

A THEORY OF ENGINEERS' MOTIVATION TO INFLUENCE

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Abstract

This paper describes a theory of engineers' motivation to influence which explains why some engineers accept invitations to become managers and others decline. The theory is based largely upon two recently published qualitative studies. In the first study, six engineers who recently accepted positions as engineering managers, were interviewed to understand their motivation to lead. In the second study, six engineers who, although qualified to be managers, declined promotions to managerial roles were interviewed to understand their motivation to follow; as such, the second study sought to understand the experience of these engineers' motivation to lead through the perspective of followership theory. Curiously, the explanation of their career choices offered by participants in both studies were similar; in other words the same motivations drove some engineers to accept managerial roles and others to refuse managerial roles. The present paper, then, proposes a model of motivation to influence which is intended to explain why some engineers accept management roles and others do not. To do this, the theory postulates the existence of constructs called motivation to influence, desire to manage, and openness to manage. Furthermore, the proposed model specifies how these three new constructs relate to motivation to lead and the likelihood that an engineer will accept a promotion to management. The central concept of the theory is that leadership and management are distinct constructs, and with engineers, motivation to lead does not necessarily translate to motivation to manage because, in many cases, engineers believe they can have greater influence upon an organization in non-managerial roles. Implications for practice are also described along with recommendations for future research.

Keywords

lead, follow, influence, motivation, engineers

Introduction

This paper describes a theory intended to explain why some engineers accept invitations to become managers and others decline. The theory is largely based upon two empirical studies. In the first study, Ulrich (2017a), interviewed six engineers who recently accepted positions as engineering managers. In the second study, Ulrich (2017b) interviewed six engineers who, although qualified to be managers, declined promotions to managerial roles. Surprisingly, when asked about their motivations to either accept or decline promotions into managerial positions, both groups offered similar explanations. The central concept of the theory is that leadership and management are distinct constructs, and with engineers, motivation to lead does not necessarily translate to motivation to manage because, in many cases, engineers believe they can have greater influence upon an organization in non-managerial roles.

This paper is organized as follows. First, a review of the literature is presented. Second, the theory of motivation to influence is described in detail. This description includes ten formally articulated propositions. Third, practical implications and recommendations for future research are provided.

Literature Review

This literature review is presented in three sections. First, the literature is used to establish the difference between the constructs of leadership and management. Second, the motivation to lead literature, beginning with Chan and Drasgow (2001) is reviewed. This review includes seven quantitative studies which build upon Chan and Drasgow and one quantitative study, Cerff (2006) which challenges Chan and Drasgow's (2001) fundamental model. Third, two recent qualitative studies of motivation to lead in engineers are described. These two papers, along with Chan and Drasgow's (2001) seminal work, form the basis of the proposed model of engineers' motivation to influence.

The Literature Related to Leadership Versus Management

According to Kotter (1990), management is concerned with bringing order whereas leadership is concerned with bringing change. As such, Kotter argues that management is primarily concerned with three sets of activities: “planning and budgeting,” “organizing and staffing,” and “controlling and problem solving” (1990, p. 4). In contrast, Kotter argues that leadership is concerned with “establishing direction,” “aligning people,” and “motivating and inspiring” (1990, p. 5). Yukl (2013) concisely summarizes Kotter’s (1990) view by saying that management seeks predictability while leadership seeks change. In their often-quoted statement, Bennis and Nanus said “managers do things right while leaders do the right thing” (2003, p. i). Kotter also notes that because management and leadership are so fundamentally different, the presence of both can result in conflict. In fact, Yukl takes this idea one step further by noting that some researchers argue that “management and leadership cannot occur in the same person” (2013, p. 6). In his account of the history of leadership studies during the 1980s, Northouse noted that the phrase most often used to distinguish leadership from management was “non-coercive influence” (2016, p. 4). In summary, the literature establishes that leadership and management are two distinct concepts. In doing so, the literature sets the stage for a model which (a) builds upon the notion that motivation to lead does not necessarily produce motivation to manage, and (b) views influence as a key distinction between leadership and management.

The Motivation to Lead Literature

According to Clemmons and Fields (2011), Chan and Drasgow (2001) wrote the seminal work on motivation to lead. For their research, Chan and Drasgow (2001) gathered usable surveys from 1,594 Singaporean soldiers, 274 Singaporean community college students, and 288 undergraduates from a large university in the mid-western United States. Using factor analysis, Chan and Drasgow identified three components of motivation to lead, which they called “affective-identity motivation to lead (AI-MTL), non-calculative motivation to lead (NC-MTL), and social-normative motivation to lead (SN-MTL)” (2001, p. 492). Leaders who enjoy leading and see themselves as leaders are said to possess AI-MTL. Leaders who lead out of a sense of either social or moral obligation are said to possess SN-MTL. And, leaders who lead out of an idealistic and transcendent motivation are said to possess NC-MTL. Chan and Drasgow also identified personality, values, general mental ability, leadership self-efficacy, and previous leadership experience as antecedents of motivation to lead.

