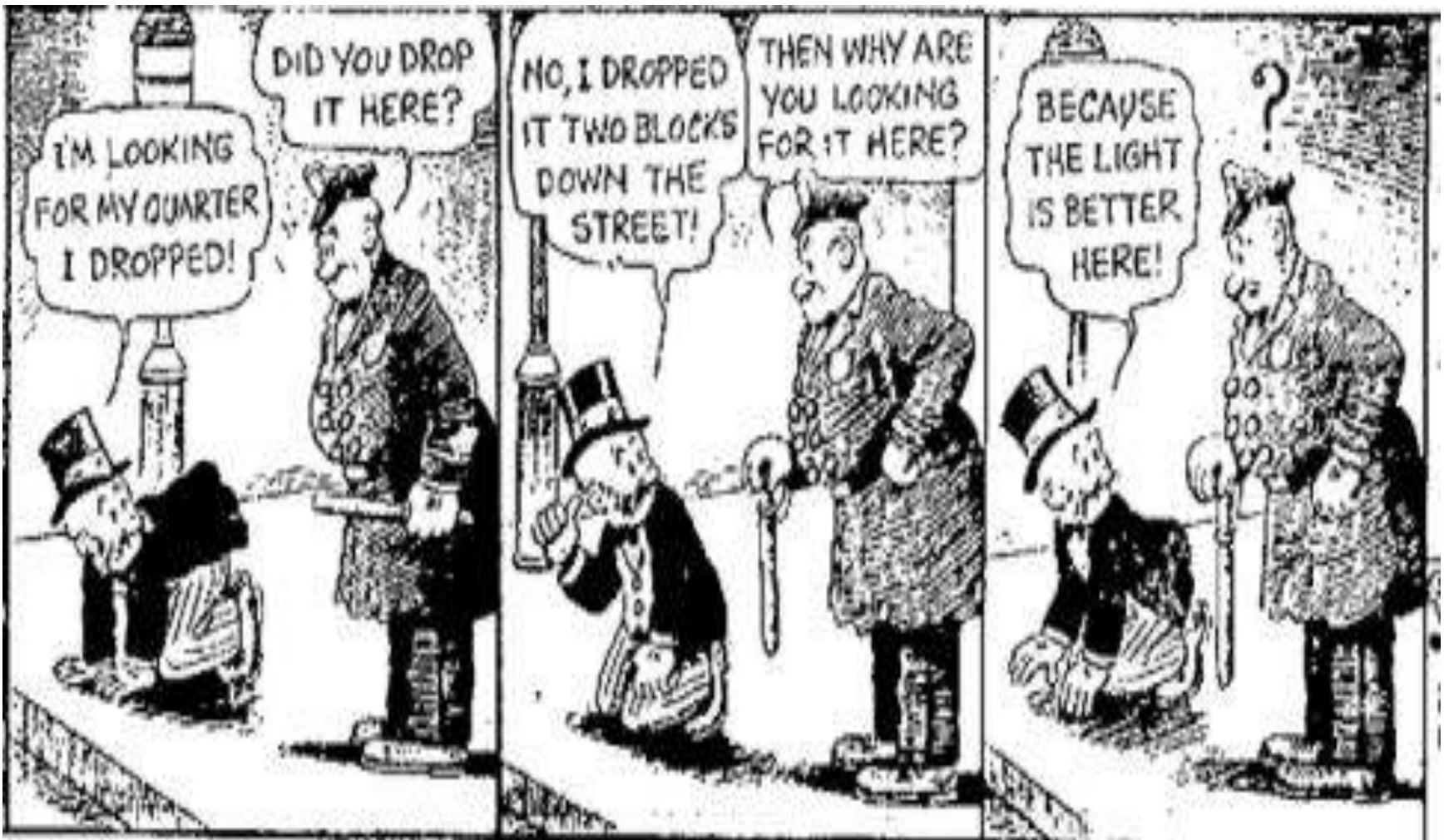
- **Required:** Significant scholarly value
- **Highly desired:** Practical utility, broader impact on business and society
- **Ideal:** All three—*scholarly, practical, aesthetic*

