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Expanding the horizons of digital social networks: Mixing big trace datasets with qualitative approaches

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ABSTRACT

The study of social networks has attracted much interest from the IS community in recent years, driven mainly by the accessibility of trace data that remain as a by-product of interactions conducted through technology-enabled platforms. Despite its rapidly growing influence, we have some concerns about the current trajectory of social network research in the IS field. Our purpose in this commentary piece is to accentuate for the new generation of social network researchers, who are au fait with mathematical techniques for analyzing massive digital datasets, how the combination of quantitative and qualitative approaches can enrich our understanding of networks. First we highlight how the social network perspective has contributed to our understanding of IS phenomena. Next we review mixed methods research in IS social network research. An agenda for future IS social network research is then presented where we suggest how qualitative approaches can best complement trace data in addressing focal social network questions. We conclude by discussing the challenges of conducting mixed method studies of digitally enabled social networks.

1. Introduction

In recent years, the study of social networks has attracted increasing attention within the global IS research community. This interest has largely been driven by the availability of trace data, which are a by-product of interactions conducted through technology-enabled social networking platforms such as Facebook, Twitter, and Second Life and open source repositories such as sourceforge and thingiverse as well as log records of email, phone, blog, and wiki communications. Every interaction that passes through social platforms leaves traces that can be easily recorded, massively stored, and inexpensively retrieved (Venturini & Latour, 2010). The emergence of easy-to-use data mining tools which extract ordered network data, such as NodeXL, have also contributed to the explosion of interest in social network research. The accessibility and sheer volume of such data can enhance social network research — a field of study that has long struggled with data collection issues (Lewis, Kaufman, Gonzalez, Wimmer, & Christakis, 2008; Rogers, 1987). Standard sociometric approaches examined behavior by asking people what they did, where they did it, when it happened, and with whom they did it. Such data collection methods de facto limited the size of the investigated network (Watts, 2007), suffered from respondents' imperfect recall (Bernard, Killworth, Kronenfeld, & Sailer, 1984), and were often viewed as obtrusive by participants (Borgatti & Molina, 2005; Rogers, 1987). In the online world, however,

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the what, where, when, and with whom can all be recorded automatically from an unlimited number of individuals. This allows for the unobtrusive and longitudinal examination of network relationships and structures in large, heterogeneous populations (Burt, 2010). As more and more social interactions are conducted through digital media, the opportunities to research digitally enabled social networks are tremendous. Indeed, it is argued "*digital networked data are revolutionizing empirical research in the social sciences in the same way that the microscope revolutionized empirical research in the biological sciences*" (Sundararajan, Provost, Oestreicher-Singer, & Aral, 2013). IS researchers, for instance, have started working with trace data to uncover new

Table 1
Analysis of social network papers presented at ICIS 2014–2015.

No.	Year	Paper	Authors	Data type	Description
1	2015	Investigating the Impact of Network Effects on Content Generation: Evidence from a Large Online Student Network	Prasanta Bhattacharya, Tuan Phan, Edoardo Airoldi	Quantitative analysis of electronic trace data	Analyzed complete online network data from a popular social media platform for 2507 undergraduate students producing a mean 145 posts each. Trace data analyzed using Markov Chain Monte Carlo techniques
2	2015	Bridging or Bonding: Do Individuals gain Social Capital from Participation in Enterprise Social Networks?	Kai Riemer, Jan. Finke, Dirk Hovorka	Quantitative analysis of electronic trace data	Used standard statistical approaches to analyze 61,945 messages created by 3158 users of an enterprise social media system
3	2015	Anonymity and Language Usage: A Natural Experiment of Social Network Integration	Ni Hong, Yili Hong, Gordon Burtch	Quantitative analysis of electronic trace data	A mass of data scraped from Tripadvisor — including review time stamps, content, reviewer profiles, and restaurant information — from 2005 to 2014. Used a text analysis application, linguistic inquiry and word count, to assess the data.
4	2015	Understanding the Role of Social Networks on Labor Market Outcomes Using a Large Dataset from a Mobile Network	Filipa Reis, Pedro Ferreira	Quantitative analysis of electronic trace data	Data includes 4.5 million users and 3.7 billion calls. Combined social network data from call detail records with employment information on mobile phone subscribers to study the role of information networks on job market outcomes. All models are estimated using the ordinary least square approach.
5	2015	eMood: Modeling Emotion for Social Media Analytics on Ebola Disease Outbreak	Wingyan Chung, Saike He, Daniel Zeng	Quantitative analysis of electronic trace data	Data consists of 255,118 tweets posted by 210,900 users. Data analyzed using SNA measure of betweenness centrality. Sentiment analysis also used to identify emotional words that appear in the tweets
6	2015	The Impact of Formal Hierarchies on Enterprise Social Networking Behavior	Sebastian Behrendt, Julia Klier, Mathias Klier, Alexander Richter	Mixed method	Combined trace data with 13 semi structured interviews of staff. Trace data contained 4096 direct messages, 1523 group messages, and 1443 comments, which was analyzed with SNA measures.
7	2015	Health 2.0 Enabled Collaborative Healthcare Maintenance	Nadee Goonawardene, Sharon Tan	Mixed method	First phase consisted of a qualitative content analysis to better understand the nature of the goals and goal progressions. Trace data in the form of profile information, friend network, discussion threads, subscribed support groups, goal descriptions, updates, self-reported progress levels, comments, extracted and analyzed in second phase.
8	2014	Social Media Broadcasts and the Maintenance of Diverse Networks	Yotam Shmargad	Quantitative analysis of electronic trace data	Applied SNA measures on the trace tie data from 665,448 users of a social media site
9	2014	Virtual Team Performance in Crowdsourcing Contests: A Social Network Perspective	Indika Dissanayake, Jennifer Zhang, Bin Gu	Quantitative analysis of electronic trace data	Trace data — in the form of ties, number of submissions, team and individual rank — scraped from 732 teams on the Kaggle platform. Data analyzed with SNA measures
10	2014	Why Do IS Scholars Cite Other Scholars? An Empirical Analysis of the Direct and Moderating Effects of Cooperation and Competition among IS Scholars on Individual Citation Behavior	Xiao Tang, Lei Wang, Rajiv Kishore	Quantitative analysis of electronic trace data	Citation and co-authorship network data for 1034 focal authors from 10 premier IS journals (2006–2011). Data analyzed with MRQAP models
11	2014	Exploring Multiplexity in Twitter — The 2013 Boston Maraton Bombing Case	Srikanth Venkatesan, Himanshu Yadav, H.R Rao, Manish Agarwal	Quantitative analysis of electronic trace data	Data consists of 955,820 tweets related to 2013 Boston Marathon Bombing. Analyzed with OLS regression
12	2014	The Emergence of Intra-Organizational Communities of Operations: Evidence from the Software Industry	Arne Beckhaus, Dirk Neumann, Lars Karg	Quantitative analysis of electronic trace data	Trace data emitted from a software development bug tracking process — 7500 bugs with over 40,000 interactions between individuals
13	2014	How Superbowl Commercials Affect My Social Network: An Empirical Study on the Evolution of Social Ties through Revealed Preferences	Tianhui Tan, Tuan Phan	Quantitative analysis of electronic trace data	Trace data from a popular social media platform consisting of user profile information of over 1.4 million undergraduate students, and users' action data recording around the superbowl. Text mining of keywords used to identify the topics