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What makes a 'good' title and (how) does it matter for citations? A review and general model of article title attributes in management science

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Abstract What makes a "good" title for an article, i.e. one which might attract citations in the academic community? Answers to this question are manifold, though inconclusive across disciplines. In an attempt to provide cohesion, we integrate significant title characteristics from previous studies across disciplines into a comprehensive model and link it with citation count. Keeping the application context constant, we focus on management science and find that only non-alpha numeric characters and a balanced title structure have small, but significant effects on citation count. Surprisingly, attributes which tended to show significant effects in other disciplines (though often in opposite directions), such as length, context, and linguistic attributes exhibited no relationship with citation count.

Introduction

The title of an academic article is easily one of its most important features (Subotic and Mukherjee 2014). So what, specifically, makes a title "good"?—And, perhaps even more interestingly, what makes a "good title"? Regarding the first question, for academics, an article's title should be the first (Paiva et al. 2012), and most concise statement of its content (Yitzhaki 2002). A good title presents a publication effectively to readers and captures their attention, thereby facilitating knowledge-flow (Jakobovits and Nahl-Jakobovits 1987; Soler 2011). In academia, an average researcher scans through approximately 1142 titles a year (Mabe and Amin 2002). Coining an article title in an effective and

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attractive way (Soler 2007) can therefore be instrumental in triggering the interest of readers and reviewers; making the title stand out, and raising interest for the article itself (Paiva et al. 2012).

Good titles might also be influential in making an article visible to practitioners and other stakeholders, or even to academics in other fields/areas of research (Stremersch et al. 2007). Naturally, as a first step, title characteristics might be more likely to influence downloads rather than citations. For instance, if a title looks informative or attractive, users might click, download, and peruse the article in terms of its usefulness for the citing author.[1] However, this only underscores the fundamental importance of the title for an article's appreciation and eventual citation. We therefore chose to measure what makes an article's title "good", i.e. the visibility, appreciation, and attention given to an article as impact (citation count). Article impact (or simply, 'impact') constitutes one of the 'strongest currencies' (Aguinis et al. 2012) in academia and is coincidentally also an influencer of the authors' own impact and reputation (e.g., Cole and Cole 1972; Garfield 2006; Judge et al. 2007). Gomez-Mejia and Balkin (1992) went as far as estimating the marginal dollar value of a single citation to articles in top-tier management journals at $192 in 1988, with a future value of $1522 and a cumulative annuity of $13,350 in 2011 (cited in Judge et al. 2007: 492). Impact of scholarly work also plays a part in determining the allocation of resources and rewards to individuals and departments (Aguinis et al. 2012). So it quite literally "pays" for authors to pay attention to title characteristics and their potential implications for impact.

What, however, makes a "good" title", i.e. one which attracts impact in the academic community? The answer to this question has so far produced equivocal evidence, in large part since vastly different characteristics of article titles were investigated in myriad disciplines (each with their own customs and traditions), from biomedicine (Lewison and Paraje 2004), biology, medicine, physics (Lewison and Hartley 2005), to marketing (Stremersch et al. 2007). To illustrate, authors from various disciplines have undertaken studies on article titles and their characteristic features such as the number of words and presence of colons (Lewison and Hartley 2005), the relationship between title characteristics, downloads and citations in psychology (Subotic and Mukherjee 2014), the relation of title length to the article length (Yitzhaki 2002), and the role of titles in informing and attracting audience in information science (Diener 1984). Some authors have even explored the relationship between various (and often eclectic) selections of article title attributes and citation counts. Buter and van Raan (2011), for instance, studied the occurrence of non-alpha numeric characters and their correlation with the citation count. Jacques and Sebire (2010) investigated the influence of article titles on impact. Jamali and Nikzad (2011) explored the type of titles and their relation with the number of article downloads and their subsequent citation rates. Paiva et al. (2012) explored the relationship between the citation count of articles and the length and format of the titles, as did Stremersch et al. (2007).

Unfortunately, after decades of research, many of these studies have produced results which do not add up, and even appear contradictory. Thus, while there is some consensus on the question what makes a title "good" (i.e. its implications for article impact), there is much less clarity on our initial question of what makes a "good title". As we see it, the main issue is that prior studies, perhaps due to the different traditions and customs prevalent in each discipline, lack of prior knowledge, or sometimes lack of a sophisticated level of automation for simultaneous coding of too many attributes, have tended to

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[1] We would like to thank one of the reviewers for alerting us to the link between downloads and citations.

narrowly focus on a very limited set of title attributes (for instance, studied titular colons, focused only on title word count etc.).

The objective of the present study is to offer an overall model of article title characteristics building on previous studies investigating different title characteristics in diverse disciplines, and to ascertain the implications of this model for article impact. We focus on one discipline, management science, as an application context. This limitation is voluntary in that it allows us, primarily, to reduce the complexity of this undertaking by keeping the disciplinary context constant while building an integrative model of article characteristics from diverse studies in diverse contexts. It is also voluntary, secondarily, in that it allows us to make a contribution to management science, which is conspicuously absent from the long list of disciplines interested in article characteristics and their implications. Also, since theoretical development in the area of article titles is still in an early stage, we consider it important to gather relevant data in all major fields and disciplines before attempting to make interdisciplinary or inter-field generalizations. As such, management-specific examination seems appropriate at this stage and we chose to focus on top management outlets to investigate the relationship between relevant title attributes and their implications for impact.

Article title attributes

Several authors, from various disciplines, have undertaken studies on article titles and their characteristic features (For example: Anthony 2001; Diener 1984; Lewison and Hartley 2005; Subotic and Mukherjee 2014; Yitzhaki 2002). Unfortunately, these results remain equivocal, and no general model of a "good" article title has emerged so far. Some authors explored the relationship between various article title attributes and citation count. However, the observations made in the literature regarding titles have so far ignored the effects of discipline and field variation (Anthony 2001) and are thus not generalizable across disciplines or fields. Habibzadeh and Yadollahie (2010) found that articles with longer titles have a higher citation count in general medicine, science and multidisciplinary journals (medicine, clinical science and science). Whereas, in Psychology, the opposite effect was found: Articles with shorter titles had a higher citation count (Subotic and Mukherjee 2014).

We focus specifically on attributes which were studied or pointed out to have a significant relationship with citation count. Depending on their characteristics, we group them together as 'length attributes', 'character attributes', 'structure attributes', 'context attributes' and 'linguistic attributes'.

