A citation analysis of theoretical concept reviews

Completed Research

Chitu Okoli
SKEMA Business School – Université Côte d'Azur, Paris, France
Chitu.Okoli@skema.edu

Abstract

In this article, we identify the concept of a theoretical concept review, a literature review that presents the theoretical concepts extracted from each primary study. We clarify what theoretical concepts are in the context of literature reviews and explain why theoretical contributions are valuable in literature reviews. We conduct a citation analysis that shows that, in general, theoretical concept reviews have been cited approximately 60% more than other kinds of reviews. Based on our findings, we recommend that literature review authors should routinely present the elements of theory in their reviews since this is demonstrably valuable to readers.

Keywords

Theoretical concept review, literature review, theory, citation analysis, information systems research.

Introduction

In the past decade, a rich research stream of information systems research has focused specifically on developing better literature reviews (for example, Rowe 2014; Okoli 2015; Paré et al. 2015; Schryen et al. 2015; Templier & Paré 2015; Paré et al. 2016; Templier & Paré 2018). (In this article, we refer only to standalone literature reviews (Okoli 2015).) Ultimately, authors publish a literature review not only for their own learning and benefit, but also to provide value to their readers. Such "value" to readers might come in various forms. It might be the explicit goal of the contribution of the review, such as opening up a new perspective on the literature or identifying the gaps in the existing literature (Schryen et al. 2015). Another approach to considering value to readers is embedded in the different genres or types of literature review, such as meta-analysis, critical reviews, descriptive reviews and so on, with each genre having its own general goal of its contribution to readers (Paré et al. 2015). A third angle of considering the value of a review has to do with methodological rigour, with the idea that review that closely follow a rigorous methodology should be more valuable (Okoli 2015; Templier & Paré 2015; Paré et al. 2016; Templier & Paré 2018).

Yet a fourth perspective of the value of a review is not orthogonal with these other views of goal, genre or methodology but rather overlaps with them: one of the most valuable things a literature review can offer is its contributions to theory (Rowe 2014). The literature currently identifies two main approaches to considering the theoretical contribution of a literature review. First, some genres of literature review, by their very nature, are oriented towards theory, such as "theoretical reviews", (that is, a statistical approach to aggregating the results of several quantitative studies) and qualitative systematic reviews (studies that aggregate results similarly to meta-analyses, but without analyzing them statistically) (Paré et al. 2015). Second, regardless of genre, some reviews have theory contribution as their explicit goal, such as "theory building reviews" and "theory testing reviews" (Schryen et al. 2015).

These four perspectives on value in literature reviews are commendable, but ultimately, they are highly subjective, inasmuch as beauty is in the eye of the beholder. However, a well-established approach to objectively evaluating the "beauty" of academic articles in the eyes of their beholders (specifically, in the eyes of other publishing academic researchers) is through citation analysis (Grover et al. 2014; Loebbecke and Leidner 2012; Tams and Grover 2010; Wagner et al. 2016), with the basic idea that readers who publish are more likely to cite articles that they find valuable. There has been very little citation analysis to specifically evaluate what aspects of a literature review are more valuable. In the only study we know of in information systems research, Wagner et al. (2016) found that the only statistically significant factor in their sample was rigorous documentation of the literature search process.

This present article focuses on the angle of theoretical contribution as one of the most valuable things a review can offer. But unlike prior research, from our examination of over 200 literature reviews on information systems, we have identified a different approach to conceptualizing theory in literature reviews that we call theoretical concept reviews (TCRs). We will give a formal definition shortly, but the basic idea is that for each of the primary studies reviewed, a TCR identifies the theoretical concepts from each study and presents them to the readers. We conduct a citation analysis that shows not only that TCRs are truly valuable to readers with an overall 60% increase in citations compared to non-TCRs, but surprisingly, that they are more valuable both among elite journals (specifically, the AIS Basket of journals (Association for Information Systems 2011)) and non-elite journals alike; they are also more valuable even when controlling for author experience. These findings lead us to recommend the TCR approach as a supplementary technique for literature reviews because of its demonstrable value to readers.

The rest of this paper is structured thus: the next section formally defines theoretical concept reviews. The following section develops a hypothesis based on the expected citation effect of TCRs. Next, we conduct a citation analysis to test this hypothesis. We conclude the article with a discussion of its implications.