**Formulate the
Research Problem So
the Answer to the
Question Will Matter**



**Safeguard Against Key Risks in
Formulating Research Problems**

First, The Streetlight Effect



CAUTION

Maintain focus on important problems, not easy-to-access datasets

The Streetlight Effect (Potentially) Exacerbated By Easy-to-Access Data



The White House
Office of the Press Secretary

For Immediate Release

May 09, 2013

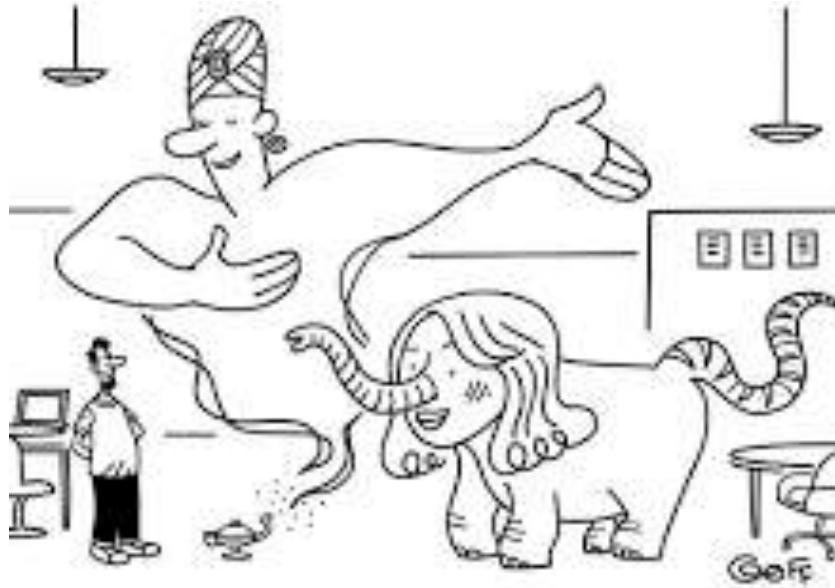
Executive Order -- Making Open and Machine Readable the New Default for Government Information

EXECUTIVE ORDER

MAKING OPEN AND MACHINE READABLE THE NEW DEFAULT FOR GOVERNMENT INFORMATION



The Streetlight Effect Exacerbated By Competency Traps in Theories and Methods



"Meet Scarledoopython - you did ask for Scarlett Johansson, Hadoop, and Python?" ©Durocette



"After closer investigation, it's become clear that we need to enter more than one value."

CAUTION

Easy to Use Tools Without Understanding the Data

Second, Being Solution-Driven Rather Than Problem-Minded

Advancing a new theory or method for an **unclear or pseudo problem**

More likely the researcher will solve the wrong problem by applying the right methods

The Law of the Hammer



If the only tool you have is a hammer, everything looks like a nail.

Abraham Maslow - The Psychology of Science - 1966

Third, Gap-Spotting and Gap-Patching— But Does the Gap Matter



Fourth, Myopic Problem Formulation While Overlooking the Generic Archetypal Problem

Sole focus on an immediate practical problem without evaluating how it relates to a more generic, archetypal problem



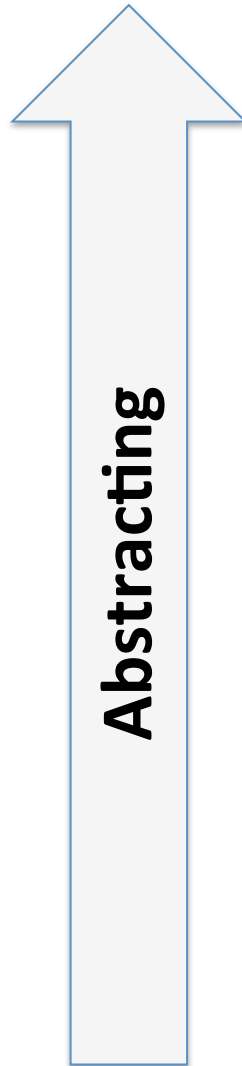
How IS (along with other means) can persuade individuals to modify behaviors to comply with a new set of behavioral norms necessary to attain goals



How IS (along with other means) can persuade patients with chronic diseases to make behavioral modification to comply with therapy



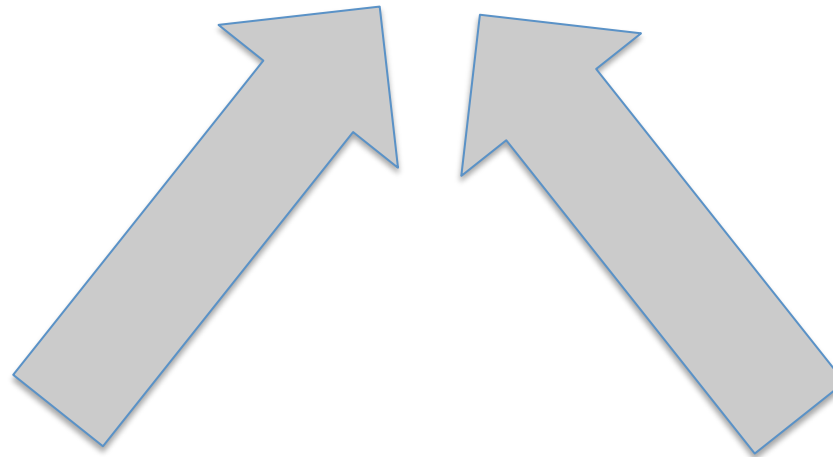
How intelligent wearable devices can persuade diabetic patients to make necessary behavioral changes to comply with therapy



Avoiding Myopic Problem Formulation— Linking to Generic Archetypal Problem

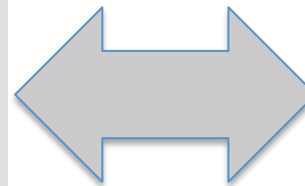
**Link Immediate Problem with Accreted
Knowledge at the Level of the Generic Problem**

**Formulate
problem to be less
transient and
idiosyncratic, and
for scholarly
impact**



**Two-fold
Grounding**

Up-close:
Perspective of those
experiencing the
particular problem



Afar:
Generalizable
characteristics of
the problem domain

Fifth, The Goldilocks Principle— Excessive or Marginal Scope



Is the problem formulation too narrow seeking to know “everything about nothing” or too diffused seeking to know “nothing about everything”?