Length attributes

Prior studies have explored length-related title attributes and how they have changed over time (Whissell 2012), unfortunately with very limited cross-pollination and progress over the years and across disciplines, emphasizing the need for more recent and more comprehensive interdisciplinary studies on titles and their role in enhancing scholarly communication. Consider two studies in particular, which contradict each other. Diener (1984) calculated the change in the informational dynamics of physical and social science journal article titles, and found only a very small increase in the number of words, key words and the informational dynamics of journal article titles. Inversely, Lewison and Hartley (2005)

examined the spatial (across disciplines, around the globe) and temporal (across 5 years) differences in article title length in science and cancer research articles in UK and around the globe (respectively). The findings show that there is an increase in length of article titles over time. The later study (Lewison and Hartley 2005) does not cite the earlier study (Diener 1984). One of the reasons the two studies do not add up might be due to the fact that Diener's (1984) article was conducted prior to the internet revolution, and Lewison and Hartley's work (2005) is more recent. As such, the disagreement between their findings could be due to the advent of search engines and online databases which might have upturned the informational dynamics of titles immensely.[2] Another possible reason might lie in the disciplinary differences in the journals/articles they considered for the study. This apparent controversy surrounding the length of titles is not limited to these two studies, however. In fact, it seems endemic across disciplines. For instance, Paiva et al. (2012) explored the relationship between the length of titles published in Public Library of Science (PLoS) and Biomed Central (BMC) journals in 2008 October. They find that articles with shorter titles have a higher citation count than articles with longer titles. A plausible reason could be that shorter titles are more attractive and simpler to understand (Paiva et al. 2012). The study by Subotic and Mukherjee (2014) also shows similar trends in the field of psychology. The results, however, were quite the reverse when Jacques and Sebire (2010) explored article titles of original human studies (January–March, 2006), in five major general medicine articles. Their results, in fact, show a very strong positive association between title length and citation rate. Articles with the highest citation rates tend to have as many as twice the number of words in their titles than articles with the lowest citation rates. Similarly, Habibzadeh and Yadollahie (2010) found that in general medicine and multi-disciplinary science journals, longer titles show a relationship with a higher number of citations. This suggests that the fields/disciplines could be moderating (in a statistical sense) the correlation between title length and citations.

Given these non-additive prior results when it comes to title length, formulating an a priori expectation is not straightforward. One might argue that a longer article could provide the readers more information about the contents of the paper, and thus increase both initial attention and exposure, as well as its readership and subsequently its citation rate. Other things being equal, though, it seems more plausible to expect that a shorter title would be more attractive and concise, signaling a clear focus and making it more appealing to the audience. The findings in the field of psychology (Subotic and Mukherjee 2014) points this out. Thus, given the similarity of our context (management) with psychology; and building on the conceptualization of the length attribute by adding previously developed-attributes such as 'number of words' (Lewison and Hartley 2005), and 'number of characters' (Paiva et al. 2012), we formulate our first hypothesis:

Hypothesis 1 Length attributes have a significant negative influence on the citation count of top management journal articles.

Character attributes

On the one hand, Paiva et al. (2012) noticed that including a question mark, colon or a hyphen is usually concurrent with a lower citation count. Likewise, Michelson (1994) also observed that there is a significant inverse relationship between colons in titles and the status of journals in industrial relations. This could be because non-alphanumeric

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[2] We thank the reviewers for pointing this out.

characters like question marks are now included by authors just to market their paper (Ball 2009), and this awareness makes these papers less appealing to the audience.

However, according to Dillon (1982), 'Titular colonicity' (colons in titles) is the primary correlate of scholarly quality'. Buter and Van Raan (2011) find that usually 29 types of non-alphanumeric characters turn up in article titles, the most common of them being hyphen, colon, comma, and the two parentheses. Jacques and Sebire (2010) also found that in general medicine articles, the presence of a colon in the title positively correlates with the citation count. Buter and Van Raan (2011) discovered that the presence of common non-alphanumeric characters have a small, but significant positive influence on the citation count. They explain that this could be due to the fact that titles without such characters appear 'odd' (Buter and Van Raan 2011: 617) to the reader. When we compare with other disciplines, social sciences have been found to have a higher percentage (33–50 %) of titles with colons (Hartley 2007a), so this variable is particularly relevant for our application context (management studies). Given the slightly more pronounced evidence for presence of character attributes in management research article titles (which makes them a common observance), we would expect a null or negative relationship between titular colonicity and impact. We focus specifically on the variable 'non-alphanumeric characters' in our study and hypothesize:

Hypothesis 2 Character attributes have a significant negative influence on the citation count of top management journal articles.

Structure attributes

Titles usually occur either in the format of a single sentence or question, or as a compound sentence (Hartley 2007b). Soler (2007) examined 570 biology and social science titles and found that compound sentences are more common in social science research papers. The study also provided evidence that interrogative formats are more common in titles of social science review papers. She reasons that compound constructions make the titles more clear, precise and informative.

Lewison and Hartley (2005) and Hartley (2005) examined the proportion of compound sentence formats. They differentiated titles according to the length of the two parts, separated by a colon (non-alpha numeric character). The different 'title structures' include '*short: long*', if the first part of the compounded sentence is shorter than the subsequent part (s), '*long: short*', if the former part is longer than the latter, and '*balanced*', if both parts are fairly balanced.

Previous authors have examined the influence certain other structure related attributes might have on citation count. Jamali and Nikzad (2011), studied the influence article title type has on the number of citations and downloads. They specify three types of article titles, '*declarative*' (including the study's main conclusions), '*descriptive/neutral*' (describing the subject), and '*interrogative*' (in a question format). The findings showed that the articles with interrogative titles are more downloaded, but less cited than the articles with descriptive or declarative titles. We consider these attributes ('*declarative*', '*descriptive*', '*interrogative*') under the categorical variable 'title format' for our study.

Furthermore, Paiva et al. (2012) examined the classification of titles as '*methods-describing*' and '*results-describing*', and found that articles with results-describing titles are cited more often than the others. We include these attributes ('*methods-describing*' and '*results-describing*') also into the study. We group these under the variable 'title classification'. Finally, we also include a couple of features, 'share of the substantive words'

(Diener 1984; Nagano 2015), and 'share of non-informative words' in this category. Considering the variety of title structures and their associations with the citation count, as well as the similarity of management in comparison with the other fields showing a positive relationship between structure attributes and citation counts (e.g. psychology), we postulate:

Hypothesis 3 Structure attributes have a significant positive influence on the citation count of top management journal articles.

Context attributes

We then examine whether title attributes providing specific contextual information influence citation count. Jacques and Sebire (2010) and Paiva et al. (2012) found that reference to a specific country/geographical location in the title predicts poor citation. This could be due to the fact that researchers may discount information which they perceive to be related to only a specific country (Jacques and Sebire 2010). Presence of contextual attributes might also suggest limited generalizability and visibility (Paiva et al. 2012) to specific researchers. Correspondingly, it seemed plausible to expect that 'country/continent name' in the titles would have a negative influence on the citation count of articles in management. We added two more management specific context attributes, 'company name in title', and 'industry name in title' into the study and hypothesize:

Hypothesis 4 Context attributes have a significant negative influence on the citation count of top management journal articles.

Linguistic attributes

Previously, the study by Jacques and Sebire (2010) found evidence that in medical journals, the citation count of articles positively correlates with the presence of acronyms in titles. Following up on that, we examine whether the inclusion of 'acronyms', might have any direct association with citation count in management discipline. Furthermore, we include the variable 'linguistic tools' (constituting proverbs, metaphors etc.) and examine whether they are positively associated with citation count. To include psychological factors of a linguistic kind, we also include the variable 'amusement' in the study. We followed the Oxford dictionary definition used by Sagi and Yechiam (2008) and Subotic and Mukherjee (2014) in their studies: *Amuse: Cause someone to laugh and smile*. We call all these variables 'linguistic attributes' collectively:

Hypothesis 5 Linguistic attributes have a significant positive influence on the citation count of top management journal articles.

