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Modelling user participation in organisations as networks

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ABSTRACT

User participation (UP) means activities that individuals perform for processes to develop systems or to act collectively and is an important factor for gaining user commitment and minimising user resistance. This is due to the ability of UP to shape the structure and behaviour of organisations through leveraged user expertise, minimised redundant processes and improved understanding of systems.

Grounded on social network analysis and UP research, this article proposes a mathematical model for analysing UP in 'organisations as networks'. The model identifies concepts for characterising network structures for UP and introduces indicators for assessing the network behaviour of human participants within organisations. The article concludes by discussing implications for researchers and practitioners, and limitations of the proposed model.

1. Introduction

1.1. Research background

User participation (UP) has long been argued in literature as an important organisational behaviour for successful systems development processes (Barki & Hartwick, 1994a, 1994b; Cavaye, 1995; Hartwick & Barki, 1994; McKeen & Guimaraes, 1997; McKeen, Guimaraes, & Wetherbe, 1994; Newman & Robey, 1992). It means activities that individuals perform for processes to develop systems (Barki & Hartwick, 1994a, 1994b) or to act collectively (Kim & Bearman, 1997; Skvoretz & Fararo, 1996; Takács, Janky, & Flache, 2008). UP enables organisations to improve information requirement assessments, to effectively leverage user expertise, to minimise redundant processes, and to improve the understanding of systems (McKeen et al., 1994). It also offers an avenue for organisations to gain user commitment and minimises user resistance (Cavaye, 1995).

The 'organisation as a network' mindset is widely considered by researchers and practitioners as a useful approach for gaining insights into organisational management (Oberg & Walgenbach, 2008; Santoro, Borges, & Rezende, 2006). Within the field of expert and intelligent systems, this mindset has been extensively adopted by researchers to study and understand organisational factors that relate to users such as *user context* (Jung, 2011a), *collaboration* (Durugbo, Hutabarat, Tiwari, & Alcock, 2011a; Durugbo, Tiwari, & Alcock, 2011b; Santoro et al., 2006), *research and development* (Jin, Park, & Pyon, 2011), *innovation* (Liu, 2011), *communication patterns* (Benham-Hutchins & Effken, 2010), *information/knowledge sharing* (Hatala & Lutta, 2009; Tsai, 2002), *organisational hierarchies* (Oberg & Walgenbach, 2008), *social status* (Lamertz & Aquino, 2004; Skvoretz & Fararo, 1996) and *system use* (Sykes, Venkatesh, & Gosain, 2009). For this article, the term 'users' is applied interchangeably with individuals and human participants, and is used throughout the article to mean people within an organisation such as senior/middle management and other employees that carry out work and directly interact with a system (Cavaye, 1995).

1.2. Aim of article

In this article, UP is analysed in organisations. The aim of the article is to propose a conceptual model that structurally analyses how individuals in 'organisations as networks' perform activities. In order to accomplish this, the article will identify existing research that study UP within 'organisations as networks', analyse characteristics of UP and propose modelling concepts for assessing UP in organisations.

1.3. Organisations as networks

Existing approaches to the structural analysis of organisations have explored two main idealisations: 'organisations as information processors' (Ellis, 1989; Feinstein & Morris, 1988; Galbraith, 1974) and 'organisations as networks' (Durugbo et al., 2011a; Liu, 2011; Merrill et al., 2008; Poell & Van der Krogt, 2010; Santoro et al., 2006). The information processing idealisation analyses internal structures and processes that change subject to environmental effects whereas the network idealisation identifies patterns of relations and involvement (centralized and decentralized) within and between systems, people and groups. The information

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processing approach however fails to identify networks and topologies capable of tapping knowledge from external sources. These networks include *collaborative networks* for leveraging information and communication technologies (ICTs), *friendship networks* for informal interactions and friendships, *hierarchical networks* for filling administrative layers, *business networks* for collaboration among online businesses (Jung, 2011b) and *task networks* for new product development (Batallas & Yassine, 2006; Durugbo et al., 2011a, 2011b; Oberg & Walgenbach, 2008). Furthermore, the 'organisation as a network' mindset, based on social network analysis (SNA), offers a useful approach for promoting organisational flexibility and adaptability, particularly in the quality and sharing of information (Durugbo et al., 2011a).

Conceptually, SNA applies two main approaches to analyse the behaviour of networks: sociocentric (whole) approaches in which groups and group interactions are studied, and egocentric (personal) approaches in which an individual and an individual's interaction is assessed (Durugbo et al., 2011a; Hatala & Lutta, 2009; Schultz-Jones, 2009). Sociocentric and egocentric approaches are primarily studied through cohesion and centrality respectively for characterising the network behaviour of social networks. The reader is referred to SNA review articles such as Haythornthwaite (1996) and Schultz-Jones (2009) and SNA books such as Scott (1991) and Wasserman and Faust (1994) for the origin, concept and applications of existing SNA concepts and metrics.