Theoretical concept reviews

It is not always clear what is a theoretical concept versus what is a non-theoretical concept (Burton-Jones et al. 2015; Rivard 2014; Weber 2012; Whetten 1989). In fact, to determine whether or not something is a theoretical concept is actually quite simple. We need only ask whether or not it can be measured, whether as numbers, qualitative categories, binary states, dates, or any other valid type of measurement. If it is measurable, then it is a theoretical concept; if not, then it is not. So, for example, the concept of "information systems (IS) project" in itself is not measurable and so is not a theoretical concept. However, different variations of that non-theoretical concept are indeed measurable and so are theoretical concepts: "number of IS projects" (a numeric count) or "IS project outcome" (measurable as failure; success; mixed; in progress). Another example: the concept of "open source software" (OSS) is not in itself a measurable theoretical concept, but it can be operationalized as such: "open source software adoption" (e.g. measured as none; minimal; partial; extensive); "number of OSS installations" (a number); or "type of software licence" (that is, OSS versus proprietary software).

In this article, we understand a theory to be an explanation of the relationship between two or more measurable concepts (Okoli 2019). Such measurable theoretical concepts span the full range of different theoretical approaches, including variance theories (where concepts are attributes of things, with values that vary), process theories (where concepts are events that occur in a specified sequence) and systems theories (where concepts are systems and subsystems with varying states) (Burton-Jones et al. 2015).

With this understanding of theoretical concepts, we definitionally define (Okoli 2019) a **theoretical concept review (TCR) as a literature review that presents the theoretical concepts extracted from each primary study**.

The presentation of theoretical concepts in a TCR may take different forms. The oldest forms of TCR are meta-analysis and vote-counting. These reviews normally present a summary table with the theoretical concepts and relationships in the rows and various statistics in the columns (e.g. Table 3 and Figure 2 in Dennis et al. 2001). Even though the primary studies might not be explicitly enumerated, the summaries of theoretical concept counts and other statistics present a summary of the findings from the literature related to each respective concept. Moreover, most meta-analyses have at least one major section that is organized in subsections according to theoretical concepts, which is an explicit textual form of presentation.

In another form of TCR presentation, Salipante et al. (1982) extended the meta-analysis presentation in their "a matrix approach", a vote-counting method, that they generalized to any literature review of empirical studies. This approach emphasizes listing each of the primary studies in one row of a table, with the columns identifying the theoretical concepts and relationships of interest, nothing which articles involve which concept. Webster and Watson (2002) took this idea further to propose a "concept matrix" that adds levels of analysis of the measured concepts (that is, individual, group or organizational levels). In addition, they recommended what they called a "concept-centric" textual presentation of the results from the constituent primary studies. This was a notable advance beyond prior approaches, because they extended their recommendations to conceptual primary studies, not only empirical ones.

Thus, there are multiple ways that a TCR may present the theoretical concepts from its primary studies. Our definition requires not only the extraction of theoretical concepts but also their presentation. Thus, there needs to be some visible evidence of the presentation of the concepts, otherwise a literature review would not qualify as a TCR.

In contrast, a non-TCR might present many contents of its constituent primary studies but does not present the theoretical concepts from each study. They might present research topics, themes, genres, paradigms, methodologies, bibliographic details (such as authors, institutions, publication outlets, publication years, etc.) or a host of other elements. They might even present elements that they call "concepts" such as topics, themes, genres, purposes or ideas. But as long as these "concepts" are not measurable as we have described above, they are not theoretical concepts, and thus such literature reviews are not TCRs.

That said, we note that unlike some categorizations of literature review, the TCR concept is not mutually exclusive with any other type of literature review. That is, a review could be a TCR and also be another type, such as a critical review, a meta-analysis or a descriptive review. Regardless of whatever else a review might do, as long as part of it presents the theoretical concepts from its constituent primary studies, then it is a TCR.

Having now explained the concept of TCR, in the next section of this article, we demonstrate why the concept is important: in general, theoretical concept reviews in information systems research are more highly cited than literature reviews that are not TCRs.