The expert knows more and more
about less and less until he knows
everything about nothing.

— Mahatma Gandhi —

McGrath, J. E., Martin, J. M., and Kulka, R. A. 1982. Judgment Calls in Research (Vol. 2), Beverley Hills, CA: Sage Publications.

Sixth, The Answer to the Question is Derivative to Current Understanding (1)

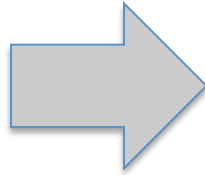
Affirming “gravity works in my kitchen”

- Reifying well-established theories or models in a new context
- Concluding that the solution works in a different setting
- Straight-up applications from another discipline: “Have theory will travel” (Weber 1992)

“Novelty is an essential component of contributions to science. No prizes are awarded for being second to discover a scientific law” (Simon 1991).

Leveraging Context—Answer to the Question is Not Derivative to Current Understanding

Move context to the foreground to reformulate problem

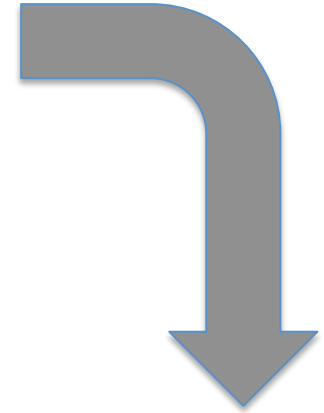


- **Challenge assumptions**
- **Change in the meaning of constructs**
- **Change in the functional form of relationship**

Formulate the Research Problem So the Answer to the Question Will Matter



Safeguard Against Key Risks in Formulating Research Problems



Being Disciplinary While Being Interdisciplinary

Boundaries of IS-related Phenomena

THEN: Stable



*Arrival of the Industrial Revolution
Opening Ceremony, 2012 London Olympics*

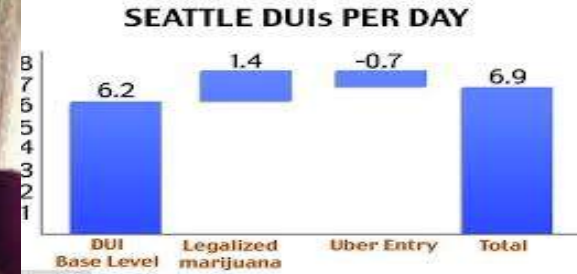
**Systems for planning and control
of new socioeconomic realities
made possible by industrial-age
technologies**

