

Guest editors' introduction: Methods innovations for the empirical study of technology adoption and diffusion

Robert J. Kauffman ·
Angsana A. Techatassanasoontorn

Published online: 24 August 2012
© Springer Science+Business Media, LLC 2012

The literature on technology adoption and diffusion is a highly mature area of Information Systems (IS) research, which requires a deft hand in research to support the creation of new contributions of knowledge. In this special issue, we focus on the application of various methods, including new ones, to shed light on research questions that have not been understood fully in prior research. In particular, we will showcase research that involves the application of event history analysis and spatial econometrics, as well as count data models to study frequency-related phenomena for changes and development in technology adoption and diffusion. We also include an article that employs game theory, as well as another work that begins with a market event study and then utilizes a blend of seemingly unrelated regression, two-stage least squares and three-stage least squares estimation. Finally, we include a new contribution on product diffusion that uses agent-based computational simulation of different user network structures.

The lead-off article of the special issue focuses on new methods for empirical research in IS and e-commerce through the application of advanced econometric models that are underutilized in the literature. The title is “Event History, Spatial Analysis and Count Data Methods for Empirical Research in Information Systems,” and has been contributed by the special issue editors, Robert J. Kauffman and Angsana A. Techatassanasoontorn, and

their coauthor, Bin Wang. The article showcases statistical analysis methods for empirical settings involving technology, information systems (IS) and e-commerce adoption. The salient characteristics of the research involve the time when an adoption event occurs, the duration of time between adoption events, the extent to which geographic or conceptual space influences adoption, and the relative frequency of adoption events over time. The authors provide a road map for understanding how different models can be applied across a number of core research areas in IS, and additional detailed and specific aspects of empirical settings in which they can be used to generate new knowledge. They also provide a reading on research that has occurred outside the IS and e-commerce areas, as a basis for illustrating the kinds of new knowledge that can be generated through the collection and analysis of interesting data sets. The authors draw several conclusions, including one that is especially relevant in another context—computational social science in the presence of large-scale data. The methods will be especially useful in support of the analysis of very large-scale data when events, time, space and frequency of outcomes are essential to understand.

The next article is entitled “Analysis of Emerging Technology Adoption for the Digital Content Market,” contributed by Bih-Huang Jin and Yung-Ming Li. The authors begin by citing a research forecast from PricewaterhouseCoopers on the future state of the global entertainment and media market, which, they note, is expected to grow from US \$1.3 trillion in 2009 to about US \$1.7 trillion by 2014, representing approximately 5 % growth per annum. This growth in the digital content market is a new target for all kinds of information and services, and there are key issues related to service transformation and emerging technology adoption that require the attention of

R. J. Kauffman
Singapore Management University, Singapore, Singapore
e-mail: rkauffman@smu.edu.sg

A. A. Techatassanasoontorn (✉)
Auckland University of Technology, Auckland, New Zealand
e-mail: angšana.techatassanasoontorn@aut.ac.nz

researchers. In this research, the authors use game theory to assess how market contexts and a spectrum of related concerns—IT costs, channel cannibalization, brand power, brand extensions, information asymmetry and market uncertainty—affect technology adoption decisions at the firm level. They explore a new service market entry game with two competing firms. They find that, when new market entry and technology costs are neither too large nor too small, a mixed-strategy Nash equilibrium, in which the firms choose their strategies from a probability distribution of related outcomes, offers an appropriate approach to decision-making for adoption. In addition, they note that the business value of adoption is controlled to a greater extent by the competitor's technology costs more so than by its own. They also report that higher technology costs, the cannibalization ration, market uncertainty, and the nature of brand extensions influence the likelihood that a dominant firm in the traditional market will enter the new market. When a firm is a new entrant or has weaker brand strength in the market, the predictions will not hold in the same way though.

The third article of the special issue is “The Adoption of Social Networking Technologies in Cinema Releases,” by J. Christopher Westland. The author explores the value of a social media marketing approach to movie promotion in light of the high risks associated with the production, distribution and acceptance of films with movie-goers. He reports that the Hollywood movie studios spend on the order of US \$4 billion each year for advertising in print and television media, and are only just beginning to explore how to leverage social media and take advantage of the new channels. The author applied event study methods from Accounting and Finance to data collected on film revenue and movie-related search activity from Internet search engines. The author's empirical results suggest that social networking activities on the Internet are associated with a 64 % increase in movie revenues, and a related increase in Internet search activity of about 48 %. When movies appear in other media outside the theater, for example, DVD, online streaming and via cable TV subscriptions, their revenues rise by 14 % over their level in the absence of social network-based advertising, while viewer search goes up by 41 %. Further, more social networking around a movie release is associated with much greater intensity of Internet search. The author concludes

that budgets for social networking-related promotion for movie releases and its impact on search activity have the power to transform film revenues, if the Hollywood studios can figure out how to harness their power.

The final article in the special issue is by Hanool Choi and Byungtae Lee, entitled “Examining Network Externalities and Network Structure for New Product Introduction.” The authors examine the role of local and global networks in network marketing strategy. Their core argument is that firms can develop more effective marketing strategies in network industries by building a strong installed base of customers in local markets to take advantage of their network properties, and this, in turn, will support global network sales performance and success when new product adoptions are involved. This article's methodological interest arises from its use of agent-based computational simulations of new product adoptions for a variety of network structures. The authors consider a range of structures from strictly-ordered network structures to randomly-connected network structures. These are produced by adjusting the β parameter in the β -graph algorithm, which is associated with the seminal work of Duncan Watts and Steven Strogatz published in *Nature* in 1998. One of the new article's authors' main results involves the effects of greater randomness or a higher value of the β parameter in the network. With randomness in the network, creating a local installed base of customers becomes less effective, though the authors also report that building a customer cluster is still superior to focusing on random selection of potentially early adopters. Another important result is that a winner-take-all local market outcome is tied in with the development of a fully-connected network structure, and is a by-product of local and global network interactions.

We would like to thank the co-editors-in-chief, Varghese Jacob and Hasan Pirkul, for their ongoing support of our effort to bring new research on technology adoption and diffusion to the pages of *Information Technology and Management*. We also appreciated the effort and contribution of the anonymous reviewers, as well as the authors, who diligently responded to our many requests to improve their work to bring out its innovations. Finally, we would like to warmly acknowledge the staff at Springer, especially Deepika Jothinathan and Subhalakshmi Anand, who have been supportive of making our editorial work and interactions with the authors successful.