Network Ties and Their Effect on Employee Collaboration in Enterprise Social Networks: A Review and Research Agenda

Research in Progress

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Abstract

In recent years, there has been a rapid growth and widespread adoption of social media technologies across all industries. Despite the growing importance of enterprise social networks (ESN) in creating social capital and facilitating innovation, there has been limited research in examining the role of employee relationships (ties) in these networks. Earlier studies have reported that the network structure can enhance or restrict employee behaviour to a great extent and that those who implement ESN should consider how network structure can support positive collaboration behaviour, rather than restrict it. Accordingly, we propose that the understanding of network ties and their effect on employees' collaboration will help in influencing the design and use of ESN in a way that it will help in building productive and sustainable employee collaboration. This paper reviews the existing literature to understand the relationship between network ties and collaboration outcomes and proposes a future research agenda.

Keywords: Enterprise social network, network ties, organisational social media, employee collaboration, collaboration outcomes

1 INTRODUCTION

There is a growing research into the adoption of social networks by organisations as well as implications of these networks. In this study we use the term "Enterprise Social Networks" (ESN) to refer to the social networking technologies used by an organisation. Prior research has made some important contribution in explaining the performance impacts of ESN at the organisational level (Kane 2017; Leonardi et al. 2013). Yet, research related to the implications of ESN at the employee level, within the context of an organisation is not significant. To name a few, Kane (2015) and Kuegler et al. (2015) have done studies to explore impact of ESN on employees. The links or connections that exist between the participating actors (e.g. employees) are commonly referred to as *ties* in social networks (Burt 2004; Granovetter 1973). Kane et al. (2014) suggested that the ESN structure can enhance or restrict employee behaviour to a great extent, so it is important to ensure that ESN structure supports employee collaboration, rather than restricting it, and in order to achieve this, it is necessary to obtain an understanding of the relationship between ESN structure, which is mainly formed by ties, and employees' collaboration in an organisation. Implications of ties on the employee collaboration in ESN is hardly researched before, therefore, this study is planning to propose a model to enhance employee collaboration through ESN ties.

Collaboration takes place when a group of individuals or stakeholders with an interest of achieving common goals engage in an interactive process using shared rules, norms and structures (Wood and Gray 1991). Collaboration can be investigated at individual, team, intra-organisational or inter-organisational level (Blomqvist and Levy 2006). While inter-organisational collaboration has received great attention in several research disciplines, research providing insights into intra-organisational collaboration is not very significant, in particular at the employee level and this study aims to contribute towards addressing this gap.

This research-in-progress investigates existing literature to understand the role of network ties on employees' collaboration manifested by collaboration outcomes within an organisation. Hence, the study aims to address the following research question*: how do network ties in enterprise social network affect employees' collaboration?* To gain an in-depth understanding of ties and collaboration, a mixed method research will be conducted.

The rest of this paper is structured as follows to present in order:

- a literature review focusing on network ties and collaboration in an organisational setting,
- research framework synthesised from literature review,
- research methodology proposed to carry out required research activities,
- research gaps identified, and finally concluding remarks of expected contribution of the study

2 LITERATURE REVIEW

2.1 Network Ties

In network structure, it is the network ties that define the nature of the relationship between individuals and therefore a foci for researchers investigating collaboration networks (Scherngell et al. 2016). Ties are often defined as links or relations between two or more individuals or actors (Liu and Moskvina 2016). Social network analysis tools like Gephi, Pajek and UCINET have the capability to enable users to visualise network structure underpinned by ties and to analyse social networks.

Not all ties in a network are similar and they tend to have different effect on actors in the network. In their seminal study of social networks, Borgatti et al. (2009) categorised **tie types** in social networks as ***similarities***, ***relationships***, ***interactions*** and ***flows*** (see Figure 1). This study will be focussing on analysing these tie types, namely similarities, relationships, interactions and flows among employees in an intra-organisational social network.

Ties between actors in a network can be measured in terms of strength. ***Strong ties*** refer to the ties between nodes or individuals that are close to each other in a network (i.e. distance) and interact often (i.e. frequency), while ***weak ties*** refer to ties between nodes that are loosely connected to each other via indirect ties and they don't interact frequently; although weak ties are still helpful in reaching more people and gaining access to diverse knowledge. (Granovetter 1973).