NOW: Shifting

- **Expanding**
- **Granulizing**
- **Creating**
- **Blurring**

**Systems to generate new
socioeconomic realities
made possible by digital
technologies**

Expanding Boundaries of ICT Impacts: Business to Business & Society

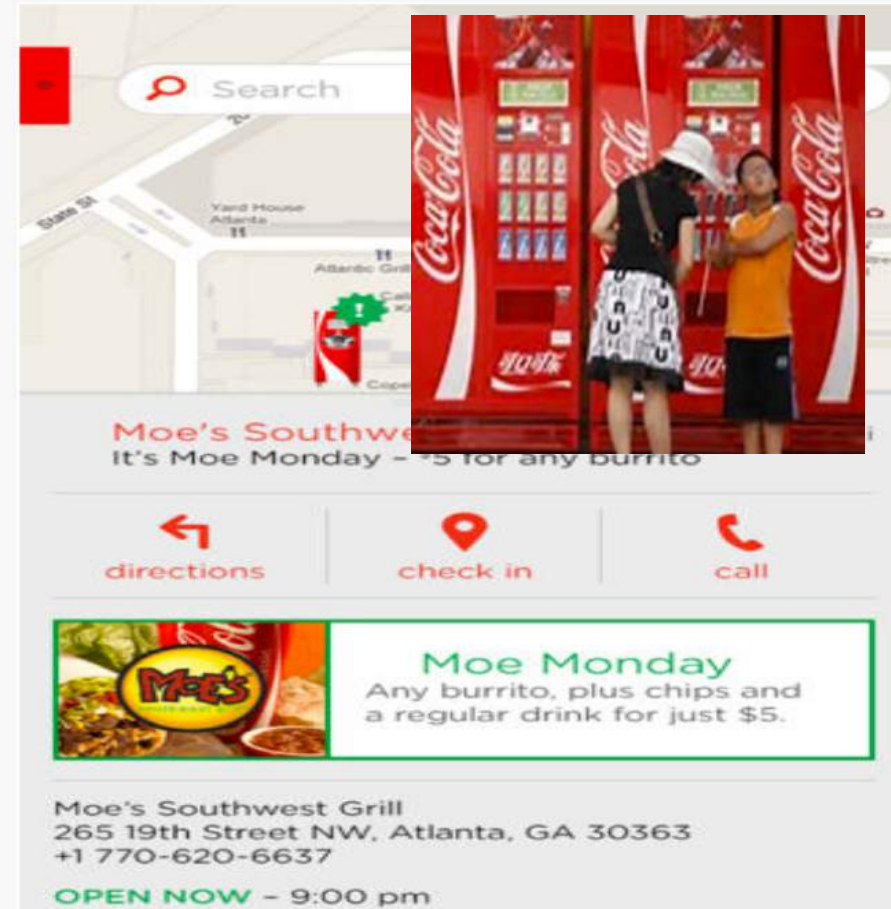


Granulizing Context Awareness: Coarse Characteristics to Granular Traces



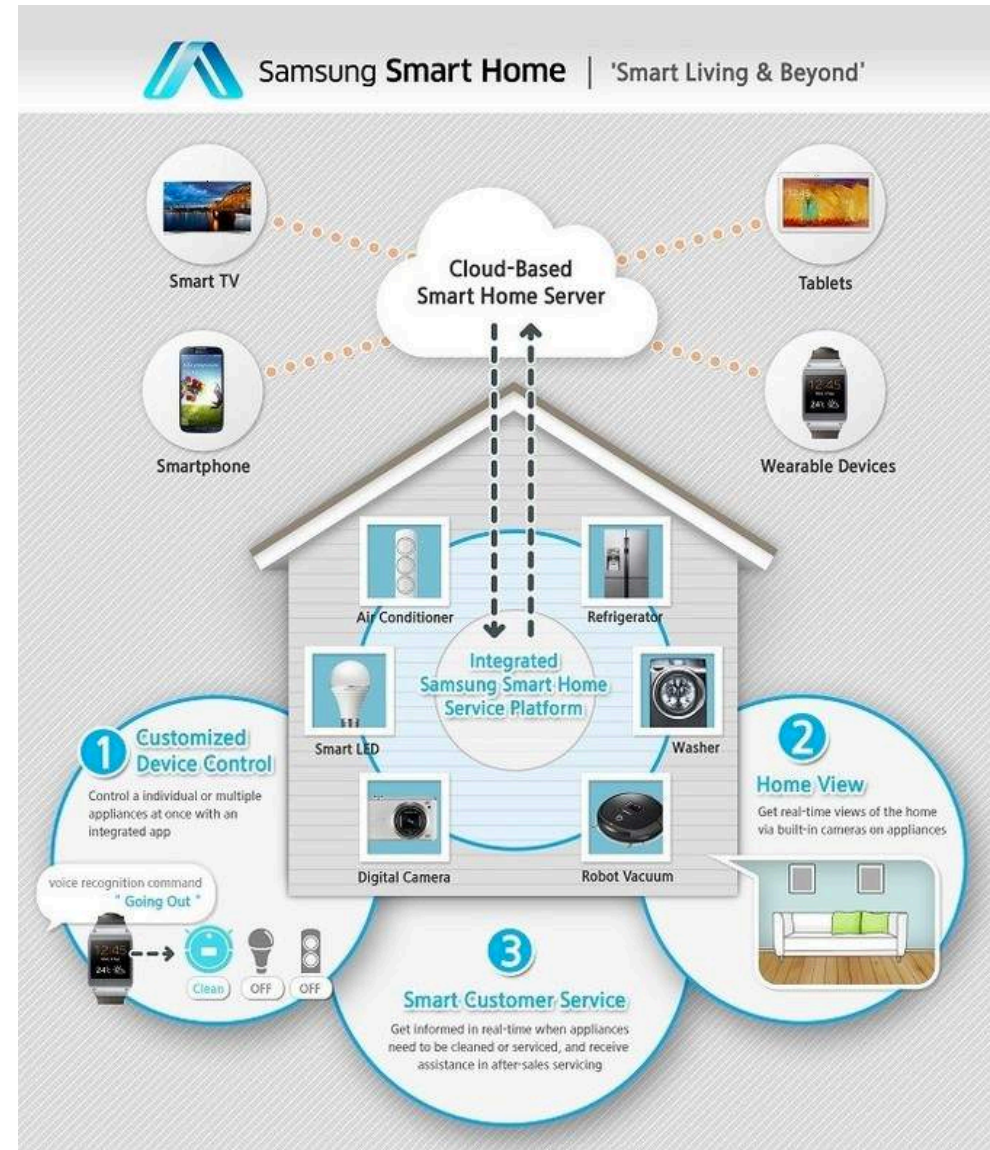
Granulizing Predictions & Prescriptions: System of Records to System of Engagement

iPhone Screenshots



**Combining IOT x Mobile x Social x Cloud x Analytics:
Coca-Cola Freestyle, The Tweeting Machine!**

Blurring Physical and Online Boundaries: Products to Internet-of-Things



Blurring Human-Machine Role Boundaries



Creating Boundaries: Digital Immigrants Vs. Digital Natives

UK introduces coding into the national school curriculum



Millions of children in England will begin a "tough" new national curriculum when they return to school this week.

Five-year-olds will learn fractions and computer coding, while those in early secondary school will have to study at least two Shakespeare plays.