Methods

Data collection

Sample

We concentrated on five top tier management journals, following previous work rating the impact of management journals (Gomez-Mejia and Balkin 1992; Podsakoff et al. 2005;

Siggelkow 2001; Tahai and Meyer 1999). The journals are *Academy of Management Journal, Administrative Science Quarterly, Journal of Management, Organization Science, and Strategic Management Journal*. We specifically focused on this array of journals since they are consistently the top ones across various ratings, and hence are good indicators of the current trends in the academic community.

We looked into all types of articles (quantitative and qualitative field studies, methodology papers, secondary data empirical studies, meta-analyses, experimental studies, and papers using mathematical modeling or simulations etc.). We excluded editorials, book reviews, comments, and letters to editors since they might behave differently from research papers. We randomly sampled articles from the time period 1997–2006, to allow for meaningful analyses of article citation counts, given that some time is needed after publication of an article for citations to accumulate (Walters 2011). The total number of articles in these journals during the time period was 2597 (source: Business Source Premier). Our sample consisted of 553 titles (approximately 110 articles/journal), following suggestions by Cohen (1992), and Ferguson and Ketchen (1999), for meeting power requirements for the statistical analysis.

Measures and data extraction

Data extraction followed the format of previous studies on article impact (Gibbert and Ruigrok 2010). We considered article impact as our dependant variable and article title attributes as our independent variables. We also controlled for the journal of publication, author attributes, and article attributes.

Article impact

In this study, we use citation count for measuring article impact. In management, citation count is considered the most popular, objective, and standard metric for measuring impact and appraising the influence of a scientist's work on another (Bergh et al. 2006). Citation count is also the traditional and most frequently used method (Adam 2002; Leung 2007). Information on article citations was collected using ISI web of science and Google scholar. We used both these sources since they are different from each other in various aspects and considering them both for the study would ensure the internal and external validity of the study. For instance, Google scholar is more widely distributed when compared to ISI web of science. Also, it involves citations not only in other academic articles, but also in student papers, dissertations, other non-scholarly sources etc. However, considering Google scholar alone would not be ideal either, since sometimes Google scholar inadvertently counts a citation more than once. For example, it might count a citation by the preprint and paper version of the same article twice (Meho and Yang 2007). It might also provide phantom or false citations due its 'frequent inability to recognize real matches between cited and citing items claiming a match where there is not even minimal chemistry' (Jacsó 2006; Meho and Yang 2007: 2111). The citation data for all the articles was collected on the same day to prevent distortion or possible errors. For the analysis, we considered both the absolute number of citations and citations per year, leading to four outcome variables (ISI citation count, ISI citation count per year, Google scholar citation count, and Google scholar citation count per year).

Article title attributes

To obtain the data on article title attributes, we manually extracted information on the features listed in Table 1. Since information on many of our attributes were extractable only by human coding (for example, the code pertaining to 'linguistic tools'), we used this technique instead of seeking the help of a bibliometric software. Likewise, for calculating the 'share of substantive words', we had to first ascertain the number of 'substantive' or 'significant' words by considering all the words in the title after discounting the articles, prepositions, conjunctions, pronouns and auxiliary verbs (Yitzhaki 2002). After manually coding the titles for the substantive word count, we calculated their share with respect to the overall number of words in the title.

Table 1 Article title attributes

Length attributes
Number of words
Number of substantive words
Number of non-informative words
Number of characters
Character attributes
Presence of non-alphanumeric characters
Structure attributes
Title structure
Short: Long
Long: Short
Balanced
Non compounded
Title format
Declarative
Descriptive
Interrogative
Title classification
Method/design specifying
Results/conclusion describing
Neither
Share of substantive words
Share of non-informative words
Context attributes
Country/continent name
Company name
Industry name
Linguistic attributes
Acronyms
Linguistic tools
Amusement

Controls

Considering the journal level policies regarding the word or character count of article titles, we presumed that the specific journal where an article is published in might influence the title attributes. Hence we controlled for the journal in which articles have been published, by applying four dummy variables representing the journals in our sample (with *Administrative Science Quarterly* as the reference group). Furthermore, in our analyses regarding the relationship between article title attributes and impact, we included the variables used to examine antecedents of title attributes in all equations. These potential antecedents of title attributes included core author and article attributes which were found to have significant relationship with citation count (Bergh et al. 2006; Conlon et al. 2006; Mingers and Xu 2010; Stremersch et al. 2007).

Author attributes

We borrow the measure 'number of authors' from the Bergh et al. (2006) study on SMJ article impact, which shows that the number of authors negatively correlates with citation count. Lewison and Hartley (2005) also found that except when the number of coauthors is high, single authors produce more titles with colons than multiple authors, in science and oncology. Apart from these variables, we include, 'continent of first author' also into the study to control for geographical and cultural differences and their influences on article nomenclature.

Article attributes

Bergh et al. (2006) explored the effects of article characteristics on citation count and found that article age has a positive relationship with citation count. Article length was also identified as a predictor of article citation count. Yitzhaki (2002) also observed that there is a moderate positive correlation between the length of a paper (number of pages) and the number of significant words in its title, in the sciences. Hence we include 'article age' and 'article length' into our study as controls. We also consider 'number of references' as a control variable since the academics who get cited might tend to 'return the favor' by citing the referrer's article too, thereby influencing the citation count of the concerned article (Gilbert 1977; Judge et al. 2007; Van Wesel et al. 2014).

Coding and data analysis

A standardized coding scheme was developed from prior literature. For the variables with yes or no answers, we allotted a '0' for absence of the concerned variable and a '1' for presence. For example, a title with non-alphanumeric characters in it was given a '1' for the concerned code and a title without the characters, a '0'. For nominal variables with more than 2 possible values, we assigned different numbers to different categories. Categorical variables with more than two categories were converted into dummy variables in the analysis and assigned an omitted reference category. For the variable 'title format' (Jamali and Nikzad 2011), we gave the value '0' to *declarative titles*, '1' to *descriptive titles* and '2' to *interrogative titles*. The omitted category during regression analysis was *descriptive titles*. For the categorical variable 'title structure' (Hartley 2005), we gave '0' to *non-compounded*, '1' to *short: long*, '2' to *long: short*, and '3' to *balanced* structures. We omitted *non-compounded* during the regression analysis. Likewise, for 'title classification', we gave '0' to *methodology/design describing*, '1' to *results/conclusion describing*

and '2' to titles in *neither* format. Here, the omitted categories were *results/conclusion describing* and *neither*, the reason for omitting the latter being the fact that only very few articles use this format (1.1 %). We followed the same criteria for coding similar author and article attributes ('continent of first author', 'journal of publication' etc.). For variables involving different values like 'number of words', 'number of characters', 'article length' etc., we included the exact count in the coding sheet.

For the variable 'amusement', we did the rating using Mturk. Each title was assessed by three native English speakers from USA. The judges used a 7- point likert scale. The rWG interrater agreement was 0.83 (James et al. 1993). An interrater agreement value above 0.70 is usually considered good.

As discussed earlier, many of our codes do not allow for a mechanistic coding or extraction via a software (for example, consider the code: title classification). Therefore, we manually coded all the titles in the sample. The titles were coded by three coders. Two of them were independent, blind coders who were neither involved in the study, nor aware of the research questions and lines of inquiry. The third coder was the first author of the present study. A consensus coding approach was followed. The pre-consensus coding inter-rater reliability was quite high for all codes (>90 %). Subsequently, we did stepwise regression analyses using ordinary least squares model on the title attributes and citation count; with the journals, author and article attributes as controls.