The value of theoretical concept reviews

Citations represent the value of an article in the specific sense of how much it has contributed to the scholarly conversation since its publication (Loebbecke and Leidner 2012; Tams and Grover 2010; Wagner et al. 2016). We do not suggest that citations are an indicator of article quality. In particular, in measuring citation counts, we do not try to infer that TCRs are altogether of superior quality than non-TCRs. Rather, our claim is that the extraction and presentation of the theoretical concepts is valuable to subsequent authors. Such TCR presentation contributes to the subsequent scholarly conversation as indicated by citations to such articles. In this section, we discuss the role of theory in increasing the value of literature reviews and then develop specific hypotheses concerning how that kind of theoretical contribution might be operationalized.

In information systems research, theory is highly valued as a supporting structure for articles, and contribution to theory is often an indispensable criterion for publication in our most highly-reputed journals (Burton-Jones et al. 2015; Gregor 2006; Rivard 2014; Weber 2012). This is borne out in the editorial statements of many of our leading journals. Specifically focusing on the role of theory in literature reviews, Rowe (2014) argued: "To evolve more rapidly towards a more comprehensive and effective research genre's spectrum we need literature reviews that offer the most solid foundations for theory building and research landscaping. Producing such theories is all the more needed and legitimate since many of us work in Business Schools and social science institutes where theory and scholarly knowledge are greatly valued." (p. 242)

With such strong emphasis on theory, it is normal that potential authors who want to publish in this discipline where theory is given such a high place would highly appreciate literature reviews that support them in contributing to theory, particularly literature reviews that explicitly aim to make a theoretical contribution. We expect that authors of information systems articles would be more likely to read literature reviews that help them access this theory from the existing literature, and then they would more likely cite such literature reviews in their own work to acknowledge the value that they have derived from such reviews. This is our general argument of why theoretical contributions in literature reviews should contribute to higher citations.

In information systems research, where theory contribution is highly valued, authors are helped by literature reviews that not only survey the body of literature related to their work, but that specifically help them to identify the theoretical elements that could help them build on theory from past research to enhance their own work (Rivard 2014). Specifically, we believe that a theoretical concept review as we have defined it is valuable to citing authors. Unlike other literature reviews, TCRs explicitly identify the theoretical concepts that are the fundamental building blocks of theory. Thus, readers who want to develop theory in their own articles can more readily access the concepts that are either part of established theories that they are building on or that can be readily leveraged for adoption in new theories that they might want to develop. If a literature review does not explicitly extract concepts in this way, authors who would want to build theory based on the articles in the review would need to either re-examine each article themselves or conduct a new review altogether for their purposes.

We note that this positive effect on citations can only be expected if a TCR explicitly presents its extraction of concepts in a way that is obvious to a reader. This is implicit in our definition of TCR where we emphasize the "presentation" of concepts. This might be achieved by summarizing the theory extraction in a concept matrix (Salipante et al. 1982; Webster and Watson 2002) that lists each source article in the rows and each extracted concept (and relationship, explanation and boundary condition, if also extracted) in the columns. It could also be achieved by the article being clearly structured on the explicit discussion of theoretical concepts, with relevant citations in the sections that refer each concept. In contrast, if a published literature review does not show that it explicitly extracted concepts in a way that is readily evident to readers, even if its authors did indeed extract concepts in their execution of the review, then we would not expect that published review to be more highly cited than those that whose authors did not extract theoretical concepts at all. In that case, we could not even tell by reading them that such reviews applied a TCR exercise at all, and so our definition does not consider them to be such.

In short, when future authors can readily access the elements of theory in a literature review that can help them adapt or develop theory in their own work, they find it valuable, and thus tend to cite reviews that present theoretical concepts in this way. Thus, we hypothesize:

H_{TCR}: Standalone theoretical concept reviews are more highly cited than standalone literature reviews that are not theoretical concept reviews.

Citation Analysis

For our citation analysis, we first present the dataset that we analyzed. Then we explain our dependent variables (different measures of citation frequency) and independent variables (measures of theoretical contribution of literature reviews), followed by various important control variables. We then present the tests of our hypotheses and some supplementary analyses. We conducted our analyses using R.

Dataset

To test our hypotheses, we aggregated and analyzed a dataset comprising all past literature reviews in information systems that we could identify based on three sources that have attempted to identify all or most existing literature reviews in information systems (Paré et al. 2012, 2015; Schryen et al. 2015). By combining our three sources, reconciling duplicate articles and excluding invalid or inapplicable articles, we compiled a final dataset of 281 literature reviews in the domain of information systems research published from 1992 to 2014 in English-language scholarly journals.

