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# Analyzing Frequent Collaborators in the IS Field: What Can We Learn about IS Coauthorship in General?

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## ABSTRACT

Despite the longstanding nature of social network theory and its application to research on communication technologies, few IS studies employ social network analysis (SNA) concepts; the few that do are by organizational communication scholars. A recent stream of work by IS scholars is to apply SNA to study research collaboration – although this has mostly focused on individual IS conferences. We analyze frequent coauthors in five IS journals from 1999-2007 to show that most of these frequent coauthors primarily publish with their PhD students (what I label “supervisory coauthorship”). Two-thirds of frequent coauthors with 7 or more distinct partners mostly publish with their former PhD students, while less than one-third mostly publish with peer scholars. Nearly 85% of frequent coauthors were affiliated with North American institutions; two or more were located in the UK, Singapore and Hong Kong. We offer insights about the high rate of coauthorship in IS journals.

## KEYWORDS

Coauthorship, collaboration, scientific collaboration, scientometrics, social network analysis, sociology of science.

## INTRODUCTION

In recent years, social networking has re-energized IT usage – leading to a new generation of IT users as well as new genres of research focusing on social collectives. While most technologies associated with social networking are new in recent years (Facebook, Linked In, MySpace), the underlying theory and methods associated with social network analysis (SNA) have existed in sociology and organizational communications for over 30 years – with seminal works appearing around 1980 (Freeman 1979; Knoke & Kuklinski 1982). Despite the longstanding nature of social network theory and its application to analyzing ICT adoption within the field of organizational communications (e.g., Rice & Aydin 1991), few IS studies draw upon SNA concepts; and the few that exist are by scholars from organizational communications (e.g., Cross et al., 2001). While the need for research grounded in SNA led to creation of this mini-track on “Social Aspects of Social Networking,” mainstream research in IS largely ignores SNA as an underlying methodology and theory.

In parallel with the use of SNA to understand IT adoption by organizational communication scholars, another research stream applies SNA to examine research coauthorship (often labeled as *scientific collaboration*). Beginning with analyses of physics and biomedical research communities (Newman 2001) and recently, extending to computer science (Chan et al. 2009) and several business disciplines (Denize et al. 2009; Urbanic 2007), SNA methods are now being used to analyze the evolution of academic disciplines – for example, to show whether new subfields are emerging or two formerly distinct fields have merged together. IS scholars are starting to apply SNA to study coauthorship – although this has primarily been to analyze individual conferences, such as ICIS (Xu & Chen 2006), ECIS (Vidgen et al. 2007), PACIS (Cheong & Corbitt 2009), and a set of HCI conferences (Horn et al. 2004).

Using SNA, it is possible to analyze coauthorship linkages to show which scholars are most “central” in a field of study – which is known as *degree centrality* (i.e., authors with the most distinct coauthorship links to other scholars in a given field of study or conference). In reviewing SNA techniques, information scientists (Rousseau & Otte 2001) have introduced other SNA concepts, such as *betweenness* centrality and *closeness* centrality (other metrics for determining how well-connected a given author is), *cliques* (sets of authors within a larger community who all coauthored with each other), and *bridges* (authors

who link otherwise disjoint research sub-communities).<sup>1</sup> For instance, in analyzing ECIS conference papers over 13 years, Vidgen et al. (2007) identify Ben Light, Elaine Ferneley and Debra Howcroft as bridging otherwise disjoint subcommunities.

In addition to their value in studying research collaboration, SNA may also be used to analyze networks of citations within a given field. By analyzing so-called *co-citation networks*, researchers can map the “intellectual structure” of a field – identifying prominent research themes within a field of study (Culnan 1987; Pilkington 2004). Co-citation analyses are often conducted to understand how a field evolves over time – for example, what new topics emerge and what old topics either atrophy. This paper will focus on the use of SNA for analyzing coauthorship networks in IS. The next section reviews prior work on scientific collaboration in order to set the stage for my empirical study.

