



Information Systems Research

Publication details, including instructions for authors and subscription information:
<http://pubsonline.informs.org>

Research Spotlights

To cite this article:

(2017) Research Spotlights. Information Systems Research 28(4):iii-vi. <https://doi.org/10.1287/isre.2017.0757>

Full terms and conditions of use: <https://pubsonline.informs.org/Publications/Librarians-Portal/PubsOnLine-Terms-and-Conditions>

This article may be used only for the purposes of research, teaching, and/or private study. Commercial use or systematic downloading (by robots or other automatic processes) is prohibited without explicit Publisher approval, unless otherwise noted. For more information, contact permissions@informs.org.

The Publisher does not warrant or guarantee the article's accuracy, completeness, merchantability, fitness for a particular purpose, or non-infringement. Descriptions of, or references to, products or publications, or inclusion of an advertisement in this article, neither constitutes nor implies a guarantee, endorsement, or support of claims made of that product, publication, or service.

Copyright © 2017, INFORMS

Please scroll down for article—it is on subsequent pages



With 12,500 members from nearly 90 countries, INFORMS is the largest international association of operations research (O.R.) and analytics professionals and students. INFORMS provides unique networking and learning opportunities for individual professionals, and organizations of all types and sizes, to better understand and use O.R. and analytics tools and methods to transform strategic visions and achieve better outcomes. For more information on INFORMS, its publications, membership, or meetings visit <http://www.informs.org>

Research Spotlights

<https://doi.org/10.1287/isre.2017.0757>

Copyright: © 2017 INFORMS

Direct and Indirect Information System Use: A Multimethod Exploration of Social Power Antecedents in Healthcare (p. 690)

Yu Tong, Chuan-Hoo Tan, Hock-Hai Teo

Not all information systems access is made by the intended users. This is so in hospitals where designated physician users often ask other people to interact with the healthcare information system on their behalf. Given that physicians enjoy high job autonomy, a strict and one-sided insistence on having them as the direct system users may be impractical. This study focuses on indirect information system (IS) use behavior. Findings from this study reveal that physicians' direct and indirect IS use behaviors are subjected to different forms of social and physiological power from their supervisors, peers, and themselves. Therefore, system designers and hospital managers should acknowledge the ubiquitous indirect IS use of physicians within the hospital. System designers could gather the opinions of designated physicians and intermediaries, and then incorporate indirect IS use into the system design. Hospital managers could mindfully employ both supervisors and physicians to promote specific types of system use behavior. This study also offers some management insights based on Confucian philosophies.

Bidding for Multiple Keywords in Sponsored Search Advertising: Keyword Categories and Match Types (p. 711)

Xiaomeng Du, Meng Su, Xiaoquan (Michael) Zhang, Xiaona Zheng

In sponsored search advertising, firms generally have to participate in multiple keyword auctions at the same time. Advertisers purchase a variety of keywords that can be categorized as generic-relevant, focal-brand, and competing-brand keywords. At the same time, firms also have to choose how the keywords can be matched to search queries: exact, phrase, or broad. This study empirically examines how *keyword categories* and *match types* influence the performance of advertising campaigns. We find that relative to generic keywords, focal-brand keywords are associated with higher click-through rates (CTR) and conversion rates (CR), and competing-brand keywords are associated with lower CTR but higher CR. This result can potentially resolve the mixed findings in the literature. We also find that

advertisers should not always look for higher positions. When they are competing on focal brand keywords, higher positions will bring them higher exposure and more orders, but if they are bidding on competing brands, lower positions will bring them more orders. Our results suggest that it is important to differentiate among the various bidding strategies for various keyword categories and match types. These findings shed light on the practice of sponsored search advertising by offering insights into how to manage ad campaigns when bidding on multiple keywords.

When Online Reviews Meet Sales Volume Information: Is More or Accurate Information Always Better? (p. 723)

Yang Liu, Juan Feng, Xiuwu Liao

In online shopping environments, online reviews and previous sales volume information are often presented to help consumers become better informed and reduce their product uncertainty. Does the presence of such information benefit firms, especially high-quality firms? Our research shows that such user-generated information can be detrimental to firms or consumers. This is because firms have to cut their prices initially to generate favorable information (that is, good online reviews and a high sales volume), hoping to cover the loss through higher future revenue. When "irregular" consumers exist who are not affected by firms' prices, however, the price-cutting strategy can be ineffective and too costly to implement. In addition, informative reviews can distract the high-quality firm's customers into buying from the low-quality firm. Consequently, consumers can be worse-off if the gain from less uncertainty cannot offset the loss from higher product prices.

The insight for management: Firms need to be cautious about price-cutting strategy and how much user-generated information to reveal to the market.