Source: <http://www.javaworld.com/article/2858646/learn-java/we-all-will-be-coders-dont-fear-the-future-of-software-development.html>

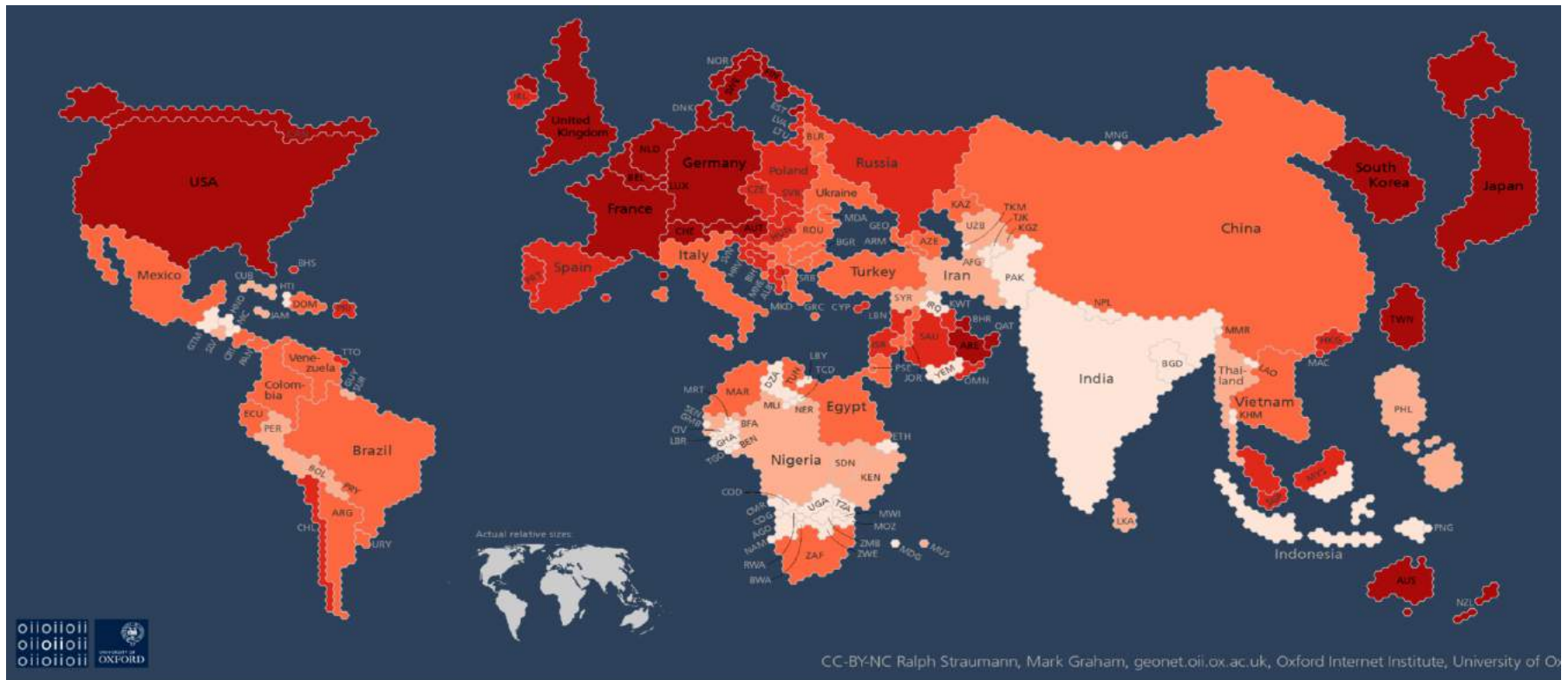
Changing demand for type of software and user experience

Most demanding users in the history of software

Demanding customization and self-configuration

Redefining the developer and user roles

Creating Boundaries: Digital Disparities



The World Online

Percentage of people online

80–100% 60–80% 40–60% 20–40% 0–20%

Number of people online

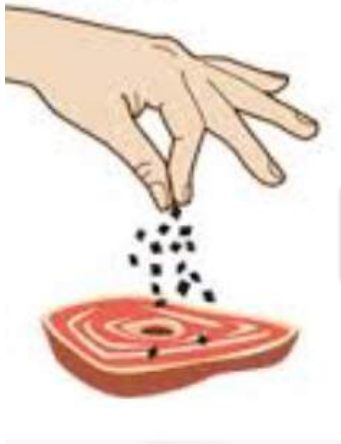
One ● represents roughly 470,000 people online.

The countries are scaled proportionally to the number of Internet users in that country. Countries with fewer than 470,000 people online have been removed from the map. The shading indicates the percentage of the population that is online.

The visualization uses 2013 data from the World Bank's Worldwide Development Indicators project and from Natural Earth.

Role of IS in Interdisciplinary Research: Sprinklers @ Work

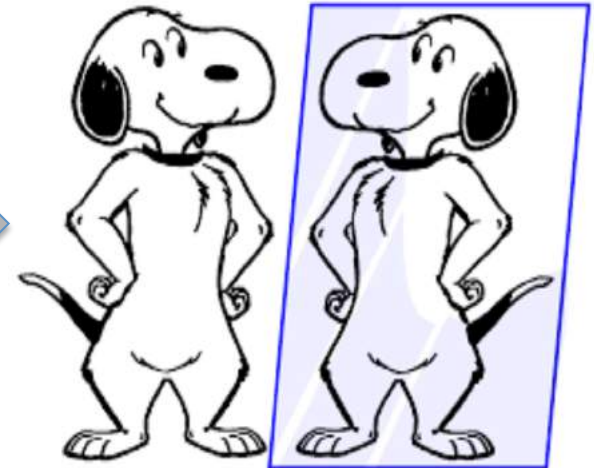
Approach



Role of IS



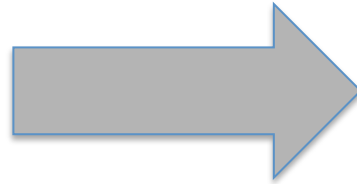
**Differentiating
Contributions
By Other Fields**



