Top Management Team's Language and Firm Performance: Text Analysis on U.S. 10-K Annual Report
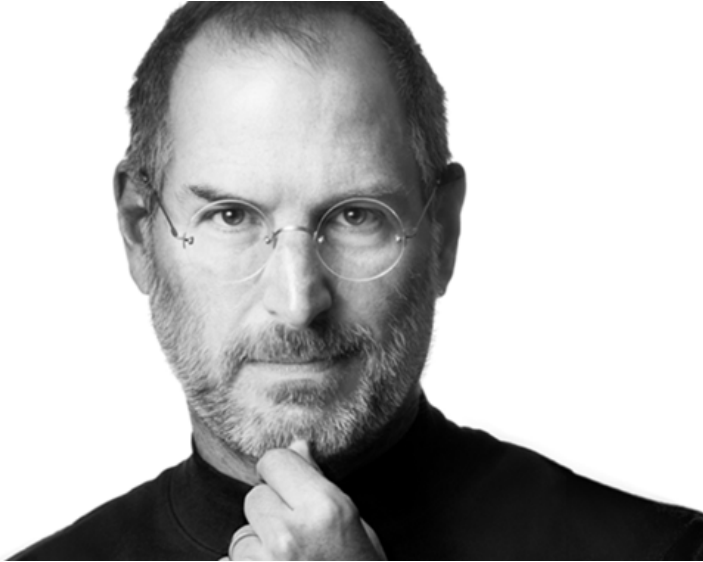
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1. Research background

Risk Taker   Innovative

Passionate

Enhance Innovation

Promote Changes

1. Research background

Upper Echelon Theory (Finkelstein and Hambrick, 1990)

- Top management team(TMT)'s values and personalities have influence on decision

  making process, which in turn affect to firms' strategy or performance
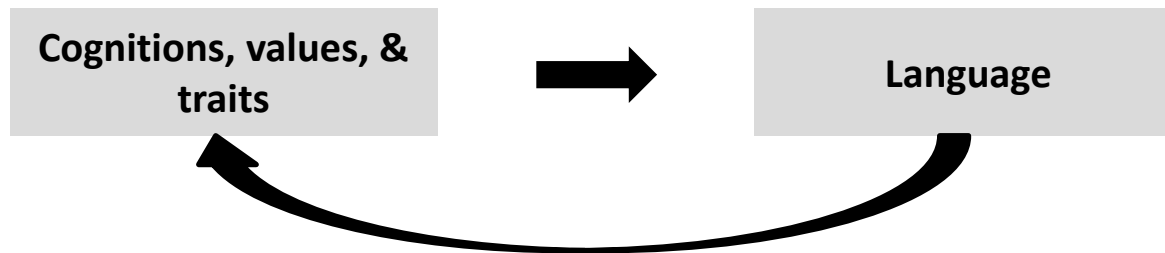
| Top management team (TMT)'s values and traits | → | Decision-making process | → | Outcomes (strategy or performance) |

Limitation of Prior Studies

- Prior studies were carried out under the assumption that demographic characteristics serve as surrogates for the beliefs, values and cognitions of managers.

- For example, age, tenure, or experiential knowledge were used to analyze the relationship between TMT's traits and performance (Hambrick, 2007).

- → It has been criticized for assumption provide in linking the proxy variables and the TMT's values.

1. Research Background

- In linguistic and psychology, human thought, values, and personalities are expressed through language (e.g., Pennebaker and King, 1999).