## LITERATURE REVIEW

SNA techniques have mostly been used to map the coauthorship structure of specific conferences.<sup>2</sup> There have been just three studies that attempted to study coauthorship in IS more widely. The first was a study that analyzed IS coauthorship in five IS journals – although most of the journals were either IT practitioner magazines or lower-level academic journals (Cunningham & Dillon 1997).<sup>3</sup> A second study analyzed IS coauthorship based on papers in two leading journals (*ISR and MIS Quarterly*), plus IS papers in *Management Science* over a 25-year period. In this study, Oh et al. (2006) provided comparative analyses of four subcommunities within the overall IS community, concluding that behavioral researchers are more centralized (i.e., have a more “dense” network of linkages) compared to IS economists or IS technical researchers.<sup>4</sup> While their analysis is useful in portraying different levels of network density for different subcommunities, one limitation of their study (and indeed, most SNA research) is that linkages between authors are treated as a binary construct: authors either do or do not have a linkage with another person. As is typical in SNA research, the strength of connections (the number of coauthored papers) is not captured. Recently, however, experts in scientific collaboration have proposed new measures of network ties that can capture both the existence as well as strength of such linkages (Newman 2004).

The third study of IS coauthorship is our own recent research (Gallivan & Ahuja, forthcoming), where we showed, first, that coauthored IS research has increased dramatically – doubling over the past 25 years;<sup>5</sup> second, that North American journals have a higher rate of coauthorship than European ones – both in terms of the proportion of coauthored papers (82% vs. 70%), as well as the mean number of authors per paper (2.7 vs. 2.25). Our study also showed that, when IS scholars coauthor, they tend to work with other members of the same sex and those who attended the same PhD program to a greater extent than can be expected by chance. Coauthored papers are also more highly cited in some journals (e.g., *MIS Quarterly* and *EJIS*), but are cited less in *ISR*. Our prior study – which analyzed papers in five leading IS journals from 1999-2005 – did not unpack the notion of coauthorship. Instead, it assumed the notion of coauthorship to be straightforward and unproblematic.

Here, I offer a different perspective on coauthorship in the IS community: first, I unpack the definition of coauthorship to specify different types of relationships that characterize collaborators. Second, I identify frequent IS coauthors, classifying them into scholars who mostly publish with their former PhD students vs. those who publish mostly with peers. Finally, I seek to extend the insights from these frequent coauthors to the general phenomenon of IS coauthorship which (as stated above) accounts for over 70% of papers in five leading IS journals (and over 80% of papers in North American journals).

I begin by “unpacking” the notion of coauthorship, which has not previously been challenged – either in IS or in any field, for that matter. While many studies exist that analyze coauthorship in various physical, biomedical and social sciences, one underlying and implicit assumption is that such coauthorship denotes collaboration among peer researchers. In fact many of the advantages frequently attributed to coauthored work assume collaboration among two or more peer researchers, rather

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<sup>1</sup> By *discrete*, I mean that these subcommunities would lack linkages between them if not for the *bridge* author.

<sup>2</sup> As mentioned above, recent studies have mapped coauthorship for ICIS (Xu & Chau 2006), as well as regional conferences in Europe (Vidgen et al. 2007), Scandinavia (Molka-Danielsen 2009), and Pacific-Asia (Cheong & Corbitt 2008) or for a set of four human-computer interaction (HCI) conferences (Horn et al. 2004). A few other IS studies analyzed coauthorship in a single country (LaRowe et al. 2007), or actually studied coauthorship computer scientists instead (Mutschke & Haase 2001).

<sup>3</sup> Among five “top” IS journals, Cunningham & Dillon include a practitioner magazine (*Journal of Systems Management*) and the academic journals: *Decision Support Systems* and *Journal of Strategic Information Systems*.

<sup>4</sup> Higher *density* means that a larger fraction of all possible coauthorship links were present among authors in the network.

<sup>5</sup> Gallivan and Ahuja document that coauthorship doubled from 1985 to 2005 in North American journals: from 41% to 83% of papers. The two leading European IS journals – *European Journal of IS* and *ISJ* – did not begin publishing until 1991.

than a hierarchical relationship involving a student and his or her advisor. In this study, I investigate whether IS coauthorship reflects this tacit assumption or not. Shedding light on this assumption is important, because studies of scientific collaboration rarely acknowledge the existence of advisor-student relationships. For example, no study has attempted to identify what proportion of coauthors are represented by such advisor-student linkages, to my knowledge.