Temporal Motivations of Volunteers to Participate in Cultural Crowdsourcing Work (p. 744)

Sultana Lubna Alam, John Campbell

Crowdsourcing used by cultural and heritage institutions engage volunteers in projects without monetary compensation. Better crowdsourcing designs should facilitate collaboration between volunteers and the cultural institutions they seek to help. Hence we need to better understand why volunteers may engage in

crowdsourcing. This study examines motivations of high performing volunteers in a newspaper digitization crowdsourcing project, initiated by the National Library of Australia. Volunteers are motivated by personal, collective, and external factors, and these motivations change over time. Volunteers initially show intrinsic motivations, though both intrinsic and extrinsic motivations play a critical role in their continued participation. Volunteer contributions range from data shaping (e.g., correcting digitized optical character recognition data) to knowledge shaping (e.g., shaping historical data through tagging and commenting, but also through development of norms and social roles). The locus of motivation (intrinsic or extrinsic) also changes with different kinds of contributions. The distinction between data and knowledge shaping contributions, and the locus and focus of motivation behind these activities, has implications for the design of crowdsourcing systems. Crowdsourcing designs for cultural and heritage institutions should offer affordances that support both data and knowledge shaping activities. Social mechanisms employed by cultural intuitions for ongoing participation must align with changing temporal locus and focus of volunteer motivation.

Understanding Consumers' Attitudes Toward Controversial Information Technologies: A Contextualization Approach (p. 760)

Michael Breward, Khaled Hassanein, Milena Head

Controversial information technologies, such as biometrics and radio frequency identification tags, are perceived as having both the potential to benefit as well as to undermine the well-being users. Given the type and/or amount of personal information these technologies capture, they have raised some serious privacy/security concerns among potential users impeding their adoption. Established technology adoption models tend to focus only on the benefits associated with technology use and are therefore inappropriate when examining controversial information technologies. This research proposes a general framework that considers the effects of both positive and negative attributes of controversial information technologies on consumer adoption intentions. The framework also highlights the importance of incorporating contextual factors that reflect the nuances of the controversial technology at hand and its specific context of use. The specific context examined here is consumer acceptance of biometric identity authentication in banking transactions through automated teller machines. A qualitative study of 402 participants informed the development of our contextualized framework for this application. This framework was then validated in a quantitative study involving 437 participants.

Our results demonstrate that by leveraging the benefits while simultaneously taking steps to mitigate consumer concerns, organizations can generate more favorable attitudes towards controversial information technologies.

Technical Systems Development Risk Factors: The Role of Empowering Leadership in Lowering Developers' Stress (p. 775)

Jaime B. Windeler, Likoebe Maruping, Viswanath Venkatesh

Developers face many challenges in executing a successful information systems development (ISD) project. ISD projects are often large and complex, with volatile requirements, creating a stressful environment for developers. Over a third of the errors in ISD projects are attributable to developer stress, yet the drivers of stress in this context are not well understood. Consequently, there are few prescriptions available to leaders who want to help developers cope with ISD-related stress. The authors examine the impact of three ISD risk factors: project size, complexity, and requirements volatility on developer stress. They also examine a leadership approach believed to help reduce stress—empowering leadership, which is characterized by five behaviors: leading by example, shared decision making, coaching, informing, and showing concern. The research was conducted by longitudinally surveying 73 leaders and 350 developers embedded in multinational ISD teams. The authors found that project size, complexity, and requirements volatility increased stress because it affected developers' role clarity. Empowering leadership alleviated the stress caused by project size, complexity, and requirements volatility, and helped developers achieve greater role clarity.

The insight for management: Empowering leadership is an effective tool for helping developers cope with the stress of large, complex, and volatile ISD projects.

Learning Effects of Domain, Technology, and Customer Knowledge in Information Systems Development: An Empirical Study (p. 797)

Keumseok Kang, Jungpil Hahn, Prabuddha De

Domain, technology, and customer are the three most essential types of knowledge for information systems development (ISD). This study asks whether ISD project teams benefit from prior experiences in these three knowledge types to increase project performance, and if they do, how experiences in the three interact with one another and with project complexity. We find that repeated experiences of domain, technology, and customer knowledge positively affect project performance. Our results also show that customer experience can substitute for domain and technology experiences such that if the ISD project team has limited

(or abundant) experience with a particular customer, it may need to rely more (or less) on domain and technology experiences to execute the project efficiently. Last, we observe that if the project is more complex, any experience with the domain, technology, or customer becomes less impactful, suggesting that a greater amount of prior experience is needed to maintain the same level of project performance for more complex ISD projects.