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┌─────────────────────┐              ┌─────────────────────┐
│ Cognitions, values, │     ──▶      │      Language       │
│      & traits       │              │                     │
└─────────────────────┘              └─────────────────────┘
            ↖_____◞
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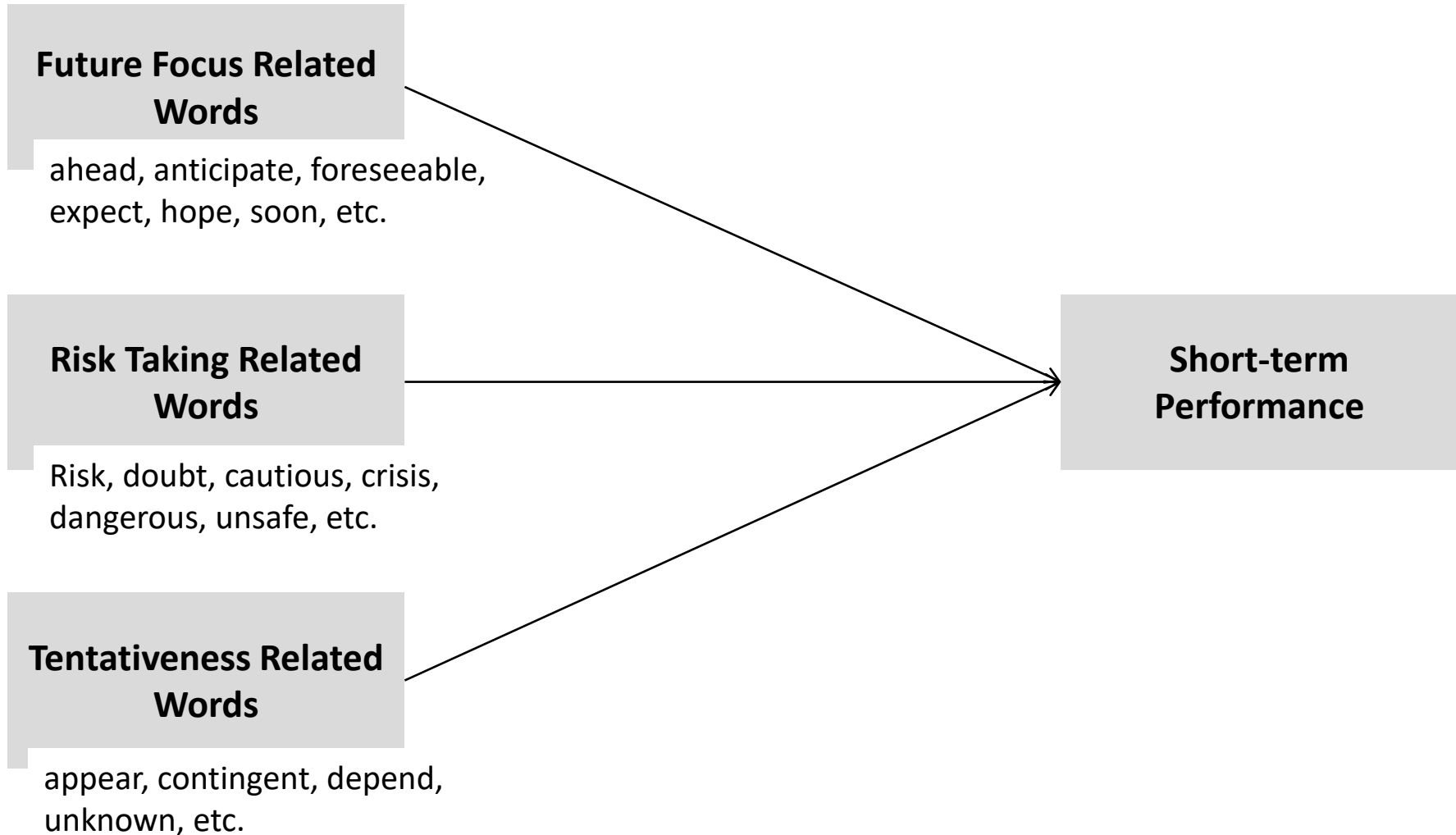
- As language is a cue for TMT's cognitions and values, analyzing the language may help understand the firm's strategy and performance (Pfeffer, 1981).

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┌─────────────────┐      ┌─────────────────┐      ┌─────────────────┐
│ TMT's linguistic│      │  TMT's values,  │      │    Strategy     │
│      style      │ ──▶  │    traits, &    │ ──▶  │       or        │
│(i.e. use of words)│     │  personalities  │      │  Performance    │
└─────────────────┘      └─────────────────┘      └─────────────────┘
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Purpose of the study

- ✓ This study suggests that language can be one of potential proxy variable to predict TMT's values & traits

- ✓ By analyzing TMT's language, this study identifies TMT's orientations that have influences on firm performance

2. Research Framework

Future Focus Related Words

ahead, anticipate, foreseeable, expect, hope, soon, etc.

Risk Taking Related Words

Risk, doubt, cautious, crisis, dangerous, unsafe, etc.