Dependent variables: citation measures adjusted for age

We used two dependent variables for our analyses. Our first dependent variable was Google Scholar citation counts (**gsc**) because this is the only measure with available citations for every article in our dataset (Wagner et al. 2017). Unlike other citation count measures that are based on their own selective database. Google Scholar tries to index citations from all scholarly sources available on the Web (Harzing, 2010). In the overall dataset of 281 articles, the median gsc was 150, with an interquartile range (IQR) of 368. To visualize the effect of theoretical concept reviews on citations, we calculated the percentile gsc per year for each article. That is, we divided number of citations by article age in years, and then scaled all values from 0 to 100. Figure 1 displays boxplots and a jittered scatterplot of the percentile gsc per year separated by whether an article was a TCR or not. (The years are not shown. The difference in x-axis values of the dots are random [jittered] to prevent overlap of dots in the display.) The figure indicates that the median gsc per year of TCRs is much higher than that of non-TCRs, but we need to conduct formal analyses that control for other variables before we can conclude that such apparent differences are statistically significant.

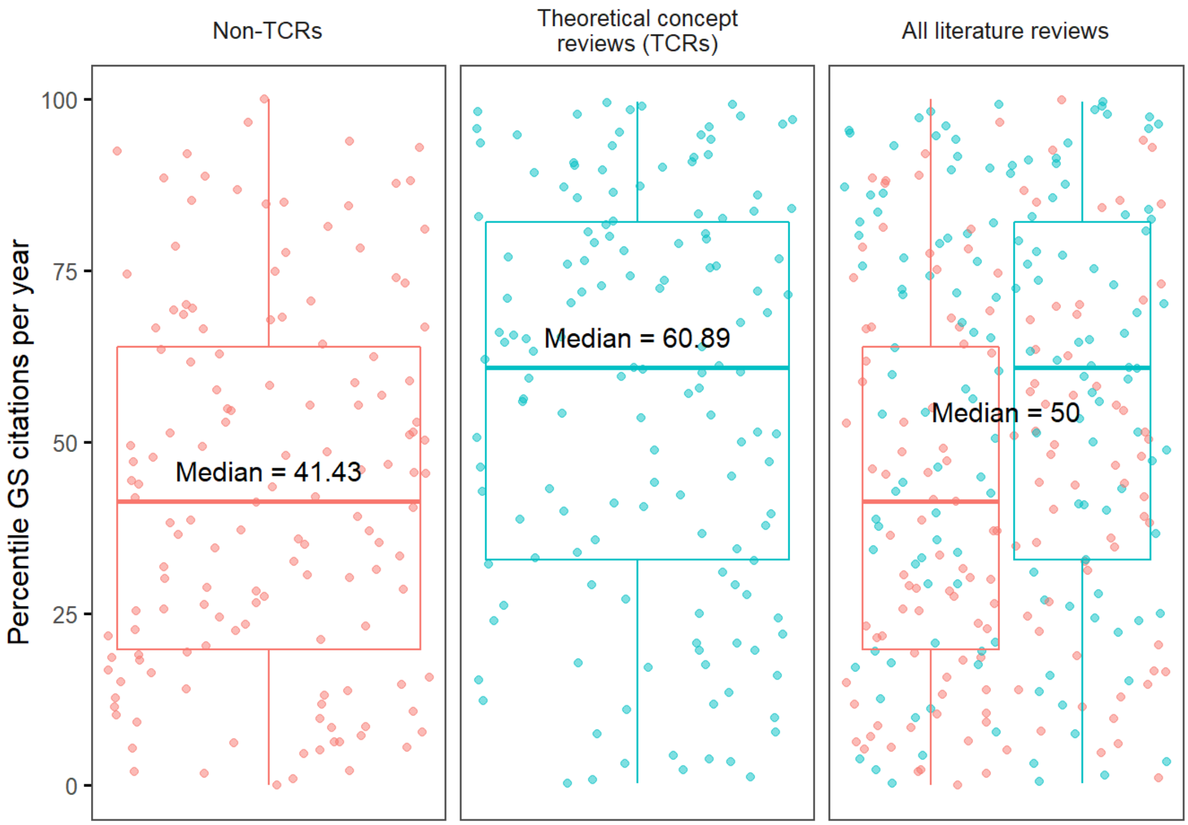

Figure 1. Percentile Google Scholar Citations per Year According to TCR Status

For analyses with gsc, we conducted negative binomial regression (Mingers and Xu 2010; Wagner et al. 2016) with article **age** as a control variable, calculated as 2018 (the year that we recorded the gsc values from Google Scholar) minus the year of publication. For these analyses, we excluded outliers with citations per year more than 3 standard deviations above the mean. We conducted regression diagnostics on the overall dataset estimating gsc with TCR as the independent variable (Table 1); there were no causes of concern.

