

Exploring Topics in Manager Strengths, Weaknesses, and Challenges with Text Mining

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Abstract

This study applies topic model, a text mining technique, onto written comments on leadership strength, weakness, and challenge from 8549 participants. Eight topics were identified for each domain (strength/weakness/challenge). The topics' ability to predict performance and demographic differences are discussed.

Introduction

- Having effective leadership is significantly related to desirable organization outcomes (Avolio, Zhu, Koh, & Bhatia, 2004).
- While most studies use quantitative ratings to establish relationship between leadership competencies and effectiveness, Bolden and Gosling (2006) show that analyzing qualitative data can contribute to a better understanding of leadership.
- Text mining is the automatic extraction of patterns that are presented in text. It assesses the semantic, grammatical, and structural properties of documents.
- Topic model identifies the underlying concepts of documents by considering the proximities and semantic relationships of words.

Research Questions:

- What are the common strengths, weaknesses, and challenges among managers?
 - How well do these common characteristics predict performance?
- Do manager strength, weakness, and challenge depend on demographics?
 - Do male and female managers have different strength, weakness, or challenge?
 - Do first-time and non-first-time managers have different strength, weakness, or challenge?

Method

Sample

- 8549 managers who took part in the Leading Others 360 (LO360; CCL, 2014), a 360-degree leadership assessments from the Center of Creative Leadership, during 2010-2016.
- Raters: manager (self), boss, peers, direct reports
- Written comments on strength and weakness were provided from all raters; three biggest challenges were provided from the managers
- Demographics:
 - Majority being male (61.6%), Caucasian (49.4%), and holds Bachelor's degree (39.1%).
 - Organization Level: middle (46.5%), first (23.0%), upper middle (14.7%).

Text Pre-Processing

- Strength/Weakness: comment from one rater on one participant treated as one document
- Challenge: three challenges collapsed into one document for each participant.
- All letters were converted into lower cases; punctuations, numbers, stop words, and common names were removed; text was stemmed.
- A document by term matrix was created for each data set: strength, weakness, and challenge.
- Terms with low term frequency-inverse-document frequency (tf-idf) were removed.
- All text pre-processing were done with the 'tm' package in R (Φελληνερ & Ηορνικ, 2015).

Analysis

- Latent Dirichlet Allocation (LDA) was applied to each data set respectively.
 - Threshold for low tf-idf elimination was tuned through human evaluation.
 - Number of topics was tuned through likelihood function and human evaluation (8 topics identified for each data set).
- Predicting Performance** (multiple regression):
 - Self:** whether each topic was prevalent (0 or 1) as predictors (8 predictors)
 - Peers and Direct Reports:** prevalence of topics averaged across raters (8 predictors for each rating source)
 - Boss' performance rating was used as criterion for all models.
- Demographic Difference:**
 - Logistic regression:** used topic prevalence to predict for gender and status as a first-time manager
 - ANOVAs and t-tests:** assess demographic differences in the number of prevalent topics in self comments
- All data analyses were done in R.

Results

Topics in Comments on Participants' Strengths

Compassionate: micromanage, confront, demeanor, kind, energetic, enthusiastic, loyal, compassionate, verbal, charged, fun, capacity, self-motivated
Skillful: smart, problem-solving, navigate, observing, patient, [team] builder, invest, spirit, regulatory
Self-Aware: trustworthy, hard-work, flexible, honest, accurate, wide [range of experience], self-aware, target, range, persistent, dynamic, courage, power, transparent, accessible
Kind and Dependable: patient, proactive, structured, tackle, easy, sincere, [help] others, multitasking, empathy, candor, conscientious
Motivated and Achieving: driven, succeed, determination, exciting, happy, agile, leverage [skills]
Strategic: solver, thinker, humor, independent, judgment, persuade, duty, likeable, visionary
People-oriented: negotiation, empathetic, rapport, concise, reflective
Reliable: friendly, reliable, dependable, teacher, prompt [others], assertive, proper, comment, discipline