By gathering 402 usable surveys from Israeli soldiers, Amit, Lisak, Popper, and Gal identified two additional motivations to lead, which they called “ideological motivation to lead” and “patriotic motivation to lead” (2007, p. 141). Leaders who lead out of a sense of ideology and patriotism, respectively, are said to possess these motivations to lead. However, these motivations to lead are not relevant to the study of organizations and are therefore not considered in the present study.

Six other quantitative studies identified correlates and antecedents of the three motivations to lead proposed by Chan and Drasgow (2001). First, Hong, Catano, and Liao (2011) gathered usable surveys from 440 Canadian and American university students and found that leader emergence correlates with AI-MTL and SN-MTL. Furthermore, Hong et al. found partial support for their hypothesis that emotional intelligence correlates with motivation to lead. Second, Clemmons and Fields (2011) surveyed 231 American Air Force officers and found evidence that a desire for self-enhancement is related to AI-MTL, and partial support for the idea that both a desire for self-enhancement and a desire for self-transcendence are related to NC-MTL. Third, Guillén, Mayo, and Korotov (2015) surveyed 260 business students and found that role models impact AI-MTL, but high self-efficacy moderates the impact of role models. Fourth, Cho, Harrist, Steele, and Murn (2015) obtained 231 usable surveys from American undergraduate students and found that the basic need for competence correlates with AI-MTL, and that the basic need for relatedness correlates with both SN-MTL and NC-MTL. Fifth, Rosch, Collier, and Zehr (2014) gathered 81 usable surveys from undergraduate engineering students and found that transformational leadership correlates with AI-MTL. And sixth, Stiehl, Felfe, Elprana, and Gatzka (2015) obtained 419 surveys from participants at a Swiss leadership seminar and concluded that effective leadership training correlates with AI-MTL.

Although the studies cited so far tend to confirm Chan and Drasgow’s three-factor model of motivation to lead (AI-MTL, SN-MTL, NC-MTL), Cerff (2006) suggested that motivation to lead is better conceived as consisting of only two components; a motivation to lead for the benefit of self (MTL-S) and a motivation to lead for the benefit of the group (MTL-G). While the simplicity of Cerff’s two factor model is appealing, her model was not used in the present theory for two reasons. First, Chan and Drasgow’s (2001) data set was ten times larger than Cerff’s (2006). Moreover, although one can argue that Chan and Drasgow’s (2001) model reflects a bias because two of the three samples were gathered in Singapore, their third sample ($N=288$) was gathered in the mid-western United States and is nearly 50% larger than Cerff’s (2006) entire sample. Additionally, the cultural difference argument against Chan and Drasgow’s (2001) data can be applied to Cerff’s (2006) data because her data was gathered in South Africa. Second, Chan and Drasgow’s (2001) three factors are useful because they allow incorporation of Deci and Ryan’s

(2000) notion of intrinsic motivation. Specifically, SN-MTL can be thought of as the part of MTL-G related to extrinsic motivation while NC-MTL can be thought of as the part of MTL-G related to intrinsic motivation.