Similarities			Social Relations				Interactions	Flows
Location	Membership	Attribute	Kinship	Other role	Affective	Cognitive		
e.g.,	e.g.,	e.g.,	e.g.,	e.g.,	e.g.,	e.g.,	e.g.,	e.g.,
Same spatial and temporal space	Same clubs Same events etc.	Same gender Same attitude etc.	Mother of Sibling of	Friend of Boss of Student of Competitor of	Likes Hates etc.	Knows Knows about Sees as happy etc.	Sex with Talked to Advice to Helped Harmed etc.	Information Beliefs Personnel Resources etc.

Figure 1. Typology of ties (Taken from (Borgatti et al. 2009))

Network ties can also be evaluated as being positive or negative. Individuals or nodes having a ***positive tie*** share positive feelings for each other, and individuals having a ***negative tie*** share negative feelings towards one another (Marineau et al. 2016). Negative ties are predominantly linked with outcomes such as lower individual performance, decreased satisfaction, and conflicts, however, a recent study suggests that indirect negative ties can be beneficial for a person's job performance (Marineau et al. 2016). While research has been done to address the positive ties and their effects, negative ties have often been ignored.

2.2 Collaboration Outcomes

In the context of ESN, collaboration can be defined as *"facilitation of the co-creation of a particular, defined **outcome** (solution, product or service). That is, social media used in this way are not primarily facilitating communication, but primarily facilitating action and work"* (Schlagwein and Hu 2017, p. 201). Many studies have been done to quantify collaboration success or the outcomes of collaboration. Lee et al. (2015) classified collaboration outcomes into subjective and objective dimensions. Objective dimension is used to quantify direct and tangible outcomes such as creating new products or services or process improvements; subjective dimension relates to indirect and intangible outcome of collaboration e.g. financial and non-financial satisfaction experienced by individuals involved in the collaboration process (Lee et al. 2015). In this study we focus on employee collaboration and thus will use the following collaboration outcomes identified in literature for further research: *knowledge creation, competitive advantage, trust, innovation, satisfaction and social capital* (Blomqvist and Levy 2006; Claiborne and Lawson 2005; Lee et al. 2015).

Collaboration in online communities often leads to "*sharing, transfer, accumulation, transformation, and co-creation of **knowledge***", a concept also known as knowledge collaboration (Faraj et al. 2011, p. 1224). Managers often find it challenging to promote an environment for knowledge creation that is consistent with the collaboration objectives of organisation (Inkpen 1996). Besides creating knowledge, employees in an organisation are believed to be a source of **competitive advantage** and sustained competitive advantage is achieved by the effective collaboration between employees (Wright et al. 1994). Competitive advantage is defined as "*valuable, inimitable, rare, and non-substitutable capabilities that help organisations outperform their competitors*" (Allred et al. 2011, p. 129). When employees collaborate, they develop a capability to understand each other and to accept negotiations i.e. mutual **trust** is built among the employees, which has tremendous effect on collaboration performance (Hurmelinna et al. 2005). **Innovation** is often a result of information-intensive activity comprising of information collection and information processing (Ahuja 2000). Collaboration networks present an increased opportunity for innovation by providing access to various information in the network. The literature suggests that active employee collaboration leads to positive attitudes toward innovation, as well as employee satisfaction (Santos-Vijande et al. 2016). Collaboration success is often measured in terms of goal achievement and **satisfaction** is a widely accepted indicator of goal achievement (Hurmelinna et al. 2005). **Social capital** is also derived from effective collaboration (Riemer et al. 2015). "*The actual content that members exchange creates a web of cooperative relationships that breed norms, trust, common purpose, and coordination—that is, social capital*" (Kane et al. 2014, p. 277). ESN helps in creating social capital by improving connections and interactions among employees (Riemer et al. 2015).

3 PROPOSED RESEARCH FRAMEWORK

To answer the research question, this study adopts a 'collaboration outcome' perspective to identify and conceptualise relationship between network ties and collaboration in an intra-organisational social network. A research framework has been developed taking into consideration the Borgatti's typology of ties, namely similarities, relationships, interactions and flows (discussed in section 2.1 earlier). A literature review was conducted to explore the effects of ties on collaboration outcomes. It was found

that despite the relationship between network ties and collaboration outcomes not being fully explored at the intra-organisational level studies retrieved from alternate contexts do indicate a strong connection between ties and collaboration outcomes. These relationships form the conceptualisation and start point for this research and are presented in a discussion of tie types and characteristics below.

Similarities: Findings from existing inter-organisational research confirmed that too little similarity between nodes can decrease inter-organisational *knowledge* exchange, and too much similarity in any form can impede *innovative* performance and can create lock-in (Lazzeretti and Capone 2016). Also, actors with diverse ties have more chance to collaborate with people from different communities and develop more *competitive advantage* (Shi et al. 2011).