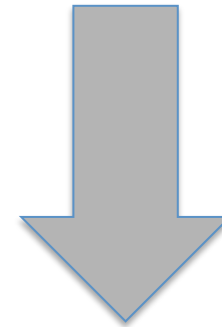
- Term-sprinkling: online, digital, mobile,
- “Cosmetic treatment of IS”
- “Thinly veneered as IS problem”

Formulating Interdisciplinary Problems: Salience on Role of IS and Boundary Shifts

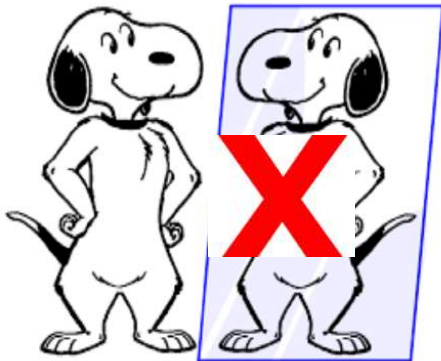
**Sense shifting
boundaries of IS-
related problems
and phenomena**



**Formulate problems with
IS in foreground—*not
background***



**Make disciplinary IS
contributions while
contributing to other
disciplines**

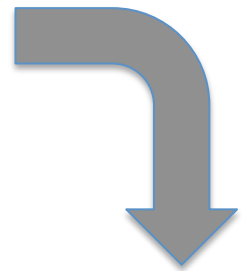
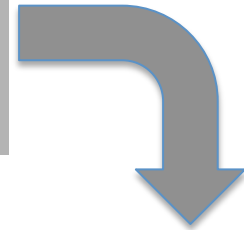
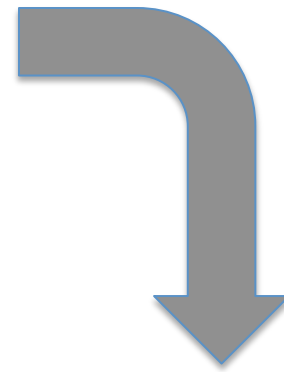


Formulate the Research Problem So the Answer to the Question Will Matter

Safeguard Against Key Risks in Formulating Research Problems

Being Disciplinary While Being Interdisciplinary

Chance Favors the Prepared Mind and the Connected Mind



Role of Individual Preparedness



In the fields of observation
chance favors only those minds
which are prepared.

~ Louis Pasteur

How Does the Prepared Mind Engage: Lone Genius, Suddenly Struck By Inspiration



**Eureka
moment of
sudden clarity!**

Johnson, S. 2010. *Where Good Ideas Come From: The Natural History of Innovation*, New York: *Riverhead Books*, Penguin Group.

How Does the Prepared Mind Engage: The Liquid Network



- **Networked, collaborative**
- **Triggers, not search and retrieval**
- **Exaptation, not mutation**

Johnson, S. 2010. *Where Good Ideas Come From: The Natural History of Innovation*, New York: *Riverhead Books*, Penguin Group.

MIS Quarterly **Fact Sheet**

- **Premier IS general-interest journal**—enjoys a stellar reputation in rankings and impact factors
- **Welcomes diverse perspectives:** Individual-level behavioral origins—expanded to include organizational, design science, and economics research traditions
- **Ranked consistently in Top Journal lists** (e.g., UT Dallas and Financial Times lists)
- **ISI Impact Factors:** 7.38 (2016); 12.2 (5-Year)

Just Released: 2016 ISI Impact Factor

AIS Basket of 8	2014	2015	2016
MIS Quarterly	5.311	5.384	7.268
European Journal of Information Systems	2.213	2.892	2.819
Information Systems Journal	1.766	2.522	4.122
Information Systems Research	2.436	3.047	2.763
Journal of the AIS	1.774	1.79	2.109
Journal of Information Technology	4.525	4.775	6.953
Journal of Management Information Systems	2.062	3.025	2.356
Journal of Strategic Information Systems	2.692	2.595	3.486

Rankings on 2016 5-year ISI Impact Factor

- **1st** among AIS Basket of Eight Journals
- **2nd** among the UT Dallas-24 journals
- **1st** among **85** journals in Information Science and Library Science
- **2nd** among **146** journals in the IS subcategory of Computer Science
- **3rd** among **497** journals across subcategories in Computer Science (*Artificial Intelligence, Cybernetics, Hardware and Software, Information Systems, Interdisciplinary Applications, Software Engineering, Theory and Methods*)
- **3rd** among **193** journals in Management
- **3rd** among **588** journals in the Business, Economics, and Management categories

MIS Quarterly Research Curations

Research Curations Editor

Ashley Bush (Florida State University)