In fact, a qualitative field study of research chemists claims that collaboration between a faculty member and a student is not possible – but rather, such a scenario instead involves *education* or *learning* – not collaboration. Based on their interpretive study of 50 chemists who worked in four networked labs at nearby universities, Hara et al. (2003, p. 957) conclude that:

... graduate students are seldom viewed as potential collaborators and have limited exposure to and/or participation in collaborative research. For some faculty/scientists, working with students (and postdoctoral researchers) does not imply collaboration unless the student is exceptional.... [We subscribe to the view] that students and postdoctoral researchers are working *for* scientists, but not working *with* them (emphasis added).

For instance, one chemist they interviewed in their study remarked:

“I don’t think of working with a student as a collaboration ... I just think that there is a much bigger role of education where I am teaching [rather] than ... where they are bringing anything other than hands to the project ... [This] doesn’t mean [that students] are not important, but I just don’t view it as collaborative....”

While it is possible that the norms for collaboration may differ between the physical sciences (chemistry) and social sciences (IS and other business disciplines), I believe that it is useful to distinguish between *collaboration among peers* vs. what I call *supervisory coauthorship* (e.g., coauthorship between a PhD student and his or her advisor). This distinction is important because, with the exception of the one qualitative field study of chemists (Hara et al. 2003), no study has explicitly asked the question of what coauthorship actually means – what it includes or excludes. It is important to unpack this concept – since it is widely assumed to refer to collaboration among peers (or at least collaboration among two or more researchers who already completed their formal Ph.D. training, whether they are at the same or different stages of their careers). Unfortunately, no study has examined whether coauthored papers in any field actually meet this implicit definition.

Thus, given the large prior body of work on coauthorship (i.e., that it tacitly assumes collaboration among peers), I seek to critically examine this assumption with data about coauthored IS publications. A careful test of this assumption would require in-depth coding of a large body of coauthored papers to classify the authors as representing either *peer collaboration* or *supervisory coauthorship*. Coding such a large number of papers would require substantial “insider” information (i.e., knowing which coauthors were the advisors or students of another author), yet such insider information is not readily available through archival data (i.e., in a published paper’s biographical section).

Instead, I identify and analyze a more limited dataset: frequent coauthors that have often coauthored – either with different partners (i.e., prolific researchers with 7 or more distinct coauthors) or with the same partner (i.e., coauthor dyads who published three or more papers together). By focusing on the smaller set of IS researchers who fit these two definitions of frequent coauthors, I seek to shed light on the underlying question of whether the rising rate of coauthorship previously reported (Gallivan & Ahuja, forthcoming) represents *true collaboration* in the sense that Hara et al. (2003) use the term (i.e., collaboration among peers). I also seek to identify the fraction of coauthorship that corresponds to my notion of *supervisory coauthorship* to show how large a share of coauthorship it represents. Given that coauthored publications in IS journals now account for more than 70% of papers in leading IS journals (and over 80% of papers in leading North American IS journals) during the years 2005-2007, it is important to understand the nature of these coauthorship linkages.

## RESEARCH QUESTIONS

My first research question is descriptive: Who are the IS researchers who publish with many different partners and what attributes characterize them? For example, are they mostly senior scholars in the field or do they also include scholars at various career stages? What is the distribution of authors by continent or country and the distribution by gender?

My second question examines the nature of the relationships that characterize these high-centrality or “promiscuous” authors (Cronin 2001; Krichel & Bakkalbasi, 2009): Are their linkages primarily with *peers* (which I define as non-supervisory relationships), or conversely, with former students (i.e., a dissertation advisor with his or her former PhD students)?

My third research question is also descriptive – to identify researchers who frequently coauthor with the same partners. In this context, I use the term “frequent coauthors” to refer to those coauthor dyads of (or possibly triads or quartets) who published three or more papers together. As with the first research question, I seek to describe key demographic attributes of these dyads, again in terms of geographic distribution (e.g., continent and country) as well as gender.