Relationships: Established online relationships between employees help in building *trust* and contributes to positive outcomes of the project like *knowledge* sharing, commitment, team satisfaction, and team performance (Buvik and Rolfsen 2015). Theoretical and empirical evidence confirms that perceived quality of relations affects the association between relationship type and well-being, thereby affecting overall *satisfaction* (Fiori et al. 2006).

Interactions: A recent study shows that social interaction ties are a significant predictor of *satisfaction* in virtual communities and active interaction in these communities leads to higher collaborative *innovation* (Xue et al. 2018). In the context of intra-organisational networks, it is not sufficient to know who interacts with whom, rather it is important to understand the effectiveness with which a group exchanges information to ensure that these interactions will lead to *innovation* (Cross et al. 2002).

Flows: Also known as tie content, flows refer to what passes through the nodes when they interact (Borgatti and Halgin 2011). Tie content (ideas, norms and beliefs) play an important role in determining the *social capital* manifested in a social network (Adler and Kwon 2002). It can also be seen that with the increased affection in online community and with an increase in information value, the *satisfaction* in online community also increases (Yang et al. 2016). Cross et al. (2002) did a social network analysis of an organisation and revealed that in typical social networks, expertise of employees is not properly captured and some employees seem to have occupied positions such that they create bottlenecks in sharing information. Such networks need interventions to realise optimal collaboration outcomes.

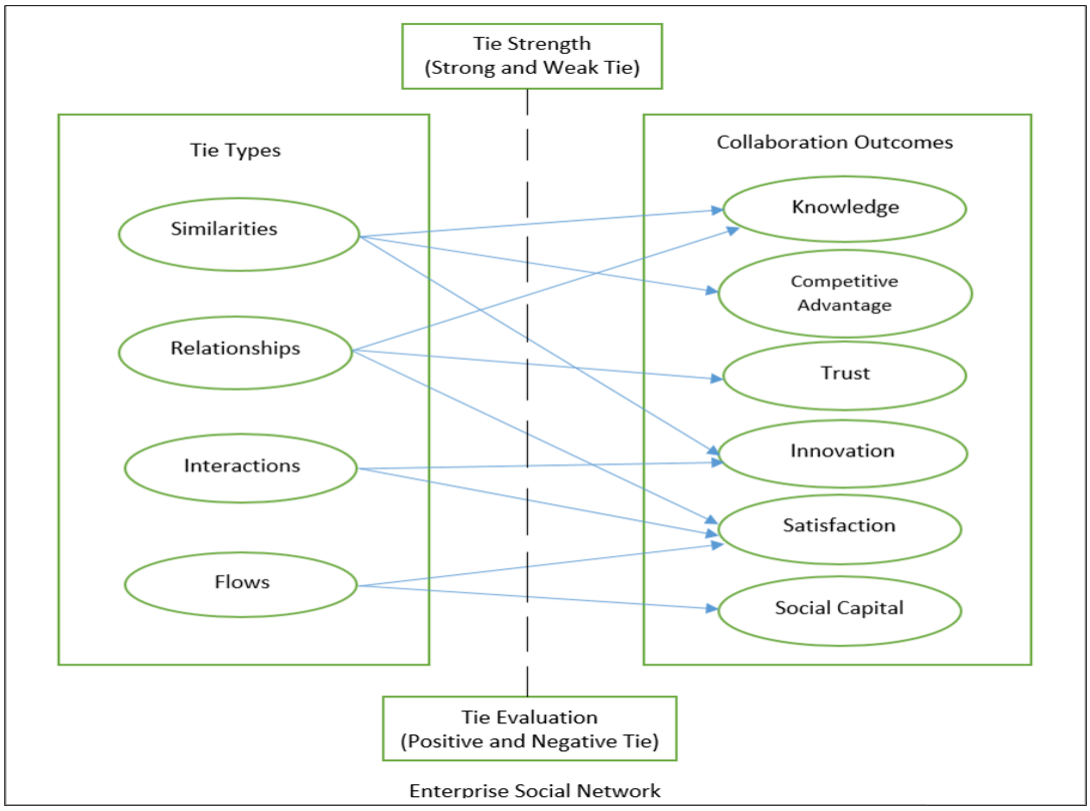

Figure 2 Conceptual framework for the study

Tie Strength and evaluation: It is perceived that the relationship between network ties and collaboration outcome is also moderated by tie strength and its evaluation i.e. whether a tie in consideration being strong, weak, positive or negative will also have an impact on collaboration