Although gsc is a commendable measure of citation effects, there is a fundamental limitation of any regular regression analysis with such data: they all assume a particular distributional pattern of citations over the years. That is, measures of citation counts such as log cites per year (Mingers and Xu 2010; Wagner et al. 2016), square root of cites per year (Grover et al. 2014; Judge et al. 2007), or other approaches for controlling for the age effect (Mingers and Xu 2010; Tams and Grover 2010) generally assume that each article has an approximately equal number of citations each year. On the contrary, Mingers (2008) demonstrated that individual articles follow different citation patterns: not only is it unlikely that any article has a roughly constant rate of citations each year, but the annual pattern of citations likely varies widely from article to article.

To address this concern, as an alternative to trying to mathematically model the most accurate function that might represent annual citation counts, we computed a relative citation measure for each year. In principle, for all the reviews published in any given year, we ranked them by GS citation count and divided them into three groups (statistically, these are called **terciles**) based on their position in the ranking: bottom third, middle third and top third. We use only three groups per year in our case because some years do not have many articles, and so using more groups would limit the number of years for which we could calculate this measure. The terciles are ordered categorical variables, thus, we used polynomial ordinal logistic regression to analyze which variables could estimate the tercile of an article. A statistically significant and positive relationship would indicate that a variable is influential in getting an article more highly cited. Since tercile inherently controls for year of publication, we did not use an age control variable for such analyses.

Independent Variables

Our independent variable was binary (true or false): whether or not a literature review was a theoretical concept review (**tcr**). To make this determination, based on a detailed coding manual that we developed during the process, three coders, including the author, carefully examined each of the articles in our database. We judged that a review applied TCR if we were able to identify any amount of extraction of theoretical concepts according to the criteria that we described earlier. Even if the extraction was only implicit (such as when the counts of articles that included a particular concept was given in a table without explicitly listing the articles, as was the case of many meta-analyses), we counted that as a TCR. In addition, even if in a review only a few articles were presented in a table with concepts extracted, and even if this was a minor part of the overall review, we counted that as TCR. That is, in order to minimize subjectivity in our coding, we did not attempt to quantify to what degree a review presented theoretical concepts; we only applied a binary consideration of whether it presented any theoretical concepts from all studies or if it presented none at all.

Control Variables

Our first control variable was a measure of the effect of average journal citations. Rather than using a single measure such as journal impact factor (JIF) (Judge et al. 2007; Wagner et al. 2017), we calculated a journal citation score based on the JIF and one of Google Scholar's journal citation measures (h5-median). We normalized the JIF and the h5-median of each journal and then used the mean of these two scores for our composite journal citation score. Because many journals in our dataset did not have a JIF and many did not have an h5-median, the advantage of this approach is that we were able to obtain scores for a total of 267 out of 281 literature reviews (95%). Because we measured the effect of journal citations as a control variable, we did not control for journal as a random effect.

Second, because author ranking, prestige or experience has been frequently found to influence citations (Grover et al. 2014; Judge et al. 2007; Mingers and Xu 2010; Wagner et al. 2017), we operationalized this effect by considering the academic ranks of the authors of each article on a scale from 1 (PhD student) to 5 (distinguished professor). These measures are based on the idea that the authors' experience at the time of their article's publication has an effect on its quality and hence on its subsequent citations. Based on these, we calculated and tested many different measures of the author effect, and the most influential for our dataset was the rank of the coauthor with the highest rank among all the coauthors of an article (**rank_top_author**).

Third, based on findings that citation counts are often correlated with the length of an article (Tams and Grover 2010) and the number of cited references (Grover et al. 2014; Judge et al. 2007), after testing many variations of these we selected the number of cited references (**refs**) as the most influential for our dataset of literature reviews.

