Full length article

Forecasting managerial turnover through e-mail based social network analysis

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ABSTRACT

In this study we propose a method based on e-mail social network analysis to compare the communication behavior of managers who voluntarily quit their job and managers who decide to stay. Collecting 18 months of e-mail, we analyzed the communication behavior of 866 managers, out of which 111 left a large global service company. We compared differences in communication patterns by computing social network metrics, such as betweenness and closeness centrality, and content analysis indicators, such as emotionality and complexity of the language used. To study the emergence of managers' disengagement, we made a distinction based on the period of e-mail data examined. We observed communications during months 5 and 4 before managers left, and found significant variations in both their network structure and use of language. Results indicate that on average managers who quit had lower closeness centrality and less engaged conversations. In addition, managers who chose to quit tended to shift their communication behavior starting from 5 months before leaving, by increasing their degree and closeness centrality, the complexity of their language, as well as their oscillations in betweenness centrality and the number of "nudges" they need to send to peers before getting an answer.

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1. Introduction

Researchers have been investigating the determinants of employee and managerial turnover for several decades (Holtom, Mitchell, Lee, & Eberly, 2008). Factors such as job satisfaction, economic conditions, and personal motivators are among the variables most frequently reported as leading to voluntary turnover (Egan, Yang, & Bartlett, 2004). The literature on turnover recognizes that turnover is not a discrete event, but rather a process of disengagement that can take days, weeks, or months until the decision to leave is made. In this paper, we describe an innovative method to determine who is more likely to leave a company and when. Using a social network approach to collect and analyze data on communication style, we demonstrate the analytical power of traditional social network metrics such as closeness, betweenness

and degree centrality (Borgatti, 2005; Wasserman & Faust, 1994), as well as novel indicators such as response time and number of nudges sent and received by employees (Gloor & Giacomelli, 2014).

Looking at the overall 18 months of communication, we focused on patterns emerging during the last five months leading to managers' departure. As suggested by the literature on disengagement at work (Burris, Detert, & Chiaburu, 2008; Kahn, 1990; Luthans & Peterson, 2002), employees can be emotionally, cognitively or physically engaged and go through specific phases of active disengagement or alienation. By looking at 5 months prior to voluntary departure, we aimed at capturing the emergence of a communication behavior that would signal the "*decoupling of the self from the work role and people withdrawing and defending themselves during role performances*", which represents the definition of disengagement according to Kahn (1990, p. 694).

The decision to focus on the last 5 months is also based on the institutional context: in this organization managers are asked to send the resignation letter three months before departing. We picked the starting point for our analysis two months prior to the official resignation — on month 5 — based on the assumption that the closer managers get to the final decision of quitting, the higher

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the likelihood to exhibit divergent communication behaviors.

In this study, we explore possible cues in the managers' communication behavior that indicate a change in the relationship "managers-organization" and possibly a fracture in the psychological contract. Following a method similar to the embeddedness approach to turnover (Mitchell, Holtom, Lee, Sablynski, & Erez, 2001) we used new social network metrics such as betweenness centrality oscillation, average response time, nudges and emotionality metrics (Allen, Gloor, Fronzetti Colladon, Woerner, & Raz, 2016; Gloor, Almozlino, Inbar, & Provost, 2014) to identify changes in the communication behaviors of managers who are close to quit their job.

Our study is embedded into a long history of examining the construct of turnover in terms of relationships (Feeley & Barnett, 1997; Labianca & Brass, 2006; Mossholder, Settoon, & Henagan, 2005; Feeley, 2000; Moynihan & Pandey, 2008; Soltis, Agneessens, Sasovova, & Labianca, 2013). While most of the previous studies have used the intention to leave as dependent variable, we correlate the actual number of managers leaving their job with measures of centrality, responsiveness to e-mail, language complexity and emotionality of the messages.

There is a lack of research examining the individual behavior that could lead to managerial turnover. While there are numerous empirical studies on the determinants and consequences of managerial turnover most of these studies focus on the role of environmental factors, firm profitability and strategic change (Brickley, 2003). Given the high costs associated with managerial turnover, such as the loss in firm-specific human capital and the costs of hiring a new manager (Sliwka, 2007), our method provides human resource departments with an effective tool to complement their incentive system and retention initiatives.

