Mixed methods analysis of enterprise social networks

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ABSTRACT

The increasing use of enterprise social networks (ESN) generates vast amounts of data, giving researchers and managerial decision makers unprecedented opportunities for analysis. However, more transparency about the available data dimensions and how these can be combined is needed to yield accurate insights into the multi-facetted phenomenon of ESN use. In order to address this issue, we first conducted a systematic literature review to identify available data dimensions and integrated them into a conceptual framework. We then adopted this framework as part of a mixed methods research approach to comprehensively analyze an empirical ESN case. With our results serving as a proof of concept we show the insights that can be derived from different data dimensions and how combining these can improve the validity of the analysis. The application of the framework also allows us to derive a detailed guideline for combining different data sources in ESN analysis to support researchers and decision makers.

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1. Introduction

Over the past few years, many companies have witnessed their employees moving toward more flexibility and self-determination, especially in terms of spatial and time-independent work [1,2]. Systems that support distributed and networked collaboration, such as enterprise social networks (ESN), have been playing an increasingly important role in changing communication practices [3–5]. Based on previous research [6–9], we define ESN as web-based intranet platforms that support users in contributing persistent objects to a shared pool, which enables public responses to these objects, allows profile information to be presented, and connects users via features like Following, or Friendship request. Examples of widely adopted platforms include weblogs, wikis, microblogs, and social networking platforms, which tend to converge into an integrated ESN [10].

The increasing use of ESN produces a considerable amount of data, since almost every interaction in the system leaves a persistent digital trace [3]. This "revolution in the measurement of collective human behavior" [11 p. 66] gives researchers and managerial decision makers unprecedented opportunities to analyze and explain such systems.

The comprehensive variety of relevant ESN data is evidenced, for example, by studies on patterns of information exchange [12,13] and their underlying network structures [14,15], the distribution of ideas [16], rumors [17] and sentiments [18], as well as their representation [19]. Other studies have shed light on social technology's effects on employee performance [20,21], hierarchy [22], contribution behavior [23], and trust [24].

Whereas existing studies have led to insightful results, they have all applied only partial views based on different individual data dimensions and research approaches.

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However, the abundant data suggests that systematically combining and triangulating different data dimensions will lead to more robust or even novel insights for researchers or managers. For example, conducting an additional sentiment analysis of the postings and qualitative user interviews might support interpreting dissemination measures. In addition to the challenge of combining multiple such data sources, consistent academic theory development faces important methodological challenges. Researchers have argued that the application of current social network theories to *online* social networks is limited in that new and unknown aspects could affect the results of ESN analysis [10]. Trier [25], also emphasizes online social interaction's high volatility and its resulting fast structural changes. Furthermore, the digital traces within an ESN are of a different nature than the data analyzed in earlier social network studies and may lack validity under certain aspects [26].

To address the above issues and in order to achieve consistent insights across future ESN research projects, more transparency of data dimensions and their interrelationships is required. This gap motivates our first research question (RQ):

RQ1. Which data dimensions are adopted in existing studies on enterprise social networks?

Contrary to the abundance of available data, analytical metrics, and perspectives on the data, there is a paucity of research that systematically develops analytical methods that effectively utilize this rich resource to inform academic inquiry and managerial decision making. In order to analyze ESN data, we explore and develop a conceptual framework as part of a dedicated mixed methods approach [27,28] to address the diversity of data and the critical validity of online data traces.

Mixed methods research builds on a combination of qualitative and quantitative methods [29] and is particularly appropriate for domains marked by diversity [30]. In our context, this approach is appropriate for several reasons: ESN are a multi-dimensional and complex domain [31] that only one method is unlikely to capture appropriately. Basic social network analysis (SNA) alone is particularly insufficient due to new user behavior in online networks [5,32,10]. Furthermore, mixing methods allows researchers to draw on the strength of the methods used and to offset their weaknesses [33,34]. It also helps to

clarify the results that one method provides with the results of others [34], which expands the results and enhances the integrity of the findings [33]. To contribute to a better understanding of ESN analysis, our second research question thus focusses on a first step toward a dedicated mixed ESN research method approach:

RQ2. What are the implications of combining different data dimensions in a mixed methods approach in the context of an enterprise social network analysis?

By answering these questions, our contributions are threefold: We first identify relevant data dimensions based on a systematic literature review and suggest a framework to improve the transparency of the available options for analysis, which can serve as a basis for future ESN analysis. In order to not limit our contribution to conceptual work, we further apply and systematically evaluate our framework empirically, using an extensive and multi-dimensional case analysis of an ESN for military medical personnel as a proof of concept. To our knowledge, there is as yet no such empirical investigation of different data dimensions by means of a case study. In the context of this paper, we only reflect on the methodological aspects of the case study and its different data dimensions. Based on the empirical case analysis, we shed light on the unexploited potential, but also on the limitations of a mixed methods approach in the context of an ESN analysis. Third, to exploit the benefits and to address the limitations of this approach, we develop a set of guidelines for conducting an effective mixed methods analysis of the identified data dimensions that will be helpful to researchers and practitioners alike. Fig. 1 summarizes our research questions and contributions.

As we specifically intend to combine a theory-based concept development and an empirical proof of concept, the remainder of this paper is structured as follows: The next section contains the results of a structured literature review of current research into social network analysis, focusing on the research methods and utilized data dimensions. From this review, we systematically categorize all available data dimensions. Thereafter, in Section 4, we assess our framework [36] and investigate the identified dimensions and their interplay in an empirical case study, using a dedicated mixed methods approach. The presentation of the analysis results follows in Section 5. Based on the empirical results, our approach is discussed in
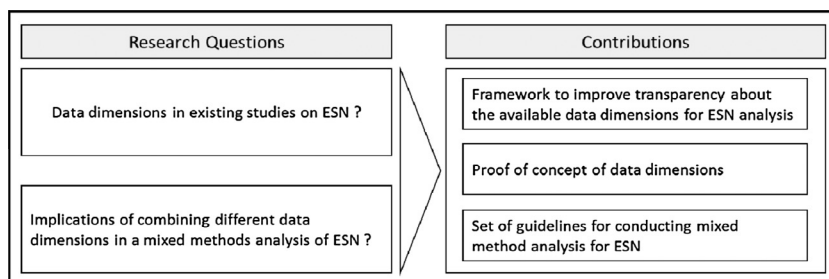

Research Questions	Contributions
Data dimensions in existing studies on ESN ?	Framework to improve transparency about the available data dimensions for ESN analysis
	Proof of concept of data dimensions
Implications of combining different data dimensions in a mixed methods analysis of ESN ?	Set of guidelines for conducting mixed method analysis for ESN

Fig. 1. Research questions and contributions.