Tentativeness Related Words

appear, contingent, depend, unknown, etc.

Short-term Performance

3. Hypothesis development

1) Future Focus Words

- Thinking primarily about what the future holds and with envisioning of future events (Nadkami & Chen, 2014)

Hypothesis 1.

Future focus words → Short-term performance

ahead, anticipate, foreseeable, expect, hope, soon, etc.

- Focus on the longer term strategy and change currently stable system
- Aggressive investment to prepare for seizing future opportunities
- Utilizing current opportunity less

3. Hypothesis development

2) Risk Taking Words

- Tendency toward risk taking in strategic activities (March & Shapira, 1987;Miller & Chen, 2004).

Hypothesis 2.
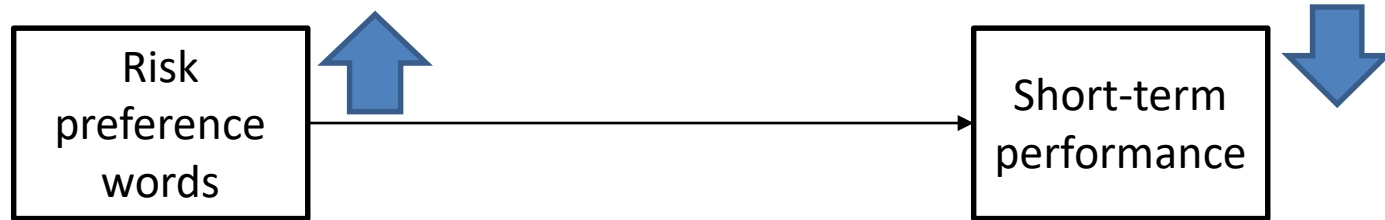
risk*, doubt, cautious, crisis, dangerous, unsafe, etc.

- Firm-level tendencies toward risk taking in strategic activities
- Less consideration for current resources or environment in pursuing new opportunities.

3. Hypothesis development

3) Tentativeness Words

- In describing certain situation and strategy, TMT's perception may be reflected.
- If outcomes are uncertain in the view of TMT, it is likely that they use tentativeness related words.

Hypothesis 3.

Tentativeness word

appear, contingent, depend, unknown, hope, etc.

Short-term performance

- TMT perceives that firm's may experience underperformance.

4. Measures

- MD&A(Management's Discussion and Analysis of Financial Position and Results of Operations) section of 10-K reports & S&P's compustat

  - containing a <u>narrative explanation</u> of past performance and future outlook by the top management

- Period: 1994~ 2015
- Firms with over 5 year observation
- Firm-year observation : 9,704
- Total 946 firms

Google

• The portion of our revenues that we derive from non-advertising revenues is increasing.

Non-advertising revenues have grown over time. We expect this trend to continue as we focus on expanding our Google offerings to our users through products like Google Play, cloud and apps and hardware products. Across these initiatives, we currently derive non-advertising revenues primarily from sales of digital content products, hardware sales, service and licensing fees; the margins on these non-advertising businesses vary significantly and may be lower than the margins on our advertising business. A number of our Other Bets initiatives are in their initial development stages, and as such, the sources of revenues from these businesses could change over time and the revenues themselves could be volatile.

• As we continue to look for new ways to serve our users and expand our businesses, we will invest heavily in R&D and our capital expenditures will continue to fluctuate.

We continue to make significant research and development (R&D) investments in areas of strategic focus for Google, such as search and advertising, as well as in new products and services across both Google and Other Bets. The amount of our capital expenditures has fluctuated and may continue to fluctuate in the long term as we invest heavily in our systems, data centers, real estate and facilities, and information technology infrastructure.

In addition, acquisitions remain an important part of our strategy and use of capital, and we expect to continue to spend cash on acquisitions and other investments. These acquisitions generally enhance the breadth and depth of our offerings, as well as expanding our expertise in engineering and other functional areas.