Results

The frequency of reporting of the variables are mentioned in Table 2. Tables 3 and 4 show the descriptives and the correlations. We noticed that certain non-titular variables have strong correlations with particular title attributes. For instance, 'article length' was found to

Table 2 Article title attributes–Frequencies

Item reported		Frequency (%)
Non-alpha numeric characters		88.1
Compounded titles		69.3
Title structure	Non compounded	30.6
	Short: long	44.8
	Long: short	18.8
	Balanced	5.8
Title format	Declarative	1.4
	Descriptive	92.9
	Interrogative	5.6
Title classification	Method/design specifying	83.5
	Results/conclusion describing	15.4
	Neither	1.1
Country/continent name		8.3
Company name		2.2
Industry name		7.6
Acronyms		6.9
Linguistic tools		7.2

Table 3 Article title attributes–Descriptives

	Minimum	Maximum	Mean	SD
Number of words	2	23	11.75	3.78
Number of substantive words	2	19	8.13	2.44
Number of non-informative words	0	12	3.63	1.86
Number of characters	20	189	90.82	28.05
Share of substantive words	0.50	1.00	0.70	0.09
Share of non-informative words	0.00	0.86	0.30	0.10

have a positive correlation with 'short: long structure', 'declarative format', 'industry name in title', and 'linguistic tools'; and a negative correlation with 'long: short structure', and 'share of substantive words'.

Title attributes and citation count

We did a step-wise regression analysis. We included relevant indicators for variables from each category. For instance, from the category 'length attributes', we included the variable 'number of characters'. This was done since including all the variables together would have caused multicollinearity. We ran the analysis by first including all the different categories of attributes separately and then including them altogether in the same model. For the final step (including all variables), we checked for results with and without interaction effects. Each analysis thus had eight models, and we had a total of four analyses. The analysis was rerun with different dependent variables (ISI citations, ISI citations per year, Google scholar citations, and Google scholar citations per year). In all combinations, we found that the presence of non-alphanumeric characters in an article title has a significant, negative relationship with citation count (see Tables 5, 6, 7, 8). This confirms our second hypothesis which states that character attributes in titles have a significant negative influence on the citation count of top management journal articles.

In the analyses containing Google scholar citation count and Google scholar citation count per year, 'number of characters' was found to have a significant, negative relationship with citation count when analyzed in a model without the other variables. In the final model, however, 'number of characters' was found to have less significant negative relationships with citation count. This could be due to the influence of all the other variables ('non-alphanumeric characters' in particular). However, this relationship was not significant across the four dependent variable categories we examined. Therefore, our first hypothesis stating that length attributes have a significant influence on top management journal article citation count, was rejected.

In all the four analyses, 'balanced structure' was found to have a slightly significant positive relationship with citation count in the final two models (model 7 and 8). This partially confirms our third hypothesis which states that structure attributes have a significant influence on article citation count in management. However, the other structure attributes were found to have only inconsistent, feebly significant relationships with citation count across models and across analyses. For example, 'short: long' structure was found to have a weakly significant, positive relationship with ISI citation count and ISI citation count per year in the final two models. 'Interrogative' format has weakly significant, positive relationships with the dependent variable, in the final two models of ISI

Table 4 Article title attributes—Correlations

	1	2	3	4	5	6	7	8	9	10
Article age	–									
Article length	0.05									
References	-0.07	0.54**								
Number of authors	0.01	-0.01	0.02							
Continent of first author	-0.04	-0.08	-0.02	-0.03						
Number of characters	-0.01	0.08	0.06	0.08	-0.01					
Non-alphanumeric characters	-0.05	-0.03	0.06	0.07	-0.07	0.26**				
Short: long structure	-0.01	0.17**	0.11*	-0.02	-0.05	0.25**	0.33**			
Long: short structure	-0.08	-0.09*	0.01	0.07	0.06	0.18**	0.16**	-0.43**		
Balanced structure	0.02	-0.04	0.01	0.03	-0.01	0.00	0.09*	-0.22**	-0.12**	
Declarative format	0.09*	0.13**	0.04	0.03	-0.06	0.01	0.00	0.04	-0.06	0.03
Interrogative format	-0.04	-0.05	-0.06	0.02	-0.01	0.06	0.09*	0.05	0.04	-0.03
Methods/design specifying classification	-0.02	-0.02	-0.01	-0.07	-0.05	-0.09*	-0.10*	-0.02	-0.15**	-0.14**
Share of substantive words	-0.07	-0.12*	-0.06	-0.01	0.00	-0.18**	0.08	-0.07	0.02	0.05
Country/continent name in title	0.05	-0.04	-0.04	0.09*	0.10*	0.15**	0.07	0.03	0.07	0.01
Company name in title	0.00	0.05	0.01	0.00	0.00	0.02	0.05	0.02	0.06	0.07
Industry name in title	-0.09*	0.12**	0.01	0.00	-0.03	0.13**	0.04	0.13**	-0.03	-0.01
Acronyms	0.02	0.02	0.00	0.01	-0.01	0.09*	0.06	0.04	0.02	0.02
Linguistic tools	0.02	0.14**	0.10*	0.10*	0.03	0.07	0.10*	0.28**	-0.12**	-0.04
Amusement	-0.17**	0.06	0.06	-0.03	-0.02	-0.01	0.13**	0.19**	0.01	-0.06

	11	12	13	14	15	16	17	18	19	20
Article age										
Article length										
References										
Number of authors										

Table 4 continued

	11	12	13	14	15	16	17	18	19	20
Continent of first author										
Number of characters										
Non-alphanumeric characters										
Short: long structure										
Long: short structure										
Balanced structure										
Declarative format										
Interrogative format	−0.03									
Methods/design specifying classification	−0.07	0.00								
Share of substantive words	−0.04	−0.08	−0.01							
Country/continent name in title	0.07	−0.04	−0.04	−0.01						
Company name in title	−0.02	0.02	−0.07	−0.05	−0.04					
Industry name in title	0.02	−0.07	0.02	−0.01	0.19**	0.10*				
Acronyms	0.03	0.00	−0.05	0.05	0.33**	0.06	0.19**			
Linguistic tools	0.14**	−0.01	−0.05	−0.13**	−0.01	0.01	−0.03	0.03		
Amusement	−0.01	0.16**	0.02	−0.10*	−0.09*	−0.01	0.07	−0.03	0.27**	–

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

Table 5 Step-wise regression analysis (ISI citation count)

	Model 1		Model 2		Model 3		Model 4	
	Beta	Error	Beta	Error	Beta	Error	Beta	Error
Controls								
Journals								
Dummies for journals	Included	–	Included	–	Included	–	Included	–
Article attributes								
Article age	0.18**	2.10	0.18**	2.10	0.18**	2.09	0.19**	2.12
Article length	0.19**	1.25	0.18**	1.25	0.17**	1.25	0.19**	1.26
References	0.00	0.25	0.01	0.25	0.02	0.25	0.01	0.25
Author attributes								
Number of authors	−0.07+	5.57	−0.07+	5.56	−0.06+	5.54	−0.07	5.61
First author: Europe	−0.06	17.83	−0.07+	17.86	−0.07+	17.82	−0.06	18.01
First author: Asia	−0.06	25.58	−0.06	25.54	−0.06	25.44	−0.06	25.81
First author: Oceania	−0.05	44.14	−0.05	44.06	−0.05	43.87	−0.04	44.40
Variables								
Length attributes								
Number of characters			−0.07+	0.22				
Character attributes								
Non-alphanumeric characters					−0.11**	19.12		
Structure attributes								
Short: long structure							−0.02	15.17
Long: short structure							−0.05	18.81
Balanced structure							0.04	28.83
Declarative format							−0.02	53.00
Interrogative format							0.06	27.08
Method/design specifying classification							0.03	17.32
Share of substantive words							0.02	66.62
Context attributes								
Country/continent name in title								
Company name in title								
Industry name in title								
Linguistic attributes								
Acronym								
Linguistic tools								
Amusement								
Interaction								
Article age*Interrogative format								
R squared		0.13		0.13		0.14		0.14
F		7.23		6.89		7.34		5.00