In our analyses, we used the corrected AIC of the models to determine when to include each of our control variables.

Hypothesis tests

We present the analyses to test H_{TCR} in Table 1 and Table 2. For the complete set of articles in the dataset, for gsc, TCRs had 160% as many citations (minimum 130% with a one-sided 95% confidence interval [CI]; $p = p < 0.001$). For tercile, TCRs were 192% as likely to appear in a higher tercile (that is, Tercile 2 rather than 1, or Tercile 3 rather than 2; minimum 119% with a one-sided 95% confidence interval [CI]; $p = 0.013$).

	Non-basket journals				All journals			
	GSC		TCR tercile		GSC		TCR tercile	
	Raw coef.	Effect (min. 5% CI)	Raw coef.	Effect (min. 5% CI)	Raw coef.	Effect (min. 5% CI)	Raw coef.	Effect (min. 5% CI)
Intercept	1.649 ***	520% (min. 242%)			2.484 ***	1199% (min. 690%)		
Intercept 1/2			0.936	255% (min. NA%)			0.394	148% (min. NA%)
Intercept 2/3			2.472 **	1185% (min. NA%)			1.780 **	593% (min. NA%)
Age	0.135 ***	114% (min. 111%)			0.133 ***	114% (min. 112%)		
Journal score	0.510 ***	166% (min. 137%)	1.034 ***	281% (min. 178%)	0.313 ***	137% (min. 125%)	0.634 ***	189% (min. 152%)
Top author rank	0.352 ***	142% (min. 123%)	0.246	128% (min. 94%)	0.209 ***	123% (min. 111%)	0.140	115% (min. 92%)
References	0.005 ***	100% (min. 100%)	0.009 **	101% (min. 100%)	0.003 ***	100% (min. 100%)		
Theoretical construct review (TCR)	0.803 ***	223% (min. 166%)	0.820 *	227% (min. 115%)	0.473 ***	160% (min. 130%)	0.651 *	192% (min. 119%)
Model performance	MAE/MAD: 172.8/240.1 (0.720)		Accuracy/Largest: 54.6%/38.1%; Kendall W: 0.741		MAE/MAD: 255.6/318.2 (0.803)		Accuracy/Largest: 54%/37.6%; Kendall W: 0.715	
TCR	Mean: 360.2 (N: 47)		43.8% in Tercile 3 (N: 48)		Mean: 438.1 (N: 100)		50.5% in Tercile 3 (N: 101)	
Not TCR	Mean: 148.9 (N: 54)		32.7% in Tercile 3 (N: 49)		Mean: 239.6 (N: 92)		22.7% in Tercile 3 (N: 88)	
Total	Mean: 247.2 (N: 101)		38.1% in Tercile 3 (N: 97)		Mean: 343.0 (N: 192)		37.6% in Tercile 3 (N: 189)	

o *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$
o GSC (Google Scholar citation counts) regressed with negative binomial regression
o Tercile regressed with polynomial ordinal logistic regression
o Raw coef.: raw regression coefficient
o Effect (min. 5% CI): Effect size as a multiplier effect; it is calculated as the exponent of the raw coefficient. For example, 50% means effect half as strong (that is, weaker); 100% means equal effect (that is, no effect at all); 150% means effect 1.5 times as strong (that is, 50% stronger). "min. 5% CI" means the lower bound of the one-sided 95% confidence interval based on hypotheses of increased citation effects.
o Model performance for gsc: Mean Absolute Error (MAE) compared with Mean Absolute Deviation (MAD) and given as a ratio; for a useful model, the ratio should be less than 1; a perfect estimate would be 0.
o Model performance for tercile: Accuracy of in-sample estimate of tercile compared with the proportion of the largest tercile group; for a useful model, the accuracy should be greater than the proportion of the largest group; a perfect estimate would be 100%. Kendall W: perfect estimate is 1; useless estimate is 0.5.
o Mean and N (gsc): Mean gsc and count of articles in gsc regression sub-sample; N is often lower than the total count in the dataset because not all articles have all variables used in each analysis (especially author scores).
o Tercile 3 and N (tercile): Proportion and count of articles in tercile regression subsample that were in Tercile 3 (that is, that are most highly cited for their respective year)