Topics in Comments on Participants' Weaknesses

Absence: visible, [working] closely, leave, [communicate with] division, attend
Unapproachable: micromanage, network, duty, director, disagree, follow-up, argument, contact, [communicate] promptly, social
Arrogant: [overly] vocal, [being at] top [level], arrogant, space, interrupt
Unruly: patient, self-aware, judgment [on others], [follow the] routine, deficit, rule
Handling Disagreement: interpersonal, soft, easy, empathy, temper, disagree
Not Achieving: strive, charge, technique, self-confident, [motivating direct] reports, equipment, overload
Not vocal: patience, quiet, honest, speed, outspoken, receptive, harsh, community, understood
Sensitive and Emotional: emotional, sensitive, treat, worry, communication

Topics in Comments on Participants' Challenges

Talent Management: staff, workforce, voluntary [turnover], department, proficient
Managing Subordinate Conflict: emotion, unity, insecure, friendship, segment, environment, unify, obligation
Effective Management Style: subordinate, micromanage, definite, dominate, onboard, tolerate, joint [venture], teacher, savvy, broaden, belief, venture
Team Cohesiveness: turnover, constraint, section, committee, constrain, overload
Strategic Management: discipline, union, agreement, persuasive, [managing] outlook, priority, inefficient, multitask, procrastination
Making Progress: upward, distribution, teamwork, [working with] branch [office], faculty, empower, urgent, estimation, responsible
Vocal Communication: interpersonal, patience, language, persuade, follow-up, personnel, interrupt
Role Clarity: retention, divide, cultivate, agile, wider [business], downsize

Predicting Performance

- Being kind and dependable mentioned by peers as a strength negatively predicted performance ($B = -0.18, p < .05$).
- Self-identified challenge of team cohesiveness positively predicted performance ($B = 0.04, p < .01$).

Demographic Difference

- Gender:**
 - Males are more likely to claim that they are compassionate; they are also more likely to be described as strategic by their direct reports.
 - Males are more likely to be described as unapproachable and likely to mishandle disagreement by direct reports.
 - Females are more likely to be described as arrogant and sensitive by direct reports.
 - Males are more likely to identify strategic management, making progress, and having role clarity as challenges.
- First-Time Manager:**
 - Non first-time managers are more likely to be described as kind and dependable by direct reports.
 - Non first-time managers are more likely to describe themselves as arrogant; they are also more likely to be described as likely to mishandle disagreement by peers and sensitive by direct reports.

Discussion

- This study provides insight on the common themes in comments on a manager's strength, weakness, and challenge.
- Gentry, Logan, and Tonidandel (2014) has identified the 12 common challenges first time managers face using content analysis. Gentry et al. also used written comments from participants of LO360.
 - Topics identified with the written comments on challenges using text mining corresponded with Gentry et al.'s findings.

Comparison of Challenge Topics Identified through Content Analysis and Text Mining

Gentry et al.	Topic Model
Adjustment to people management/ Displaying authority	Managing style
Developing managerial & personal effectiveness	Managing style, Making progress, Strategic management
Leading team achievement	Making progress, Team cohesiveness
Managing internal stakeholders & politics	Strategic management
Motivation of others	Team cohesiveness
Performance management & accountability issues	None
Coaching, developing, & mentoring others	Team cohesiveness
Communication	Vocal communication
Delegation & Micromanagement	Role clarity
Conflict management	Managing subordinate conflict
Working with a range of employees	Strategic management
Doing more with less	Role clarity
None	Talent management

References

- Avolio, B. J., Zhu, W., Koh, W., & Bhatia P. (2004). Transformational leadership and organizational commitment: Mediating role of psychological empowerment and moderating role of structural distance. *Journal of Organizational Behavior*, 25, 951-968.
- Bolden, R., & Gosling, J. (2006). Leadership competencies: Time to change the tune? *Leadership*, 2, 147-163.
- CCL. (2014). *Leading others 360 facilitators' manual*. Greensboro, NC: Center for Creative Leadership.
- Feinerer, I., & Hornik, K. (2015). tm: Text mining package. *R package version 0.6-1*. <http://CRAN.R-project.org/package=tm>
- Gentry, W. A., Logan, P., & Tonidandel, S. (2014). Understanding the leadership challenges of first-time managers: Strengthening your leadership pipeline. *The Transitioning into Leadership*.