The insights for management: The ISD project team's prior domain, technology, and customer experiences increase project performance; however, their effects are substitutive for one another and are diminished by ISD project complexity.

Mitigating Diminishing Returns to R&D: The Role of Information Technology in Innovation (p. 812)

T. Ravichandran, Shu Han, Sunil Mithas

Increasingly firms across many industries are grappling with the challenge of research and development (R&D) productivity and declining returns to R&D investments. In this study, we investigate how information technology (IT) can help firms to deal with this problem. We theorize that IT systems can help firms to cope with the complexity and inefficiency in managing innovation when R&D investments scale. We explicate two mechanisms through which IT will mitigate the diminishing returns to R&D: scalable communication infrastructure and avoiding trade-offs among efficiency, scope, and flexibility. Our findings based on data from 161 firms from 1991 to 2003 does suggest that IT mitigates the diminishing returns to R&D. In particular, firms facing greater complexity in their R&D activities, as measured by inventor intensity, geographical complexity, and technological complexity are likely to see stronger effects on R&D productivity when they leverage IT.

Software Diversity for Improved Network Security: Optimal Distribution of Software-Based Shared Vulnerabilities (p. 828)

Orcun Temizkan, Sungjune Park, Cem Saydam

Firms, and other agencies, tend to adopt widely-used software to gain economic benefits of scale, which can lead to a software monoculture. This can, in turn, involve the risk of correlated computer systems failure as all systems on the network are exposed to the same software-based vulnerabilities. Software diversity has been introduced as a strategy for disrupting such a monoculture with limited success in decreasing the risk of correlated failure due to common vulnerabilities shared by different software alternatives. We expand the concept of software diversity by considering the shared vulnerabilities between software alternatives, and subsequently developing a new software diversity metric based on the entropy in information theory.

We develop a combinatorial optimization model that distributes software alternatives to maximize software diversity on a network. We also develop a simulation model of virus propagation based on the Susceptible-Infected-Susceptible model. This model allows calculation of the epidemic threshold, a measure of network resilience to virus propagation. We show the effectiveness of the proposed software diversity strategies against the spreading of viruses through a series of experiments. Information technology managers and cloud service providers can use the proposed models as an effective tool to increase network resilience which can be an additional defense against security attacks.

Seeking Value Through Deviation? Economic Impacts of IT Overinvestment and Underinvestment (p. 850)

Joanna Ho, Feng Tian, Anne Wu, Sean Xin Xu

A firm's competitive actions may trigger rival reactions. This can create a competitive race, and, as a result, the firm's performance depends on exceeding the actions of its rivals. We test the performance impacts of such a competitive race in the context of firm information technology (IT) investment, as a specific example of competitive actions. We find that a firm's overinvestment in IT, i.e., defined as exceeding the IT investment amount of rivals, is positively related to firm performance, with this relationship attenuating at higher levels of overinvestment. Interestingly, we find that a firm's underinvestment in IT, i.e., making IT investment less than rivals', may also help improve firm performance, possibly because the saved resources can be allocated to non-IT-based approaches to a competitive edge, but this positive payoff of underinvestment of IT exists only in firms with concentrated ownership. Our findings imply (1) that managers need to jointly evaluate both IT-enabled and non-IT-enabled competitive moves; (2) that the action of deviation from the industry's average IT investment is more likely to work with a strong monitoring mechanism embedded in concentrated corporate ownership; and (3) that firms at high levels of overinvestment may face challenges due to losing legitimacy.

Unraveling the Alignment Paradox: How Does Business—IT Alignment Shape Organizational Agility? (p. 863)

Huigang Liang, Nianxin Wang, Yajiong Xue, Shilun Ge

Executives want their firms to be flexible and agile enough to survive the highly competitive and uncertain markets. Traditional wisdom believes that the alignment between business and information technology (IT) strategies can enhance firms' agility and performance. For decades, one of the chief information officers' top priorities is to achieve business-IT alignment. Yet there are cases that business-IT alignment

cannot increase, or even decrease firm performance. It is important to unravel the alignment paradox to help executives make appropriate strategic decisions. The authors evaluate survey data from 429 pairs of business and IT executives to understand how business–IT alignment influences organizational agility. Surprisingly, they find that the formal strategic alignment could make organizational resources and routines too rigid to respond to external changes, thus reducing agility. By contrast, the social aspect of business–IT

alignment, or the business and IT executives’ shared knowledge and understanding, can facilitate emergent coordination to enhance agility.

The insight for management: IT alignment can have both positive and negative effects. A strong alignment between IT and business strategies could reduce firms’ agility, especially when the environment changes. A balance between the formal and social alignment should be kept so that the benefits of alignment are reaped without losing agility.