Table 5 continued

	Model 5		Model 6		Model 7		Model 8	
	Beta	Error	Beta	Error	Beta	Error	Beta	Error
Controls								
Journals								
Dummies for journals	Included	–	Included	–	Included	–	Included	–
Article attributes								
Article age	0.18**	2.12	0.18**	2.14	0.17**	2.15	0.16**	2.20
Article length	0.20**	1.27	0.19**	1.26	0.18**	1.28	0.18**	1.28
References	0.00	0.25	0.00	0.25	0.01	0.25	0.00	0.25
Author attributes								
Number of authors	−0.07+	5.59	−0.07+	5.61	−0.06	5.64	−0.07+	5.64
First author: Europe	−0.06	17.89	−0.06	17.88	−0.07+	18.03	−0.07	17.99
First author: Asia	−0.06	26.11	−0.06	25.67	−0.07+	26.26	−0.07+	26.20
First author: Oceania	−0.05	44.21	−0.05	44.36	−0.05	44.29	−0.05	44.17
Variables								
Length attributes								
Number of characters					−0.06	0.25	−0.06	0.25
Character attributes								
Non-alphanumeric characters					−0.15**	23.12	−0.15**	23.06
Structure attributes								
Short: long structure					0.11+	19.01	0.11+	18.96
Long: short structure					0.05	21.72	0.06	21.72
Balanced structure					0.09*	30.26	0.09*	30.20
Declarative format					−0.02	53.05	−0.02	52.95
Interrogative format					0.07+	27.26	0.08+	27.48
Method/design specifying classification					0.04	17.26	0.04	17.22
Share of substantive words					0.03	68.69	0.03	68.51
Context attributes								
Country/continent name in title	0.01	23.45			0.03	24.91	0.04	24.88
Company name in title	−0.02	42.95			−0.02	43.27	−0.02	43.19
Industry name in title	−0.05	24.25			−0.04	24.75	−0.04	24.69
Linguistic attributes								
Acronym			−0.04	24.62	−0.03	26.31	−0.04	26.29
Linguistic tools			0.03	26.08	0.03	26.74	0.03	26.67
Amusement			−0.03	7.33	−0.03	7.54	−0.02	7.56
Interaction								
Article age*Interrogative format							−0.08*	8.95

Table 5 continued

	Model 5		Model 6		Model 7		Model 8	
	Beta	Error	Beta	Error	Beta	Error	Beta	Error
R squared		0.13		0.13		0.16		0.17
F		5.81		5.78		3.86		3.87

** $p \le .01$; * $p \le .05$; + $p \le .10$

Table 6 Step-wise regression analysis (ISI citation count per year)

	Model 1		Model 2		Model 3		Model 4	
	Beta	Error	Beta	Error	Beta	Error	Beta	Error
Controls								
Journals								
Dummies for journals	Included	–	Included	–	Included	–	Included	–
Article attributes								
Article age	−0.02	0.16	−0.02	0.16	−0.02	0.16	−0.02	0.16
Article length	0.20**	0.10	0.20**	0.10	0.18**	0.10	0.20**	0.10
References	0.02	0.02	0.03	0.02	0.04	0.02	0.03	0.02
Author attributes								
Number of authors	−0.09*	0.43	−0.08*	0.43	−0.08*	0.43	−0.08+	0.43
First author: Europe	−0.06	1.38	−0.07	1.38	−0.07+	1.38	−0.06	1.39
First author: Asia	−0.06	1.97	−0.06	1.97	−0.07	1.96	−0.06+	2.00
First author: Oceania	−0.05	3.41	−0.05	3.40	−0.05	3.39	−0.05	3.43
Variables								
Length attributes								
Number of characters			−0.07+	0.02				
Character attributes								
Non-alphanumeric characters					−0.11**	1.48		
Structure attributes								
Short: long structure							−0.01	1.17
Long: short structure							−0.04	1.45
Balanced structure							0.03	2.23
Declarative format							−0.02	4.10
Interrogative format							0.04	2.09
Method/design specifying classification							0.03	1.34
Share of substantive words							0.03	5.15
Context attributes								
Country/continent name in title								
Company name in title								
Industry name in title								
Linguistic attributes								
Acronym								

Table 6 continued

	Model 1		Model 2		Model 3		Model 4	
	Beta	Error	Beta	Error	Beta	Error	Beta	Error
Linguistic tools								
Amusement								
Interaction								
Article age*Interrogative format								
R squared		0.10		0.11		0.12		0.11
F		5.70		5.52		5.88		3.66

	Model 5		Model 6		Model 7		Model 8	
	Beta	Error	Beta	Error	Beta	Error	Beta	Error
Controls								
Journals								
Dummies for journals	Included	–	Included	–	Included	–	Included	–
Article attributes								
Article age	−0.03	0.16	−0.02	0.17	−0.03	0.17	−0.05	0.17
Article length	0.22**	0.10	0.20**	0.10	0.20**	0.10	0.20**	0.10
References	0.01	0.02	0.02	0.02	0.03	0.02	0.02	0.02
Author attributes								
Number of authors	−0.09*	0.43	−0.09+	0.43	−0.08+	0.44	−0.08*	0.44
First author: Europe	−0.06	1.38	−0.06	1.38	−0.07	1.39	−0.06	1.39
First author: Asia	−0.07	2.01	−0.06	1.98	−0.08+	2.03	−0.07+	2.03
First author: Oceania	−0.05	3.41	−0.06	3.43	−0.05	3.42	−0.05	3.42
Variables								
Length attributes								
Number of characters					−0.07	0.02	−0.07	0.02
Character attributes								
Non-alphanumeric characters					−0.15**	1.79	−0.15**	1.78
Structure attributes								
Short: long structure					0.12+	1.47	0.12+	1.47
Long: short structure					0.06	1.68	0.07	1.68
Balanced structure					0.09+	2.34	0.09+	2.34
Declarative format					−0.02	4.10	−0.02	4.10
Interrogative format					0.05	2.11	0.06	2.13
Method/design specifying classification					0.03	1.33	0.03	1.33
Share of substantive words					0.03	5.31	0.03	5.30
Context attributes								
Country/continent name in title	0.01	1.81			0.03	1.92	0.04	1.92
Company name in title	−0.03	3.31			−0.02	3.34	−0.03	3.34