## RESEARCH METHODS

I analyzed articles published in five leading information systems (IS) journals from 1999-2007. These five journals (EJIS, ISJ, ISR, JMIS, and MISQ) represent five of the six journals in the AIS Senior Scholars “basket of six” journals. I chose these journals because they are the leading journals that primarily publish IS research. While there are other leading journals that publish some IS research (*Management Science*, *Organization Science*, *Decision Science*), the latter do not publish much IS research. Hence I limited my dataset to these five leading journals. I used the central repository of IS articles created by Chua et al. (2002a, 2002b) which has been used and cited in several recent studies of IS publications (e.g., Gallivan & Benbunan-Fich 2007; Scime et al. 2009). I validated and cleaned the data in the bibliographic repository to ensure that it was complete and accurate for these journals during the years 1999-2007. If necessary, I added data to the repository to fill any gaps, in terms of specific volumes, issues, or articles that were omitted when the repository was created.

I classified each published paper as solo authored or coauthored, noting the exact number of authors. For coauthored papers, I created a symmetric edge list (Eaton et al. 1999), as is typical of scientometric studies that examine scientific collaboration. A paper consisting of four authors (Anderson, Bates, Carter, and Dalton) would be represented by 12 coauthor dyads in the symmetric edge list:

Anderson, Bates	Anderson, Carter	Anderson, Dalton
Bates, Carter	Bates, Dalton	Carter, Dalton
Bates, Anderson	Carter, Anderson	Dalton, Anderson
Carter, Bates,	Dalton, Bates,	Dalton, Carter

Thus, the number of rows in the symmetric edge list is  $n \times (n-1)$ , where  $n$  is the number of authors on a given paper. Using Excel, I first created separate edge lists to capture the publications in each IS journal, and then conducted various steps of merging and sorting the file to produce an edge list with over 4,500 rows. I performed various manipulations on the data first, to identify those IS scholars who had published with the most different coauthors, and later, those who published two or more times with the same coauthors.

## RESULTS

First, I identified IS researchers who published with the most different coauthors and coded various attributes: country and institutional affiliation (as of 2007), as well as gender. Other studies label such scholars as having the highest centrality or *size* in the network (Vidgen et al. 2007), as well as being as the most “promiscuous” coauthors (Cronin 2001; Krichel & Bakkalbasi 2009). Table 1 lists 75 IS scholars each of whom had at least seven distinct coauthors. Of the 75 “high centrality” authors, 85% were affiliated with North American universities as of 2007 (the last year in the dataset). Of the remaining 15% of non-North-Americans, the following countries and authors were represented: the UK (Zahir Irani, Marinos Themistocleous, Mark Lycett), Singapore (Bernard Tan, James Thong), Hong Kong (K.K. Wei, Kar Yan Tam), Finland (Juhani Iivari), Korea (Jae-Nam Lee) and Taiwan (Eric Wang). In terms of gender, 83% of the high centrality authors are men; 17% are women. Since this gender distribution is identical to the overall proportion of papers published by men and women in these journals, neither men nor women are over-represented among the 75 high-centrality IS scholars.<sup>6</sup>

To answer my second question regarding the nature of the linkages between these high-centrality authors and their coauthors, I classified them into two groups – those who primarily coauthored with their (current or former) PhD students (Category A, which I defined as scholars for whom 70% or more of their coauthored papers are with PhD students) and those who mostly coauthor with peer researchers (labeled Category B). I operationalize Category B as scholars for whom 30% or less of their coauthored papers are published with former students. I examined the author biographical information in the original articles to inform this classification into Category A or B. For several authors in Table 1 for whom I was unsure of the correct classification, I sent email messages to them in order to confirm the appropriate classification (approximately 20 authors).

My coding found that nearly 70% of the high-centrality authors belong to Category A; just over 30% belong to Category B. Many of those authors who belong to Category B tend to be younger researchers who received their PhD degrees in 1997 or later, and who were too junior to have published many journal papers with their own PhD students between 1999 and 2007. In a few cases, some scholars in Category B worked at institutions without a PhD program; hence they could not publish with their own PhD students. Others were at institutions *with* a PhD program, but they still published mostly with peer researchers.