1.4. Research motivation and focus

In recent years, UP has become a popular organisational factor for information systems (IS) research due to *technological changes* (Heller, Gusic, Strauss, & Wilpert, 1997; Wixom & Watson, 2001). These changes have resulted in the proliferation of ICTs for data warehousing, networking and user interaction such as: e-mail, voice over IP, peer-to-peer and grid computing, video-conferencing and mobile/broadband connectivity. Consequently, UP research continues to be dominated by studies of systems development, a trend earlier observed by McKeen and Guimaraes (1997). Nonetheless current IS research are now exploring novel areas of study such as online communities (Jarvenpaa & Majchrzak, 2010; Remondino & Boella, 2010; Zhou, 2011), IS security risk management (Spears & Barki, 2010), and ICT use in social care (Webb, 2008). UP has also been studied in areas such as fisheries management (Nielsen & Vedsmand, 1999) and watershed management (Johnson, Ravnborg, Westermann, & Probst, 2001). Other UP-focused studies have explored areas such as: *community, public and citizen participation* based on individual motives and social influence (particularly in terms of social identity i.e. individuals viewing themselves as part of a community and group norms i.e. behaviour relating to the 'way we do things') (Dholakia, Bagozzi, & Pearo, 2004; Irvin & Stansbury, 2004; King, Feltey, & Susel, 1998), *customer participation* for getting customers involved in the production and delivery of products and services (Bendapudi & Leone, 2003), and *organisational participation* between multiple firms for fulfilling market needs (Grewal, Comer, & Mehta, 2001).

UP research is motivated by the need to explore the social dynamics of systems development (Newman & Robey 1992) and the amount of control that users exert (Majchrzak, Beath, Lim, & Chin, 2005). It has been shown to improve job satisfaction, quality of decision making, quality of systems and the acceptance of systems by users (Barki & Hartwick, 1989, 1994a, 1994b; Hartwick & Barki, 1994; McKeen et al., 1994). Participation has also been studied and shown to be successful and sustainable in areas where coercion and subsidisation strategies have been ineffective (McKeen & Guimaraes, 1997).

On the other hand, UP may be counterproductive if user disagreements/ conflicts are not managed (Barki & Hartwick, 1994b) or if user suggestions are ignored (McKeen & Guimaraes, 1997). UP therefore requires practitioners to effectively manage neutral (neither positive nor negative) conflict and disagreement so as to encourage growth and change (Barki & Hartwick, 1994b). Companies must also make sure that the mechanisms for participation are carefully chosen to match the desired output from participation and current stage of systems development (Simmons, 1994). Furthermore, several authors such as Cavaye (1995), Lin and Shao (2000) and McKeen and Guimaraes (1997) have observed that the findings of UP research remain mixed, inconclusive, fragmented or contrary to expectations. In the opinion of these authors, these problems are due to poorly grounded theories, methodological flaws, and the omission of important contextual indicators.

Within the context of SNA, most of the UP-motivated research have made use of existing SNA concepts to explore how UP can be enabled through the use of online community driven technologies/ services and peer-to-peer networks, as shown in Table 1. The reader is referred to the review article by Kolbitsch and Maurer (2006) for on overview of online community driven technologies and services for enabling UP such as blogs, wikis (Wikipedia and Wikinews), social networks and services (e.g. Orkut, Friendster and del.icio.us), file sharing tools (e.g. Flickr), and podcasting. Few studies in the literature have formulated ways for measuring UP based on top-down approaches. For instance, in Barcellini, Détienne, and Burkhardt (2009), a three interaction space model is provided of the design process for Open Source Software and in Webb (2008) existing SNA metrics were identified for use in social care for describing the deliberations and democratic roles of human participants. Current research could therefore be critiqued for failing to evaluate the suitability of existing SNA concepts to characterise UP. The evaluation exercise is necessary for the development of contextual indicators that could enable researchers and practitioners to monitor the evolution of UP at intra-organisational (individual or group) and inter-organisational levels (Durugbo et al., 2011a).

The focus of this article is to identify the characteristics of UP and to make use of SNA concepts to: (*i*) define vertices and edges for the network structure of UP in organisations and (*ii*) propose contextual indicators for the network behaviour that can be used to characterise UP in organisations. Key UP characteristics will be derived from UP academic literature and used to propose concepts for analysing the network structure and behaviour of UP in organisations. Using data from an industry case study conducted by the author of this article, the proposed concepts will then be applied and discussed.

The article plans to contribute to knowledge by: (i) introducing a conceptual model for analysing UP, and (ii) demonstrating the use of the model in an industry case study. In order to accomplish this, the article will make use of a *bottom-up* approach through a methodology that analyses characteristics of UP, proposes modelling concepts for assessing the level of UP in organisations and applying the model in a real-life network scenario. Whereas a top-down approach concentrates on system performance, the bottom-*up* approach explores processes that lead to systems outputs as well as system performance (Baron, Kruser, & Huey, 1990). Concepts outside the scope of the model include: *co-management* that applies UP for legislation and administrative support (Nielsen & Vedsmand, 1999), *involvement* as a psychological concept (Barki & Hartwick, 1989, 1994a, 1994b; Cavaye, 1995; Hartwick & Barki, 1994), *client learning* that concentrates on how representatives of users acquire knowledge to enhance understanding of system characteristics (Majchrzak et al., 2005) and *social status* that determines how an individual participates (Kim & Bearman, 1997; Skvoretz & Fararo, 1996).