Table 6 continued

	Model 5		Model 6		Model 7		Model 8	
	Beta	Error	Beta	Error	Beta	Error	Beta	Error
Industry name in title	−0.07+	1.87			−0.06	1.91	−0.06	1.91
Linguistic attributes								
Acronym			−0.03	1.90	−0.03	2.03	−0.03	2.03
Linguistic tools			0.02	2.01	0.02	2.07	0.02	2.06
Amusement			−0.03	0.57	−0.02	0.58	−0.02	0.58
Interaction								
Article age*Interrogative format							−0.07	0.69
R squared			0.11		0.12		0.14	0.14
F			4.73		4.54		3.17	3.15

** $p \leq .01$; * $p \leq .05$; $+p \leq .10$

Table 7 Step-wise regression analysis (Google scholar citation count)

	Model 1		Model 2		Model 3		Model 4	
	Beta	Error	Beta	Error	Beta	Error	Beta	Error
Controls								
Journals								
Dummies for journals	Included	–	Included	–	Included	–	Included	–
Article attributes								
Article age	0.20**	7.09	0.21**	7.06	0.20**	7.05	0.21**	7.15
Article length	0.22**	4.23	0.21**	4.21	0.20**	4.23	0.22**	4.25
References	−0.03	0.83	−0.02	0.83	−0.01	0.83	−0.02	0.84
Author attributes								
Number of authors	−0.07+	18.78	−0.07+	18.73	−0.07	18.69	−0.07+	18.90
First author: Europe	−0.05	60.18	−0.06	60.12	−0.06	60.12	−0.05	60.70
First author: Asia	−0.06	86.32	−0.06	85.97	−0.06	85.84	−0.06	87.01
First author: Oceania	−0.05	148.94	−0.05	148.31	−0.05	148.03	−0.04	149.64
Variables								
Length attributes								
Number of characters			−0.10**	0.75				
Character attributes								
Non-alphanumeric characters					−0.11**	64.53		
Structure attributes								
Short: long structure							−0.04	51.13
Long: short structure							−0.06	63.40
Balanced structure							0.03	97.17
Declarative format							−0.03	178.63
Interrogative format							0.06	91.26

Table 7 continued

	Model 1		Model 2		Model 3		Model 4	
	Beta	Error	Beta	Error	Beta	Error	Beta	Error
Method/design specifying classification							0.03	58.38
Share of substantive words							0.04	224.54
Context attributes								
Country/continent name in title								
Company name in title								
Industry name in title								
Linguistic attributes								
Acronym								
Linguistic tools								
Amusement								
Interaction								
Article age*Interrogative format								
R squared		0.12		0.13		0.14		0.13
F		6.87		6.83		7.01		4.56

	Model 5		Model 6		Model 7		Model 8	
	Beta	Error	Beta	Error	Beta	Error	Beta	Error
Controls								
Journals								
Dummies for journals	Included	–	Included	–	Included	–	Included	–
Article attributes								
Article age	0.20**	7.15	0.20**	7.20	0.20**	7.25	0.18**	7.42
Article length	0.23**	4.27	0.22**	4.24	0.21**	4.30	0.21**	4.29
References	−0.03	0.84	−0.03	0.84	−0.02	0.84	−0.02	0.84
Author attributes								
Number of authors	−0.07+	18.87	−0.08+	18.92	−0.07+	19.00	−0.07+	18.98
First author: Europe	−0.05	60.36	−0.05	60.23	−0.06	60.70	−0.06	60.61
First author: Asia	−0.06	88.08	−0.06	86.48	−0.07+	88.42	−0.07	88.24
First author: Oceania	−0.05	149.14	−0.05	149.46	−0.05	149.11	−0.05	148.77
Variables								
Length attributes								
Number of characters					−0.08+	0.85	−0.09+	0.85
Character attributes								
Non-alphanumeric characters					−0.13**	77.84	−0.14**	77.66
Structure attributes								
Short: long structure					0.09	64.00	0.08	63.88

Table 7 continued

	Model 5		Model 6		Model 7		Model 8	
	Beta	Error	Beta	Error	Beta	Error	Beta	Error
Long: short structure					0.04	73.14	0.05	73.16
Balanced structure					0.09+	101.89	0.09*	101.73
Declarative format					−0.04	178.61	−0.03	178.34
Interrogative format					0.07	91.78	0.08+	92.57
Method/design specifying classification					0.03	58.13	0.03	58.00
Share of substantive words					0.04	231.26	0.04	230.76
Context attributes								
Country/continent name in title	−0.01	79.10			0.03	83.88	0.03	83.79
Company name in title	−0.02	144.88			−0.01	145.68	−0.02	145.47
Industry name in title	−0.06	81.81			−0.04	83.35	−0.04	83.16
Linguistic attributes								
Acronym			−0.05	82.95	−0.04	88.57	−0.05	88.55
Linguistic tools			0.04	87.89	0.04	90.03	0.04	89.83
Amusement			−0.05	24.70	−0.05	25.38	−0.04	25.46
Interaction								
Article age*Interrogative format							−0.08+	30.16
R squared		0.13		0.13		0.16		0.16
F		5.56		5.63		3.81		3.81

** $p \leq .01$; * $p \leq .05$; + $p \leq .10$

Table 8 Step-wise regression analysis (Google scholar citation count per year)

	Model 1		Model 2		Model 3		Model 4	
	Beta	Error	Beta	Error	Beta	Error	Beta	Error
Controls								
Journals								
Dummies for journals	Included	–	Included	–	Included	–	Included	–
Article attributes								
Article age	0.03	0.54	0.03	0.54	0.03	0.54	0.03	0.55
Article length	0.23**	0.32	0.23**	0.32	0.21**	0.32	0.23**	0.32
References	−0.01	0.06	0.00	0.06	0.00	0.06	0.00	0.06
Author attributes								
Number of authors	−0.09*	1.43	−0.08*	1.43	−0.08*	1.43	−0.09*	1.44
First author: Europe	−0.06	4.59	−0.07	4.58	−0.07+	4.58	−0.06	4.63

Table 8 continued

	Model 1		Model 2		Model 3		Model 4	
	Beta	Error	Beta	Error	Beta	Error	Beta	Error
First author: Asia	−0.07	6.58	−0.06	6.55	−0.07+	6.54	−0.06+	6.64
First author: Oceania	−0.05	11.36	−0.05	11.30	−0.05	11.29	−0.05	11.42
Variables								
Length attributes								
Number of characters			−0.11**	0.06				
Character attributes								
Non-alphanumeric characters					−0.12**	4.92		
Structure attributes								
Short: long structure							−0.04	3.90
Long: short structure							−0.06	4.84
Balanced structure							0.03	7.42
Declarative format							−0.03	13.64
Interrogative format							0.04	6.97
Method/design specifying classification							0.03	4.46
Share of substantive words							0.04	17.14
Context attributes								
Country/continent name in title								
Company name in title								
Industry name in title								
Linguistic attributes								
Acronym								
Linguistic tools								
Amusement								
Interaction								
Article age*Interrogative format								
R squared		0.09		0.10		0.11		0.10
F		5.00		5.18		5.29		3.34

	Model 5		Model 6		Model 7		Model 8	
	Beta	Error	Beta	Error	Beta	Error	Beta	Error
Controls								
Journals								
Dummies for journals	Included	–	Included	–	Included	–	Included	–
Article attributes								
Article age	0.02	0.54	0.02	0.55	0.02	0.55	0.00	0.57
Article length	0.25**	0.33	0.24**	0.32	0.23**	0.33	0.23**	0.33
References	−0.02	0.06	−0.01	0.06	0.00	0.06	−0.01	0.06
Author attributes								
Number of authors	−0.09*	1.44	−0.10*	1.44	−0.08*	1.45	−0.09*	1.45