<sup>6</sup> The number of men is larger than the number of women, but this is proportional to the ratio of men and women who publish in these journals: 82%-18% (Gallivan & Benbunan-Fich 2006). It is similar to the gender ratio of IS PhD degrees awarded.

Last Name	First Name	Gender	# of Co-Authors	Institutional Affiliation (as of 2007)		Prior Affiliation	
				Country	University	Country	University
		0=male, 1=female					
Nunamaker	Jay	0	26	USA	Univ. Arizona		
Keil	Mark	0	20	USA	GSU		
Benbasat	Izak	0	19	Canada	Univ. of BC		
Lyytinen	Kalle	0	18	USA	Case Western	Finland	Univ. of Jyväskylä
Kauffman	Robert	0	17	USA	Univ. Minnesota		
Zmud	Robert	0	15	USA	Univ. Oklahoma	USA	Florida State Univ.
Whinston	Andrew	0	15	USA	Univ. Texas		
Krishnan	Ramayya	0	14	USA	Carnegie Mellon		
Grover	Varun	0	14	USA	Clemson	USA	Univ. of S. Carolina
Burgoon	Judee	1	14	USA	Univ. Arizona		
Malhotra	Arvind	0	13	USA	Univ. of NC		USC
Majchrzak	Ann	1	13	USA	USC	USA	USC
Dennis	Alan	0	13	USA	Indiana Univ.	USA	Univ. Georgia
Agarwal	Ritu	1	12	USA	Univ. Maryland	USA	Univ. Florida
Straub	Detmar	0	11	USA	GSU		
Saunders	Carol Stoak	1	11	USA	Centr. Florida		
Robey	Daniel	0	11	USA	GSU		
Irani	Zahir	0	11	UK	Brunel Univ.		
Stohr	Edward	0	10	USA	Stevens Inst.	USA	New York Univ.
Sambamurthy	V.	0	10	USA	Michigan St.	USA	Univ. of Maryland
Hart	Paul	0	10	USA	Florida Atlantic		
Clemons	Eric	0	10	USA	Univ. Penn.		
Butler	Brian	0	10	USA	Univ. Pitts.	USA	Carnegie Mellon
Wei	Kwok-Kee	0	9	Hong Kong	City Univ. of HK		
Slaughter	Sandra	1	9	USA	CMU		
Romano	Nicholas	0	9	USA	Univ. Oklahoma		
Narasimhan	Sridhar	0	9	USA	Georgia Tech.		
Rai	Arun	0	9	USA	GSU		
Oh	Wonseok	0	9	Canada	McGill Univ.	USA	New York Univ.
Mukhopadhyay	Tridas	0	9	USA	Carnegie Mellon		
Konana	Prabhudev	0	9	USA	Univ. Texas		
King	William	0	9	USA	Univ. Pitts.		
Hirschheim	Rudy	0	9	USA	LSU		Univ. Houston
Gosain	Sanjay	0	9	USA	Maryland	USA	USC