The Literature Related to Engineers' Motivation to Lead

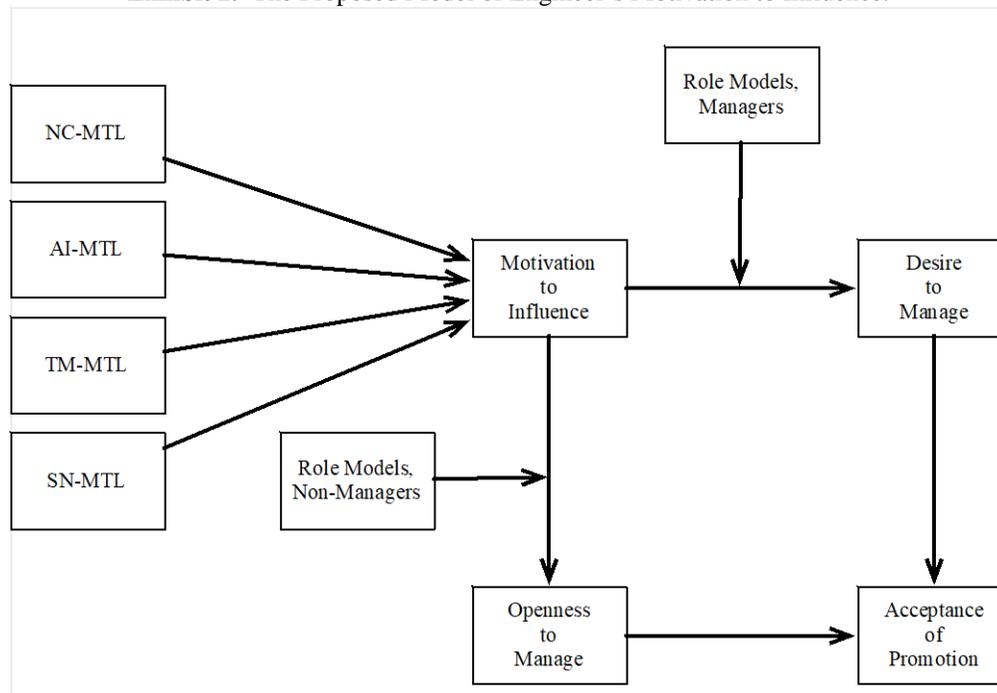
The theory of engineers' motivation to influence stems primarily from two empirical studies. Ulrich (2017a) was a phenomenological inquiry into the motivation to lead of six engineers recently promoted to managerial roles at a medical device manufacturer in Southern California. The idea behind the study was that all of the motivation to lead works cited previously, including the seminal work, were quantitative inquiries. However, Creswell and Creswell (2018) note that, ideally, qualitative efforts precede quantitative efforts. Hence, Ulrich (2017a) was intended to backfill the research stream with qualitative inquiry to see if, in its immediate jump to quantitative inquiry, anything was missed. As it turns out, Ulrich (2017a) reported finding a fourth factor called teaching-mentoring motivation to lead (TM-MTL). However, it should be noted that Ulrich (2017a) called for follow-on quantitative research to confirm the existence of TM-MTL.

Ulrich (2017b) was something of a mirror-image of Ulrich (2017a). Specifically, Ulrich (2017b) was a phenomenological inquiry of six senior engineers who, although qualified to be managers, turned down promotions to management. Furthermore, Ulrich (2017b) considered the motivation to lead of these engineers from the perspective of followership theory (Kelley, 1992). Importantly, Ulrich (2017b) found evidence that these six engineers experienced the four factors of motivation to lead (AI-MTL, SN-MTL, NC-MTL, TM-MTL) just as the managers in Ulrich (2017a) did. However, the engineers in Ulrich (2017b) expressed their motivation to lead by declining offers of promotions. Their rationale was that they believed they could have greater influence upon the organization as senior engineers than as engineering managers.

A Description of the Theory

Exhibit 1 illustrates the proposed model of engineers' motivation to influence. The most central notion in this theory is the distinction between leadership and management. This is critical because the theory rests on the idea that for engineers, leadership and management are sometimes perceived as mutually exclusive options. This occurs as engineers observe other engineers making significant technical contributions while the managers are attending meetings and putting together schedules. Ultimately, engineers conclude that senior engineers who influence the technological aspects of a project have more influence than managers, and as such, the senior engineers without managerial titles provide more leadership to the organization than managers. Somewhat ironically, an engineer's motivation to lead may motivate him/her to refuse promotions into management (Ulrich, 2017b).

Exhibit 2. The Proposed Model of Engineer's Motivation to Influence.



Motivation to Influence

At the core of the model exists a new construct called motivation to influence. This construct is based on data in Ulrich (2017b) which suggests that in high technology environments, motivation to lead translates to a motivation to exert maximum influence. However, engineers sometimes perceive that accepting a promotion into management would reduce their organizational influence, which means that motivation to lead relates to motivation to influence but not necessarily a motivation to manage. The proposed model shows the four motivations to lead as antecedents to motivation to influence. Accordingly, the following propositions are stated formally.

Proposition 1A. NC-MTL correlates with motivation to influence such that increases in NC-MTL cause increases in motivation to influence.

Proposition 1B. AI-MTL correlates with motivation to influence such that increases in AI-MTL cause increases in motivation to influence.

Proposition 1C. TM-MTL correlates with motivation to influence such that increases in TM-MTL cause increases in motivation to influence.

Proposition 1D. SN-MTL correlates with motivation to influence such that increases in SN-MTL cause increases in motivation to influence

Desire to Manage

The proposed model also includes a construct called desire to manage, which reflects an individual's desire to assume a managerial role. The data in Ulrich (2017a) demonstrated the presence of desire to manage. The proposed relationship is that motivation to influence correlates with desire to manage; however, the relationship is moderated by managerial role models such that in the presence of positive role models of engineering managers, motivation to influence translates into a greater desire to manage. However, in the presence of negative role models of engineering managers, motivation to influence has far less correlation with desire to manage. The following propositions express this relationship formally.