Research Curations Site

<http://www.misq.org/research-curations/>



Completed

- Securing Digital Assets
- Trust
- Privacy

In Process

- IS Use
- IS Sourcing

MIS Quarterly Social Media Initiative: Push Content, Engage Community

Editorials



Author Stories Behind Publications



Announcements



MIS Quarterly on Facebook

The screenshot shows the top of the MIS Quarterly Facebook page. At the top, there is a blue navigation bar with the Facebook logo and a 'Sign Up' button. Below this, there is a search bar for 'Email or Phone' and 'Password', with a 'Log In' button and a link for 'Forgot account?'. The main content area features a banner for 'MIS Quarterly is on Facebook.' with 'Sign Up' and 'Log In' buttons. Below the banner, the page name 'MIS Quarterly @MISQuarterly' is displayed with a 'Call Now' button. The page is categorized as 'Education · Minneapolis, Minnesota' with a 5.0 star rating. A search bar is present for posts on the page. A 'PEOPLE' section shows 1,121 likes and 2 visits. The main post is from June 8 at 10:17am, mentioning a presentation by Carmen Leong, Shan Pan, Sue Newell, and Lili Cui.



This screenshot shows a post from MIS Quarterly published by Jessica Pye on May 25 at 12:39pm. The post text reads: 'Jason Chan, Anindya Ghose, and Robert Seamans have prepared a video discussion of their paper, which appears in the June 2016 Special Issue on ICT and Societal Challenges.' Below the text is a video thumbnail for 'Increased Internet Access Leads to Rise in Racial Hate Crime' by Carlson School Assistant Professor of Information and Decision Sciences Jason Chan. The post has 3,555 people reached, 124 reactions, comments, and shares, and 317 post clicks. A 'Boost Post' button is visible, along with a 'Boost this post for \$5 to reach up to 710 people.' option. The engagement breakdown is as follows:

Reaction	Count	On Post	On Shares
Like	113	56	57
Love	1	0	1
Comments	2	0	2
Shares	8	3	5

Post clicks: 317 (0 Photo Views, 77 Link Clicks, 240 Other Clicks). Negative feedback: 1 Hide Post, 0 Hide All Posts, 0 Report as Spam, 0 Link to Page.



www.facebook.com/MISQuarterly

Developing Social Media Library: Companions to Publications



Social Media Library

Connect through Social Networking



Using social media to expand the visibility of work published in MISQ and the engagement of the community with the work!

Authors share social media content – short video, Podcast, a slide deck, news media coverage, or even a short write up of how the authors came up with the idea or story behind the paper – that directly relate to their articles published in MISQ.

We are delighted to post the content to our social media channels and promote the community's engagement with our authors and their work!



MIS Quarterly

Write something here about MIS Quarterly. The same content will display on each page.

Type of Content

Contributions

Infographic

2

News Article

7

Slides

6

Videos

6

MIS Quarterly on Twitter



The screenshot shows the Twitter profile for MIS Quarterly (@MISQuarterly). The profile bio states: "Leading scholarly journal in the field of development, management, use, impact, and economics of IT with managerial, organizational, and societal implications." The location is listed as "Minnesota, USA" and the website as "misq.org". The profile was joined in February 2009 and the user was born in 1977. The profile picture is a headshot of a man. The tweet feed shows several tweets, including a presentation of a paper by @shalamranaka, Amber Young and Emre Yetgin, and a discussion of a paper by Shivardhini Jha. The right sidebar features a "New to Twitter?" sign-up button, a "You may also like" section with user avatars, and a "Trends" section with various trending topics.