Galletta	Dennis	0	9	USA	Univ. Pitts.		
Tan	Bernard	0	8	Singapore	NUS		
Tam	Kar Yan	0	8	Hong Kong	HKUST		
Seidmann	Abraham	0	8	USA	Rochester		
Mathiassen	Lars	0	8	USA	GSU	Denmark	Aalborg Univ.
Kraemer	Kenneth	0	8	USA	Calif.-Irvine		
Baskerville	Richard	0	8	USA	GSU		
Gupta	Alok	0	8	USA	Univ. Minnesota		
Gallivan	Michael	0	8	USA	GSU		
Dewan	Rajiv	0	8	USA	Univ. Rochester		
Bardhan	Indranil	0	8	USA	Univ. Texas		
Ba	Sulin	1	8	USA	Univ. Conn.	USA	Univ. Texas
Wixom	Barbara	1	7	USA	Univ. Virginia		Univ. Georgia
Wells	John	0	7	USA	Wash. State		
Wang	Eric	0	7	Taiwan	National Univ		
Thong	James	0	7	Singapore	NUS		
Themistocleous	Marinos	0	7	UK	Brunel Univ.		
Pavlou	Paul	0	7	USA	USC		
Newell	Sue	1	7	USA	Bentley Univ	UK	Univ. of Warwick
Markus	Lynne	1	7	USA	Bentley Univ	Hong Kong	City Univ. of HK
March	Salvatore	0	7	USA	Vanderbilt		
Lee	Jae-Nam	0	7	Korea	Korea Univ.		
Klein	Gary	0	7	USA	Centr. Florida		
Kimbrough	Steven	0	7	USA	Univ. Penn.		
Jiang	James	0	7	USA	Centr. Florida		
Jasperson	'Jon	0	7	USA	Univ. Oklahoma	USA	Univ. Oklahoma
Iivari	Juhani	0	7	Finland	Univ. Oulu		
Fuller	Mark	0	7	USA	Wash. State		
Davis	Gordon	0	7	USA	Univ. Minnesota		
Chudoba	Katherine	1	7	USA	Utah State	USA	Florida State
Chin	Wynne	0	7	USA	Univ. Houston		
Lycett	Mark	0	7	UK	Brunel Univ.		
<b>Table 1: High-Centrality IS Researchers (i.e., Most Unique Coauthor Linkages)</b>							

Since 70% of the scholars in Table 1 belong to Category A, I list just the names of those in Category B (in descending order).

Mark Keil, Kalle Lyytinen, Arvind Malhotra, Ann Majchrzak, Edward Stohr, Paul Hart, Brian Butler, Sandra Slaughter, Nicholas Romano, Wonseok Oh, Sanjay Gosain, Richard Baskerville, Mike Gallivan, Indranil Bardhan, Rudy Hirschheim, Sulin Ba, Barb Wixom, Marinos Themistocleous, Paul Pavlou, Sue Newell, Jae-Nam Lee, Jon Jasperson, Juhani Iivari, Kathy Chudoba.

With the exception of these authors, others listed in Table 1 primarily coauthored with their PhD students during the years

1999-2007 (Category A). Most are senior faculty members located in institutions with large, established PhD programs (and thus, many IS researchers have received their degrees from them).

My third question is descriptive – to identify which researchers are “frequent coauthors” – in this case, referring to coauthors who published three or more journal papers between 1999-2007. Table 2 lists the names of these coauthors who published at least 3 papers, while the Appendix (available from the author upon request) identifies those with 2 coauthored papers. Some of the coauthors form what I call “triads” (sets of 3-authors who often coauthor) or “quartets” (sets of 4 authors who often coauthor). In many cases, they represent a recent PhD graduate and her two (or three) advisors.

Author A Surname	Author A First Name	Author B Surname	Author B First name	Author A Country Affiliation	Author B Country Affiliation
Baskerville	Richard	Pries-Heje	Jan	USA	Denmark
Bassellier	Genevieve	Benbasat	Izak	Canada	Canada
Benbasat	Izak	Lim	Kai	Canada	USA
Benbasat	Izak	Reich	Blaize	Canada	Canada
Bhattacharjee	Anol	Karimi	Jahanghir	USA	USA
Bhattacharjee	Anol	Somers	Toni	USA	USA
Briggs	Robert	Nunamaker	Jay	USA	USA
Chellappa	Ram	Shivendu	Shivendu	USA	USA
Clemons	Eric	Dewan	Rajeev	USA	USA
Clemons	Eric	Kauffman	Robert	USA	USA
Dewan	Rajiv	Kauffman	Robert	USA	USA
Goes	Paulo	Gupta	Alok	USA	USA
Gosain	Sanjay	Malhotra	Arvind	USA	USA
Grover	Varun	Saeed	Khawaja	USA	USA
Irani	Zahir	Love	Peter	UK	Australia
Irani	Zahir	Sharif	Amir	UK	UK
Irani	Zahir	Themistocleous	Marinos	UK	UK
Jiang	James	Klein	Gary	USA	USA
Karimi	Jahanghir	Somers	Toni	USA	USA
Kautz	Karl Heinz	Madsen	Sabine	Denmark	USA
Kraemer	Kenneth	Zhu	Kevin	USA	USA
Love	Peter	Sharif	Amir	Australia	UK
Lyytinen	Kalle	Rose	Greg	USA	USA
Massey	Anne	Montoya-Weiss	Mitzi	USA	USA
Newell	Sue	Swan	Jackie	UK/USA	UK
Sharma	Rajeev	Yetton	Philip	Australia/USA	Australia
Stallaert	Jan	Whinston	Andrew	USA	USA
Tam	Kar Yan	Thong	James	Hong Kong	Singapore