Proposition 2A. Motivation to influence correlates with desire to manage such that increased motivation to influence correlates with increased desire to manage.

Proposition 2B. The presence of management role models moderates the relationship between motivation to influence and desire to manage such that positive role models result in greater desire to manage while negative role models result in lesser desire to manage.

Openness to Manage

The model also includes a construct called openness to manage. This construct is based on data from Ulrich (2017b) which suggests that, when asked, some engineers will accept promotions to management even though they have no desire to manage. However, the data also shows that some engineers will refuse the promotion in the presence of role models who demonstrate that non-managers exert tremendous influence in the organization. The following two propositions formally express this idea.

Proposition 3A. Motivation to influence correlates with openness to manage such that increased motivation to influence correlates with increased openness to manage.

Proposition 3B. The presence of non-management role models moderates the relationship between motivation to influence and openness to manage such that positive role models result in less openness to manage while negative role models result in greater openness to manage.

Acceptance of Promotion

Ultimately, the point of this model is to predict the circumstances under which engineers will accept promotions into management. In the model, a construct called acceptance of promotion represents the likelihood that an engineer will accept a promotion to management. The model shows that desire to manage and openness to manage contribute to acceptance of promotion. The following two propositions formally state this idea.

Proposition 4A. Desire to manage correlates with acceptance of promotion such that increased desire correlates with increased acceptance.

Proposition 4B. Openness to manage correlates with acceptance of promotion such that increased openness correlates with increased acceptance.

Discussion and Future Research

The model uses motivation to lead theory to explain why some engineers accept promotions into management and others decline. As such, this model may be useful for practitioners interested in developing potential engineering managers. In particular, this model highlights the need for positive role models of engineering managers. In fact, this model suggests that organizations should not tolerate toxic and/or incompetent engineering managers because their presence reduces the likelihood that competent engineers will accept promotions into management. In other words, this model suggests that tolerating a poor engineering manager tends to prevent a suitable replacement from emerging in his/her place. Conversely, this model also affirms the cascading value of an effective engineering manager. Specifically, this model suggests that a single effective manager may play a critical role in establishing a pipeline of emerging engineering managers.

A particular strength of the model is that it is based on the empirical findings from both Ulrich (2017a) and Ulrich (2017b). However, the data in both papers is qualitative which, accordingly to Creswell and Creswell (2018) is insufficient grounds to generalize the findings. Accordingly, quantitative research is needed to validate the proposed model of motivation to influence.

One aspect of the model which needs careful future attention is the use of the four motivations to lead (AI-MTL, SN-MTL, NC-MTL, TM-MTL) instead of Cerff's (2006) simplified model of motivation to lead (MTL-S, MTL-G). In a quantitative study, principle components analysis (Hair, Black, Babin, & Anderson, 2010) should be performed to confirm the use of the four motivations to lead instead of Cerff's two. Although it is conceptually important to validate that detail of the model, it is also important to note that modifying the model to use only Cerff's two motivations to lead does not substantially alter the model. This is because the core of the model rests upon the concepts of motivation to influence, desire to manage, and openness to manage.

Another aspect of the model requiring attention involves precise definition of the term *engineer*. Ulrich (2017a) included only participants with earned four-year degrees in either engineering or computer science. Additionally, Ulrich (2017b) further limited participants to engineers with degrees in either electrical, mechanical, software, computer, or biomedical engineering. This narrow definition makes sense in that it prevents inclusion of colloquial roles such as *domestic engineer*. However, it may be overly restrictive in that it eliminates, for example, chemists and mathematicians to whom the model may apply. Accordingly, there seems to be a need to either provide a more precise definition of engineer or replace the term with a better term such as *detailed technical expert*, which will also require careful definition.

The term engineering manager may also require additional clarification. For example, should supervisors and executives be included by this term? Furthermore, should the term refer only to managers with departmental responsibilities? Or, should the term include program managers who are responsible for specific projects even though they have no direct reports? Future research is needed to answer all of these questions.

Conclusion

A new theory of engineers' motivation to influence has been proposed. Based on two qualitative investigations of engineers' motivation to lead and follow, the new theory explains why some engineers accept promotions into management while others decline. Furthermore, the implications of the model have been formally stated as propositions, which provides guidance for future work intending to validate the model. Moreover, it was proposed that this model may have significant value for practitioners interested in encouraging the emergence of engineering managers.

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