Table 8 continued

	Model 5		Model 6		Model 7		Model 8	
	Beta	Error	Beta	Error	Beta	Error	Beta	Error
First author: Europe	−0.06	4.60	−0.05	4.60	−0.07	4.63	−0.06	4.63
First author: Asia	−0.07	6.71	−0.07+	6.60	−0.08+	6.74	−0.08+	6.73
First author: Oceania	−0.05	11.36	−0.06	11.40	−0.05	11.37	−0.05	11.35
Variables								
Length attributes								
Number of characters					−0.09*	0.07	−0.09*	0.06
Character attributes								
Non-alphanumeric characters					−0.14**	5.93	−0.14**	5.93
Structure attributes								
Short: long structure					0.10	4.88	0.10	4.88
Long: short structure					0.05	5.58	0.06	5.58
Balanced structure					0.08+	7.77	0.09+	7.76
Declarative format					−0.03	13.62	−0.03	13.61
Interrogative format					0.05	7.00	0.06	7.07
Method/design specifying classification					0.03	4.43	0.03	4.43
Share of substantive words					0.04	17.63	0.04	17.61
Context attributes								
Country/continent name in title	0.00	6.02			0.03	6.39	0.03	6.39
Company name in title	−0.03	11.03			−0.02	11.11	−0.02	11.10
Industry name in title	−0.07+	6.23			−0.06	6.35	−0.06+	6.35
Linguistic attributes								
Acronym			−0.05	6.33	−0.04	6.75	−0.04	6.76
Linguistic tools			0.03	6.71	0.03	6.86	0.03	6.86
Amusement			−0.05	1.88	−0.04	1.94	−0.04	1.94
Interaction								
Article age*Interrogative format							−0.06	2.30
R squared		0.10		0.10		0.13		0.13
F		4.21		4.12		3.03		3.00

** $p \leq .01$; * $p \leq .05$; + $p \leq .10$

citation count as well as on the final model of Google scholar citation count. Nevertheless, none of those results were uniform across all the models.

Regarding context attributes, 'industry name in titles' was found to have weakly significant ($p < .1$) relationships with Google scholar and ISI citation count per year. However, neither this nor the other variables in this category had any strongly significant or steady influence on citation count as per our four analyses. Hence, our fourth hypothesis

about the significant influence of context attributes on citation count in management journal articles was also rejected. Finally, we also found that none of the linguistic attributes we examined had any significant relationships with citation count in any of the analyses. Hence our final hypothesis stating linguistic attributes have a significant positive effect on citation count was also rejected.

Additionally, we checked for interaction effects between variables that might systematically influence the title attributes-scholarly impact relationship. We tested for potential interactions with 'article age' since this variable was found to have influence on citation count in prior studies (Bergh et al. 2006). This testing revealed one significant interaction effect for article age with the presence or absence of a title's 'interrogative format'. This interaction was noticed in the case of both ISI and Google scholar citation count, even though there were miniscule differences in the magnitude of the revealed results.

To further explore the nature of the detected interaction effect we probed the simple slopes, revealing a significant positive relationship between article title attributes and article impact for high article age, while there was no significant relationship for articles of low article age. The plots of these simple slopes are shown in Fig. 1.

To ensure the rigor of our overall results, we performed robustness checks by exchanging variables from each category, with others from the same category (for example, in one of the robustness checks, we exchanged the variable 'number of characters', with 'number of words'). Following recommendations by the review board, we also re-ran all the four analyses with transformed (log) values of dependent variables. The findings of the robustness checks were consistent with our original results, with minor changes in the significance level. For instance, the significance value of the relationship between 'balanced' structure and citation count increased a little (moving from <0.1 to <0.05), thus further confirming our earlier conclusions. Hypothesis 3 pertaining to the influence of structure attributes on citation count, was thus partially confirmed. Hypothesis 2 regarding the effect of non-alphanumeric characters was fully accepted; and Hypotheses 1, 4 and 5 (which respectively stated that length, context and linguistic attributes in titles have a significant influence on the citation count of top management journal articles) were refuted.
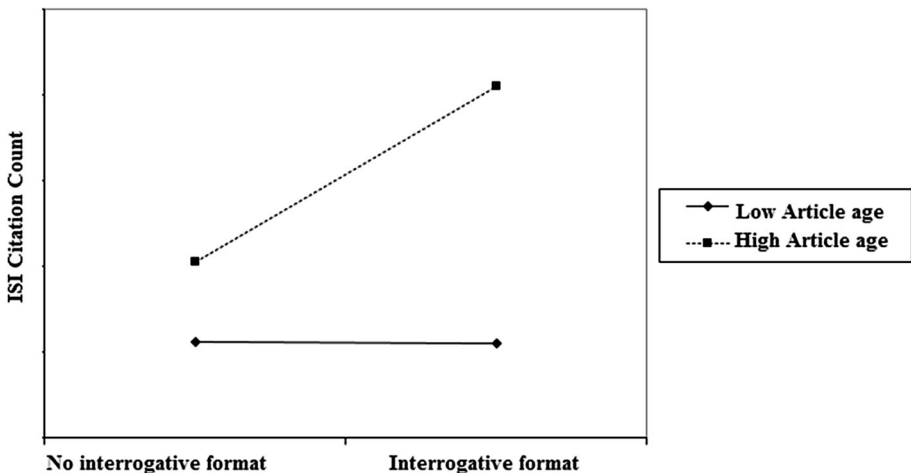

Fig. 1 Plot of interaction effect

Discussion

The question, what makes a "good title", i.e. one which produces scholarly impact via citations in the academic community, has so far not provided conclusive results. Our study is one of the first steps towards building an overall model of article characteristics and linking them with impact. We do this in a specific application context (management science), in order to keep the discipline constant, reducing unnecessary variation across disciplines. Focusing on five of the top journals in the management discipline, our results show that certain title attributes do indeed predict the article citation count. Our step-wise regression analyses showed that the article title attribute 'non-alphanumeric characters' has a significant negative relationship with ISI and Google scholar citation counts and citation counts per year; thus confirming our Hypothesis 2. This corroborates the findings by Jamali and Nikzad (2011) and Paiva et al. (2012), in the field of biology and life sciences and Michelson (1994), in the field of industrial relations. On the other hand, it contradicts the findings by Jacques and Sebire (2010) in the field of general medicine and the interdisciplinary study by Buter and Van Raan (2011) both of which suggested a positive relationship between non-alphanumeric characters and citation count.

A plausible reason for this relationship between the title attribute 'presence of non-alphanumeric characters' and citation count could be that non-alphanumeric characters such as colons, question marks etc. usually denote complex, distinctive titles (Dillon 1982). These titles used to be quite popular in the past, due to their containing more keywords, and therefore being more 'findable and visible' in databases (Moore 2010). However, the arrival of search engines made them no longer a necessity. The search engines nowadays allow scanning keywords, abstracts, and often the full text of papers (Rostami et al. 2014), reducing the need for long and informative titles, and, coincidentally, also reduce the need for non-alphanumeric characters. In fact, they seem to propagate the use of titles which are simpler to understand, play the role of 'interest-grabbers', and are ultimately more attractive (Paiva et al. 2012). Another reason for the non-alphanumeric characters predicting low citation count would be that some of these characters might be thrown into titles as part of marketing strategies to win the attention of the readers (Ball 2009), which might even suggest a lack of credibility and frivolity (Fox and Burns 2015), without accurately explaining an article's subject matter (Aleixandre-Benavent et al. 2014).