**Table 2: Frequent Coauthors with 3 or More Coauthored Papers**



In analyzing the results in Table 2, I observe, first, that most (but not all) coauthors have their primary affiliation with an institution in the same country as their partner. Just a few pairs of frequent authors span different continents (e.g., Europe and USA, or UK and Australia). Of the 56 names represented by the 28 pairs of frequent coauthors in Table 2, 40 (72% of the total) were affiliated with institutions in North America – USA or Canada. In addition, 8 (14.3%) were from the UK, 4 (7%) from Australia, 2 (3.5%) from Denmark, plus one each (1.8%) from Hong Kong and Singapore.

Second, we identified 18 scholars who appeared on both lists: Table 1 (coauthors with many different coauthor partners) and Table 2 (coauthors having 3 or more publications with the same coauthor). All but one were male: Izak Benbasat (Univ. of British Columbia, Canada), Kalle Lyytinen (Case Western Univ., USA), Jay Nunamaker (Univ. of Arizona, USA), Robert Kauffman (Univ. of Minnesota, USA), Andrew Whinston (Univ. of Texas, USA), Varun Grover (Univ. of South Carolina, USA), Eric Clemons (Univ. of Pennsylvania, USA), Arvind Malhotra (Univ. of North Carolina, USA), Zahir Irani (Brunel Univ., UK), Marinos Themistocleous (Brunel Univ., UK), Richard Baskerville (Georgia State, USA), Alok Gupta (Univ. of Minnesota), Rajiv Dewan (Univ. of Rochester, USA), Kar Yan Tam (HKUST, Hong Kong), and James Thong (NUS, Singapore). The one (female) exception was Sue Newell (Bentley University, USA; formerly Univ. of Warwick, UK).

In my AMCIS 2010 presentation, I will report the proportion of advisor-coauthor dyads in Table 2. I will also graphically depict linkages between various triads (sets of 3 authors) and quartets (sets of 4 authors) who published together. In all cases of triad or quartets, one author – usually the first author – was a former PhD student of one of the other coauthors. In my presentation, I will employ visualization techniques to show these coauthors are interconnected with other IS researchers.

## DISCUSSION

The results show, first, that most frequent coauthors are individuals who primarily publish with their PhD students. Nearly 70% of the high-centrality researchers appearing in Table 1 are senior IS faculty who have repeatedly published with their former PhD students. For instance, most are full professors located in institutions with large, well-established PhD program – which has facilitated their ability to publish many papers with many different PhD students (at least six different students) between 1999-2007. These include (in descending order): Jay Nunamaker (Univ. of Arizona), Izak Benbasat (Univ. of British Columbia), Rob Kauffman (Univ. of Minnesota), Robert Zmud (Univ. of Oklahoma, formerly Florida State Univ.), Andrew Whinston (Univ. of Texas), Ramayya Krishnan (Carnegie Mellon Univ.), and Varun Grover (Univ. of South Carolina). The few exceptions among the “Top 10” authors listed in Table 1 are Mark Keil (Georgia State Univ.) and Kalle Lyytinen (Case Western Univ., formerly, Jyväskylä Univ., Finland). These authors (Keil and Lyytinen) each had over 17 distinct coauthors, but less than 30% of their coauthored papers were with PhD students. Thus, they are classified as belonging to Category B.