4. Measures

Variable	
ROA	Net income/Total assets
Future Focus	Number of future focus related words – number of past & present focus related word
Risk Preference	Number of risk preference related words
Tentativeness	Number of tentativeness related words
Total Words	Total words
Firm Size	A natural log value of total assets
R&D Intensity	R&D expenses/total assets
Debt Ratio	Total debt/total assets
Investment	Capital expenditure/fixed assets
BM Ratio	Book-to-market ratio
Past ROA	The average value of 1-year and 2-year prior ROA

4. Measures

- Summary Statistics

Variable	Min	Max	Average	St.d.
ROA	-0.59	0.26	0.03	0.17
Future Focus	-13.33	6.90	-1.03	0.97
Risk Preference	0.00	21.43	0.96	0.57
Tentativeness	0.00	18.18	1.58	0.93
Total Words	403	23902	9222.86	4912.18
Firm Size	3.10	10.88	6.52	1.66
R&D Intensity	0.00	0.44	0.07	0.09
Debt Ratio	0.09	3.39	0.56	0.52
Investment	0.03	0.85	0.25	0.17
BM Ratio	-7.17	4.43	0.50	0.43
Past ROA	-0.48	0.45	0.00	0.11

		1	2	3	4	5	6	7	8	9	10
1	ROA	1									
2	Future Focus	-0.13*	1								
3	Risk Preference	-0.20*	0.18*	1							
4	Tentativeness	-0.17*	0.48*	0.30*	1						
5	Total Words	-0.03*	0.20*	0.02*	0.13*	1					
6	Firm Size	0.21*	0.07*	-0.26*	-0.16*	0.48*	1				
7	R&D Intensity	-0.42*	0.24*	0.34*	0.29*	-0.01	-0.31*	1			
8	Debt Ratio	-0.31*	0.13*	0.04*	0.05*	0.23*	0.25*	0.24*	1		
9	Investment	-0.11*	0.14*	0.16*	0.17*	-0.11*	-0.26*	0.34*	-0.10*	1	
10	BM Ratio	-0.20*	-0.11*	-0.01	-0.06*	-0.08*	-0.12*	-0.19*	-0.18*	-0.14*	1
11	Past ROA	0.13*	0.01	0.04*	0.02*	0.02	-0.01	-0.04*	-0.02	-0.02	-0.13*

5. Results

	(1)	(2)	(3)	(4)	(5)
Future Orientation **H1**		-0.012*** (0.000)			-0.008** (0.008)
Risk Preference **H2**			-0.013+ (0.062)		-0.007 (0.341)
Tentativeness **H3**				-0.015*** (0.000)	-0.010* (0.029)
Total Words	-0.007* (0.025)	-0.005 (0.105)	-0.007* (0.025)	-0.005+ (0.098)	-0.004 (0.151)
Firm Size	-0.007 (0.119)	-0.007+ (0.094)	-0.008+ (0.082)	-0.007 (0.120)	-0.008+ (0.085)
R&D Intensity	-0.217** (0.001)	-0.217** (0.001)	-0.218** (0.001)	-0.218** (0.001)	-0.218** (0.001)
Debt Ratio	-0.042*** (0.000)	-0.042*** (0.000)	-0.042*** (0.000)	-0.043*** (0.000)	-0.042*** (0.000)
Investment	-0.002 (0.882)	0.002 (0.858)	-0.002 (0.859)	0.000 (0.995)	0.002 (0.870)
BM Ratio	-0.071*** (0.000)	-0.072*** (0.000)	-0.071*** (0.000)	-0.072*** (0.000)	-0.072*** (0.000)
Past ROA	0.108*** (0.000)	0.107*** (0.000)	0.109*** (0.000)	0.108*** (0.000)	0.107*** (0.000)
YEAR/FIRM Effect	Controlled	Controlled	Controlled	Controlled	Controlled
Constant	0.141*** (0.000)	0.126*** (0.000)	0.159*** (0.000)	0.153*** (0.000)	0.147*** (0.000)
Observations	9,704	9,704	9,704	9,704	9,704
Adj. R-squared	0.144	0.146	0.144	0.146	0.147

Note:
P-value in parentheses.
*** $p<0.001$, ** $p<0.01$, * $p<0.05$, + $p<0.1$

6. Discussion and Contribution

- Suggests the value of TMT's language used in annual reports in understanding TMT's mind.

- Suggests TMT's future focus and risk preference level are relevant for predicting financial performance.

- We show that text analysis based on easily obtained annual reports has predictive power on performance , and this analysis can be further utilized in testing other important strategies, e.g., M&As, R&D intensity, innovation, or marketing intensity.

Thanks for Listening