outcome. For example, in the context of similarity ties, strong positive ties are more likely to be formed between highly similar nodes due to network homophily. One the one hand, this indicates that people tend to interact more with whom they are similar with or feel more comfortable with. On the other hand, such strong positive ties may form a close network around a person thus leading to restricted *knowledge* of the outside world beyond his/her network (Granovetter 1973). As actors with strong ties are often in constant touch, the information they share might become redundant after a while and will not be contributing significantly to *social capital* of a network, whereas weak ties (e.g. acquaintances) have a potential to contribute novel information to the network, and can possibly lead to *innovation* (Granovetter 1973). Similarly, Negative ties have often been associated with stress, reduced performance, lack of *trust* and decrease in performance (Marineau et al. 2016), while positive ties are considered to be highly beneficial as they increase the *trust* in the perceived value of knowledge and it's source, enabling positive collaboration outcomes (Levin and Cross 2004).

Based on the above findings from literature, this study develops the conceptual framework shown in figure 2. The framework proposes relationship between network ties and collaboration outcomes in the context of ESN, and this relationship will be studied in detail in the next phase of the research. Knowledge about how network ties impact collaboration outcomes will not only help contribute to ESN theory but also assist stakeholders in leveraging on the use of enterprise social networks to facilitate, support, and strengthen employee collaboration (GC Kane, 2014).

4 RESEARCH METHODOLOGY

The research will be conducted using case study research method. An organisation using ESN for intra-organisational collaboration (i.e. within the organisation will be selected and the research participants will be actors (employees at managerial and executive level) participating in these networks. This study will use mixed-method approach, in which both qualitative and quantitative research methods will be used. "*Mixed methods designs create special opportunities for improving data quality, thereby increasing the significance of results"* (Hollstein 2014)

Social network data will be visualised and analysed using one of the network visualisation tools such as R, Gephi, UCINET etc. The tool will be selected based on its compatibility with the case organisations' social network. Several measurements will be employed to evaluate network properties. At the individual level, degree, centrality, closeness, and betweenness will be used to identify actors of interest and their interaction patterns. We are particularly interested in identifying actors representing different types of ties in the network, including those located at the periphery of the network via weak ties. Additionally, other measures like density, centralization, and size will be used to describe the whole network. If needed, the network data may undergo further investigation using statistical analysis.

Qualitative and descriptive data will be gathered by conducting interviews and performance ratings for employees will also be collected. With respect to network research, qualitative methods are most appropriate for investigating network practices and network perceptions and interpretations (Hollstein 2014). This data will provide better understanding of the actors involved in the network and will help to draw relations between their virtual workplace ties and resulting collaboration outcomes. Qualitative data will be analysed using Nvivo, a popular qualitative data analysis computer software package. NVivo software helps in textual data analysis and theory construction (Walsh 2003).

5 RESEARCH GAPS

A review of existing literature led to the identification of following limitations:

- A wealth of research has explored how ties affect interactions and behaviours of individuals in a social network (Borgatti et al. 2009; Faraj et al. 2015; Marineau et al. 2016). However, in the context of ESN, the effects of ties on employees' collaboration needs to be explored in depth.
- The extant literature essentially reflects one way relationship between ties and collaboration. We believe that it's a two-way relationship and studying the effect of collaboration on ties can be a potential research area for ESN studies.
- "*Most social network research in organizations has focused exclusively on the structure of ties, without regard to the content or flows which make their way through those ties*" (Marineau et al. 2016, p. 245). These studies provide a partial view of social network and a holistic approach is needed that will reveal what is truly happening within the network.
- What positive effects negative ties may have on collaboration outcomes is still an open question, and more research is warranted to study negative ties to determine their full potential.

6 CONCLUSION AND FUTURE DIRECTIONS

After an initial study of the literature, several research gaps have been identified in understanding network ties and their association with collaboration at intra-organisational ESN level. Due to the limitation of existing research findings in the identified area, further study is needed to answer our research question. In the next phase of this study, a case study research will be carried out to address the research question and will provide an in-depth insight into the impact of network ties on collaboration. Exploring tie types and their characteristics and associated collaboration outcomes in depth might aid in developing strategies to ensure productive and sustainable employee collaboration in ESN. In a broader sense, the work is expected to make important theoretical contributions to IS research that continuously seek to explore the role of technology in affecting job performance at workplace.

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