Based on my classification of the scholars in Table 1 into Category A vs. Category B, over two-thirds of the high centrality IS researchers primarily publish with their (former) PhD students – with most exceptions being researchers who would have been too junior to have published with their own PhD students during the time period covered by my data (i.e., where the more senior member received his or her PhD degree in 1997 or later). Moreover, 85% of high-centrality authors are located in North American institutions, with other countries represented among the remaining 15% being the UK, Singapore and Hong Kong (with 2 authors each), plus Korea, Taiwan, and Finland (one author each). Moreover, neither men nor women are over-represented among high-centrality researchers, since the proportion of men and women in Table 1 is similar to the proportion of authors who publish in these journals overall: 82% men and 18% women (Gallivan & Benbunan-Fich 2006).

What insights can we draw about the steady increase in the proportion of coauthored papers over the past 20 years that has been recently documented (Gallivan & Ahuja, forthcoming), based upon this analysis of frequent coauthor relationships? It appears that authors who coauthor with many distinct partners consist largely of advisor-student linkages (rather than peer collaborators) and most are located in North America. There are some exceptions to these patterns – which I plan to identify and highlight in my AMCIS presentation.

## LIMITATIONS AND OPPORTUNITIES FOR FUTURE RESEARCH

One limitation is that this study covers a specific set of five journals for a specific period of time (1999-2007). I excluded papers published in several leading journals which occasionally publish some IS research (e.g., *Academy of Management Journal*, *Decision Sciences*, *Organization Science*, *Management Science*). While just a small fraction of papers published in these journals are by IS scholars, if I had included such journals in my dataset, then it is possible that my results would differ somewhat. In fact, when I emailed one author to confirm his/her classification into Category A or B, s/he responded that:

“With respect to the journals listed I would be in ‘Category B’.... however, if you broaden the set of journals to include *Management Science* and *Organization Science*, then there would be more of my PhD students involved in the papers published.”

Another scholar offered a similar observation that the end points defining the time period matter in terms of how he should be classified. This scholar agreed that his coauthored papers between 1999-2007 correspond to Category B, although he stated that, in recent years, “I have been moving towards Category A – I guess it is a more North American phenomenon.”

These responses suggest that had I included a larger set of journals or even the same journals for a different time period, then some of the results reported here may have changed somewhat.

One challenge for future research is to try to unravel the disparity by continent: although the prior study (Gallivan & Ahuja, forthcoming) reported a higher incidence of coauthorship in journals published in North America than in Europe – and while we know that most researchers in North America and Europe tend to publish in journals located in their local region (Galliers & Meadows 2003), we do not know whether the higher rate of coauthorship in North American IS journals over the past 20 years is due specifically to North American researchers publishing coauthored work in these journals; conversely, it could be that *all* IS researchers who publish in North American journals are more likely to coauthor, regardless of their own country location. Likewise, IS scholars who publish in European journals may be *less* likely to coauthor – without regard to their country location. Future research should tease out whether this observed difference based on the geographic location where a given journal is published is primarily a function of the country location of the authors themselves or of the journal.

Another issue for future research is to identify what proportion of coauthors today represents other types of contributors (Hara et al. 2003), who may have had a specific role in the study (e.g., technicians, statistical consultants, managers who offer access to a field site). In their work, Hara et al. (2003) provide a typology of different collaboration types – which they label *true* collaboration, *mild* collaboration, and individuals who simply provide *connections* to another resource. It may be that some contributors today receive a coauthor listing, when they would previously have received an acknowledgment in research published a decade or two ago. Perhaps such contributors should really be seen as “sub-authors” – referring to those who receive acknowledgement in a publication – rather than full coauthors. Economists have argued that shifts in terms of the norms for who should be included as a coauthor account for much of the observed increase in coauthorship in economics. For instance, some contributors who would previously have received an acknowledgement at the end of the paper are now receiving coauthorship credit – either because that is now the norm in some fields. Barnett et al (1988) claim that due to the higher number of demands on their time, some researchers now demand full authorship as a condition for being willing to offer feedback or advice to colleagues on a manuscript. Clearly, there are a host of issues that future research can explore, to understand the factors underlying the observed increase in the rate of coauthored research in IS, as well as in other fields.

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