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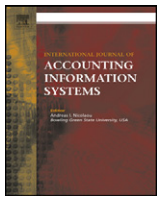

Social network analysis in accounting information systems research

James Worrell [1], Molly Wasko *, Allen Johnston [2]

University of Alabama at Birmingham, 319 Business and Engineering Complex, 1530 3rd Avenue South, Birmingham, AL 35294-4460, United States

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ABSTRACT

This paper introduces social network analysis as an alternative research method for conducting accounting information systems related research. With advances in information and communication technologies, transaction data are being recorded in electronic form, resulting in a variety of research opportunities to examine dyadic interactions. A network consists of a set of nodes connected by ties. Social network research focuses on how outcomes are influenced not just by the attributes of the nodes (e.g. individuals), but also by the ties connecting nodes to each other. The nodes are typically conceptualized as actors, such as individuals, teams, or organizations. A unique network structure is created to reflect each different type of tie, such as trust, advice, collocation, or organizational affiliation. Social network analysis can be used for research examining individual, dyadic or network levels of analyses, and is a powerful tool for conducting multi-method research. Given the vast amounts of trace electronic data collected via accounting information systems, this paper reviews how social network analysis not only opens new research avenues for accounting information systems researchers, but identifies opportunities for the field of accounting information systems to inform social network research by identifying new network structures and dynamics leveraging transactional data.

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1. Introduction

There has been a general shift in management research over the past decade towards more relational theories of organizations that view actions and actors not as independent, autonomous agents, but as embedded within

* Corresponding author. Tel.: +1 205 934 8806(office); fax: +1 205 975 4429.
E-mail addresses: worrellj@uab.edu (J. Worrell), mwasko@uab.edu (M. Wasko), ajohnston@uab.edu (A. Johnston).
[1] Tel.: +1 205 934 8820.
[2] Tel.: +1 205 934 8870.

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socio-technical systems. In contrast to theories that examine individuals based on their attributes, such as gender, age, education, or occupation, social network perspectives focus on how the relationships between entities, such as individuals, functional units, or organizations, influence interactions and outcomes. The concept of a "network" is broad and can be applied to a variety of phenomena where a set of relations is ascribed to an identified set of actors. What unites social network perspectives is the focus on the patterns and implications of the ties within a collective (Scott, 1991; Wasserman and Faust, 1994). For example, at the individual level ties facilitate the spread of information among network participants, enable the flow of both tangible and intangible resources among network members, and place constraints on each member's behavior (Burt, 1992).

Social network research focuses on the significance of relationships as essential for understanding social action, but varies widely in the attributes that are studied. A network is defined as a set of nodes connected by ties. Nodes are typically "actors", and can be people, teams, organizations or information systems. Relations, or ties, connect the actors and can vary in content, direction, and relational strength, all of which influence the dynamics of the network (Garton et al., 1999). The content of ties refers to the resource exchanged or common bond, such as information, money, advice, or kinship. The direction of ties indicates an "ego" who gives the resource, and the "alter" who receives it, although ties in some networks are undirected, such as a shared attribute (e.g. gender), or joint membership on a team. The relational strength of ties pertains to the level of activity, such as quantity of communications, or the intensity, such as the social influence exerted by the tie, indicating that ties can be valued or weighted. For instance, the relational strength of ties could indicate the amount of energy, emotional intensity, intimacy, commitment or trust connecting the actors. Relational ties are often studied in management research as important aspects of social influence that can exert control, such as social punishments or ostracism (Ostrom, 1990). Other aspects of social influence foster cohesion and prosocial behavior in the network, such as trust, identification, the diffusion of information and commitment (Coleman, 1990; Nahapiet and Ghoshal, 1998).

Each tie defines a different network, and while some ties are often related (a trust network is often correlated to a friendship network), ties are often assumed to function differently. Not all ties are considered to have positive outcomes; for instance, network research is often used to map the flow of disease or terrorist networks. Therefore, some network research focuses on how to improve the flow of the resource through the network, such as adoption of a new accounting information system, or how to disrupt the flow of resources in the network, such as taking out key nodes in a fraud network. Depending upon the theory being applied, some studies examine network variables as independent variables causing consequences, such as adoption of a technology or improved performance, while other studies examine network variables as dependent variables, identifying the causes underlying the pattern of network connections, how networks come to be, and how networks change over time (Borgatti and Foster, 2003).

2. Example of social network analysis

This section describes a social network study to provide insights about how to apply social network analysis. The context for the study was a business school consisting of 89 faculty members organized into 7 departments. The purpose of the study was to understand how social networks impact the research performance of individual faculty, and the practical question was how collaboration among faculty members within a business school impacts an individual faculty's research performance (Smatt, 2009). The data for this study were collected via survey using a roster method with the names of all faculty members in the school listed. Each faculty member responded to survey items based upon their relationships with all other faculty members. Social network data can also be collected from archival data, such as using electronic trace data from transaction processing systems, electronic data interchange (EDI) or email communications. Data are recorded in a square matrix to indicate the ego (in the first column), the alter (in the first row) and the tie (weighted, directed and/or dichotomous) in the corresponding ego/alter cells. A separate network is created for each type of tie; for instance, in this study multiple networks were collected, including collocation, same department, hierarchical level (assistant, associate, full, and administrator), how well faculty members knew each other, trusted each other and sought advice from each other.

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