Hypothesis 3 was partially confirmed, since one of the structure attributes 'balanced' structure, was found to have a positive relationship with the citation count in the final two models of all the analyses. This suggests that when we consider all the title attributes together, as we do in the final models, a balanced title slightly enhances the citation count.

Compound titles generally are used by authors for succinctly presenting the interrelationship between the two parts constituting the title (Swales and Feak 1994). The two parts of the sentence usually discuss the topic and method used, a problem and its solution, or the general area of study and the specific topic within it. Of these types, the most common one was found to have the general: specific presentation (Soler 2011). Hence, another plausible reason behind our observed relationship between balanced title structure and citation count could be that in a compounded title, readers look for equal information on the research area and the specific topic discussed.

Hypotheses 1, 4, and 5 were rejected. Length, context and linguistic attributes were found to have no relationship with citation count. This contradicts many prior studies, where an increase in these attributes (for instance, length attributes) were found to have either a positive (Habibzadeh and Yadollahie 2010; Jacques and Sebire 2010) or negative

effect (Jamali and Nikzad 2011; Moore 2010; Paiva et al. 2012) on the citation count. Thus, isolated effects from previous studies which focused narrowly on individual variables did not materialize in our application context, where all attributes were examined together, and where individual effects cancel each other out when analyzed simultaneously.

As an instance of this is, in our analyses, we found that certain attributes, in particular 'number of characters' to be having significant relationships with the citation count when entered in a model of its own. However, when entered into our final model, along with all the other attributes, 'number of characters' was no longer found to have any significant relationship with citation count. In particular, including more specific variables, like 'non-alpha numeric characters' in our model helped us to better ascertain the actual relationships between relevant title attributes and citation count. Overall, then, a full model of article title such as ours represents a significant step forward in delineating just what makes a "good title". Prior studies, which concentrated narrowly on specific title characteristics, without putting them in the context of other important attributes might lead to erroneous conclusions.

The study has a number of theoretical implications, both for scientometrics more generally, as well as for management science specifically. Regarding the first field of study, our model makes a first step towards exploring the influence of relevant title aspects, allowing us to observe how various title attributes contribute to citation count, in the presence of other factors. Including different attributes adapted from prior scientific literature into one model brings together different, and so far largely separate, lines of research focusing on article title attributes. Since a title would often display multiple attributes simultaneously, analyzing their collective implications represents a starting point for advancing theory development on title consequences. In this way, this study adds on to other scientometric studies on titles. Especially, our findings regarding the (negative) influence of non-alpha numeric characters on titles confirm the findings by certain prior researchers in the fields of medicine, physics (Ball 2009), life sciences (Ball 2009; Paiva et al. 2012), and industrial relations (Michelson 1994), whilst disconfirming the findings in the fields of chemistry, etymology (Buter and Van Raan 2011) and general medicine (Jacques and Sebire 2010). As can be observed, most of the application contexts explored so far are in life sciences. The choice of management as our setting allows us to add on one more context to the field of scientometric research on titles. Further studies could build upon our findings and examine more title aspects, in other application contexts, or even across disciplinary contexts. In fact, it is crucial to engage in such a simultaneous analyses of disciplines, and to map exactly which title attribute might moderate which others; given the increasing prominence of titles and other good writing conventions in enhancing scholarly impact (Bergh et al. 2006).

Several disciplines have different title constructions and discourse conventions (Anthony 2001). This might be an explanation for the observed results varying from prior studies. For instance, in medicine, using full sentences represents the most widely-used article title structure (Soler 2007). However, in management, as our study results show, the most common title structure is compounded. Only 30.6 % of the titles in management were not compounded, i.e. were full sentences. Hence what influences citation count of journals in the former discipline (medicine) might not have a similar effect in the latter discipline (management), thus providing additional leads for further research.

Regarding management science specifically, scholarly impact is often defined and measured in terms of the number of citation counts an article receives (Adler and Harzing 2009; Aguinis et al. 2012). Several articles have examined the relationship between various

aspects of a scientific article and its subsequent citation count (e.g., Bergh et al. 2006; Gibbert and Ruigrok 2010; Laband 1986; Newman and Cooper 1993) However, not many studies has examined the influence of article titles and their attributes and how they relate to scholarly impact. Through this study, we examine the association of academic article title attributes with their scholarly impact in terms of citation counts. While three of the five proposed relationships did not hold, our study did find evidence that management article titles without non-alpha numeric characters have a higher citation count than titles including them. Likewise, our results also showed that balanced titles exert a slight positive influence on scholarly impact.

Interestingly, the specific application context (management science) and its specific attributes which we considered (industry name, company name) did not show any implications on the citation count of management articles. However, the frequency of these attributes in our sample was quite small (7.6 and 2.2 % respectively). Further studies involving titles with additional context-relevant attributes could examine whether this effect holds even when these attributes are present in higher frequency. Due to field and discipline specificity and the scarcity of findings (Subotic and Mukherjee 2014), management scholars often find it difficult to construct a title which is an informative and attractive short version of the article. There are several guidelines put forth by management journals which suggest titles of a particular length or format. However, those guidelines are not based on scientific data (Paiva et al. 2012). This study would thus be the first to offer some recommendations regarding the effective composition of management article titles. By looking at a wide range of title attributes simultaneously, we make a step in this direction. Most significantly, we provide a holistic approach which other researchers could adopt while examining titles in their specific fields or disciplines.

Limitations and conclusion

One of the main limitations of our study is that we focused on article titles of one decade only (1997–2006). Also, our sample size is quite small considering the number of variables involved. Future studies could address this limitation by using a bigger sample. Furthermore, we did not perform any temporal comparisons of the trends, to see if there were significant changes in the titular practices over different time periods. Secondly, our sample consists of top management journals only. Including journals which are at the lower end of management scholarship would have facilitated a more detailed comparison. Additionally, we focus on article title attributes for explaining the citation count of articles. Citation count of articles can be due to several factors including the transparency, rigor, content, theoretical contributions etc. of the published articles. However, since prior studies have shown that titles do exert a significant, though small influence on an article's reception in the academic community, we limit this study to the characteristics of titles only. In addition, even though our study considered a wide variety of article title attributes, it is still not an exhaustive study of all possible title aspects out there. Future research could have a look at new, unexplored title attributes and their relationship with scholarly impact.

This study is a starting point towards building a holistic approach for examining article characteristics and exploring their implications for impact in different fields. We aim to describe recent trends with respect to management article titles, analyze the relationship between title aspects and citation count, and account for the relationship between various precursors of title aspects and the aspects themselves. Of course, tackling with title

attributes alone cannot be used as an exclusive strategy to increase citations. But an optimized title would help an article gain the attention it deserves from readers (Moore 2010). Thus through this study we state the need for (and take the first steps in) enhancing the visibility of an article to the desired audience, by formulating titles that stand out. This visibility in turn translates to impactful articles, which conceivably shape the direction of management as an academic discipline.

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