First, we review the existing literature on the determinants of managerial turnover, starting with the traditional attitude models and then focusing on the relational perspectives on turnover. Second, we describe our research design and the social network metrics used in our research: closeness, betweenness and degree centrality, oscillations in betweenness centrality, number of *nudges* sent and received, communication activity and average response time. Third, we discuss our hypotheses and report our empirical findings trying to identify managers who are likely to leave based on their communication patterns and managers who choose to stay. Finally, we discuss some practical implications, as well as limitations and opportunities to replicate and extend this study.

2. Traditional determinants of turnover

This section gives an overview of the literature on voluntary turnover and demonstrates the contribution of our approach, which looks at changes in the communication behaviors of managers before they leave the company. This overview of the literature on the main variables affecting turnover will also help provide empirical evidence to our selection of control variables. The variables most frequently reported as affecting turnover are usually falling into three categories: environmental/economic, organizational and individual (Selden & Moynihan, 2000). It has been shown that economic conditions might trigger voluntary turnover decisions, since employees are more likely to quit if they are confident that they will find easily another job (Cohen, 2003). Shih, Jiang, Klein, and Wang (2011) found that increasing job autonomy can significantly reduce turnover, especially for jobs with a higher learning demand. In their meta-analyses of the main predictors of turnover, Griffeth, Hom, and Gaertner (2000) found that job satisfaction, organizational commitment and job involvement are the attitudinal variables most frequently investigated. Job satisfaction — which can be strongly influenced by job characteristics, even

more than by personal motivation (Chen, 2008) — has been found to be the most reliable predictor of turnover: when employees express low job satisfaction, they are more likely to leave (Brawley & Pury, 2016; Cohen, 2003).

Several empirical studies focused on the individual differences that could lead to a higher propensity to leave. It has been extensively demonstrated that the length of time in a position is negatively correlated with turnover (Cohen, 2003; Trevor, 2001). Two other demographic variables, race and gender, were usually considered major predictors of turnover, given the assumption that women and minorities would be more prone to quit. However, other researchers found that race and gender had scant predictive value on turnover when associated with other relevant variables (Lyness & Judiesch, 2001).

Some of the off-the-job factors that could possibly predict turnover include ample job opportunities and perceptions of the job market (Hom & Kinicki, 2001), family attachments (Lee & Maurer, 1999) or unpredictable events, also called shocks, representing positive, negative or neutral events such as unsolicited job offers, changes in marital state, transfers, and firm mergers (Lee, Mitchell, Holtom, McDaniel, & Hill, 1999, p. 451).

Various reviews reported that attitudinal variables explain only about 4—5 percent of the variance in turnover (Griffeth et al., 2000; Mitchell et al., 2001). Although the traditional attitude approach to turnover showed significant results, other significant factors should be included (Maertz & Campion, 1998). Some researchers suggested that turnover might be predicted looking at how well employees "fit" within the larger organizational culture (Mitchell et al., 2001). Villanova, Bernardin, Johnson, and Dahmus (1994) predicted that a poor *employee-organization fit* was a good predictor of turnover, while O'Really, Chatman and Caldwell (1991) found that employees who did not fit within the culture quit their job faster than others, but only after 20 months of tenure.

What seems to be missing in traditional theory and research on voluntary turnover is the understanding that employees' decisions are based on the social relations they form within and outside their work environment. In the following section we explore more recent attempts to break away from the traditional categories of predictor variables, specifically job attitudes and ease of movement.

2.1. Relational perspectives on turnover

Researchers have been increasingly interested in examining turnover not exclusively on the basis of individual, organizational or environmental/economic factors. In the past fifteen years empirical results have been presented to account for the role of employee's social relationships in predicting voluntary turnover. A relational perspective on turnover has been attracting attention based on the assumption that social capital may increase job satisfaction and ultimately reduce turnover (Dess & Shaw, 2001). In their influential study, Krackhardt and Porter (1986) investigated communication ties between employees at a fast-food restaurant. The authors found that turnover was based on clusters of employees who occupied similar structural positions and communicated with each other more intensively.

There seems to be strong empirical evidence suggesting that embeddedness and strong relational ties, reflected by high network centrality are able to reduce voluntary turnover. Our study is inspired by the work done by Mitchell et al. (2001), who introduced job embeddedness as a new organizational attachment construct that was negatively correlated with voluntary turnover. Job embeddedness included individuals' links to other people, teams and groups, besides their perception of fit within the organization and their perceived sacrifice in case of voluntary turnover. Similarly to Mitchell et al. (2001), Maertz and Griffeth (2004) found that links