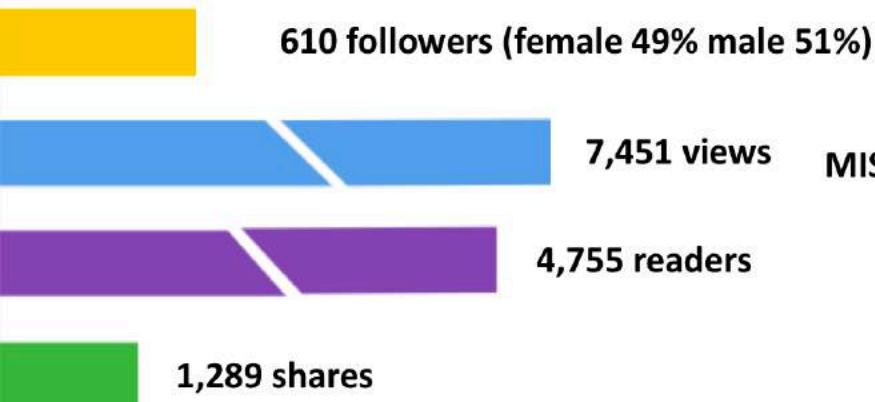


Follow Us

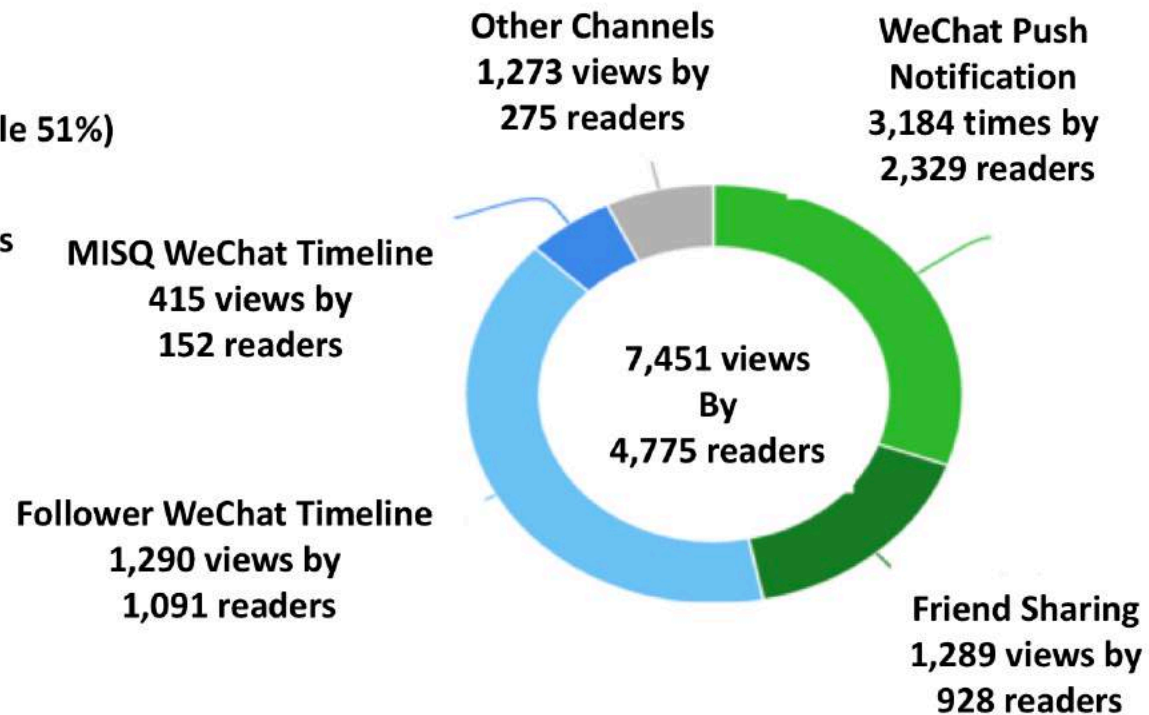
– www.twitter.com/MISQuarterly

WeChat Activity

Rapid Build-up of Engagement



Channels through Which Readers View The Posts



As of May 28, 2017 -- launched in March 2016

MISQ Author Development Workshops

Pre-AMCIS 2016



Pre-AMCIS 2017 Workshop:
August 9, 2017

Email excerpt from ABC and DEF:

*“ABC and I (DEF) were talking after the MISQ Author Workshop, and we both agreed that it was a **career-changing afternoon**. Thanks so much for listening to our concerns and providing us with **actionable advice** on how to improve! We both left the workshop with new perspectives about our research, as well as a better sense of direction on how to achieve our goals.”*

Harbin Workshop initiated –
July 4, 2017

MISQ Reviewer Development Workshops



*“The access to **other reviewers’** comments allowed me to learn from others. Also, the roundtable discussion allowed me to **get guidance from editors** in terms of the strength and weaknesses of my review. The discussion process provides me with the golden opportunity **to learn as a reviewer, and author too.** ”*



- Experiential, vicarious, mentoring
- Close to 50 participants, 20 editors in Dublin
- Next workshop, Post-ICIS in Seoul

Special Issues

- **Complexity and Information Systems in An Emerging Digital World – *In Process***
- **ICT and Societal Impacts**
- **Big Data and Analytics in Networked Business**
- **IT Innovation**

152 submissions!



**Call for Papers
MISQ Special Issue on**

**The Role of Information Systems and
Analytics in Chronic Disease Prevention
and Management**

Special Issue Editors

Indranil Bardhan, University of Texas at Dallas (bardhan@utdallas.edu)
Hsinchun Chen, University of Arizona (hchen@eller.arizona.edu)
Elena Karahanna, University of Georgia (ekarah@uga.edu)

Submission Deadline: August 1, 2017

MISQ – AIS Partnership

MIS
Quarterly



Reducing Accept-to-Print Cycle Time

**300 additional pages to be printed this year—
equivalent to an extra issue**

Partnerships With Complementary Channels

Scholarly Impact



First simultaneous publication,
March 2017

Second in process

Broader Impact



Jerry Kane, Liaison Role

Frontiers 

Exploring the Digital Future of Management



The Heavy Toll of 'Always On' Technology

LARRY D. ROSEN, INTERVIEWED BY FRIEDA KLOTZ
Expectations of immediate responses to digital communications negatively impact productivity.



Mastering the Digital Innovation Challenge

FREDRIK SVAHN et al.
Digital innovation can require carefully balancing new capabilities and core competencies.



Five Myths About Digital Transformation

STEPHEN J. ANDRIOLE
Understanding these five myths will give you a more realistic view of digital transformation.



How to Monetize Your Data

BARBARA H. WIXDM AND JEANNE W. ROSS
The ability to monetize data — not hoard it — can offer competitive advantage in the digital economy.



What's Your Data Worth?

JAMES E. SHORT AND STEVE TODD
Many organizations need to develop greater expertise at valuing their data assets.



What to Expect From Artificial Intelligence

AJAY AGRAWAL et al.
To grasp how artificial intelligence will change organizations, understand how it delivers value.



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