Table 1. Hypothesis Tests for All Journals and Journals Not in the AIS Basket

To better understand the details of our results, we divided the articles into three groups based on subjective considerations of journal reputation because these have been found to influence citation counts (Judge et al. 2007). Thus, we considered four subsamples: all journals together; all journals not in the AIS Basket of 8 journals; *MIS Quarterly* only; and the other seven AIS Basket journals. When we considered only the journals not in the AIS Basket, TCRs had 223% as many citations measured as gsc (minimum 166%, 95% CI, $p < 0.001$). For tercile, TCRs were 227% as likely to appear in a higher tercile; minimum 115%, 95% CI, $p = 0.026$). When we considered the TCR effect on articles in the seven journals of the AIS Basket other than *MIS Quarterly*, TCRs had a probability of 319% as likely to appear in a higher tercile (minimum 157%, 95% CI, $p = p = 0.005$). However, in this case, the effect on gsc was not statistically significant. In the case of *MIS Quarterly*, TCR had no statistically significant effect on citations, whether measured as gsc or as tercile.

	Basket journals (except MISQ)				MIS Quarterly			
	GSC		TCR tercile		GSC		TCR tercile	
	Raw coef.	Effect (min. 5% CI)	Raw coef.	Effect (min. 5% CI)	Raw coef.	Effect (min. 5% CI)	Raw coef.	Effect (min. 5% CI)
Intercept	4.017 ***	5554% (min. 3618%)			3.665 **	3904% (min. 693%)		
Intercept 1/2			0.181	120% (min. NA%)			2.540	1268% (min. NA%)
Intercept 2/3			1.644 ***	517% (min. NA%)			2.845	1720% (min. NA%)
Age	0.121 ***	113% (min. 109%)			0.162 ***	118% (min. 111%)		
Journal score	0.438 *	155% (min. 105%)	1.172 *	323% (min. 134%)				
Top author rank					0.075	108% (min. 77%)	0.475	161% (min. 26%)
References					0.003 **	100% (min. 100%)		
Theoretical construct review (TCR)	0.158	117% (min. 86%)	1.160 **	319% (min. 157%)	0.141	115% (min. 65%)	0.139	115% (min. 18%)
Model performance	MAE/MAD: 230.7/307.7 (0.750)		Accuracy/Largest: 45%/36.2%; Kendall W: 0.628		MAE/MAD: 588.9/556.4 (1.058)		Accuracy/Largest: 57.1%/57.1%; Kendall W: 0.500	
TCR	Mean: 379.2 (N: 41)		56.4% in Tercile 3 (N: 39)		Mean: 758.2 (N: 25)		42.9% in Tercile 3 (N: 7)	
Not TCR	Mean: 323.8 (N: 46)		17.1% in Tercile 3 (N: 41)		Mean: 672.5 (N: 6)		28.6% in Tercile 3 (N: 7)	
Total	Mean: 349.9 (N: 87)		36.2% in Tercile 3 (N: 80)		Mean: 741.6 (N: 31)		35.7% in Tercile 3 (N: 14)	

o *** p < 0.001; ** p < 0.01; * p < 0.05
o For explanation of conventions used, refer to the first hypothesis table in this article.

Table 2. Journals in the AIS Basket

We investigated *MIS Quarterly* more carefully because, not only is it an especially elite journal, but it has published the most literature reviews in our dataset (12.1%: 34/281). There seemed to be disproportionately more TCRs published by *MISQ*: 26 out of the 34 (76.5%) literature reviews published in *MISQ* are TCRs, whereas for all other journals, the ratio was 116 out of the 247 (47.0%); in the entire dataset, there were 142 out of the 281 (50.5%) TCRs. This ratio was indeed more than what could reasonably be expected by chance (p(chi-squared) = 0.002). Thus, this finding confirms H_{TCR} concerning *MISQ*.

Based on these results, we conclude that **H_{TCR} is confirmed**. Specifically, TCRs published in IS literature reviews are generally cited more highly than those that do not extract concepts, whether measured as raw citation counts or as likelihood to be in a higher citation tercile.

Discussion and conclusion

Our results make it clear that theoretical contribution is an important element in the value that other researchers derive from a literature review as expressed in their citing such valuable work. Specifically, we found that theoretical concept reviews TCR increases citations in all subgroups of information systems journals that we analyzed, with approximately 60% more citations overall than non-TCRs. In *MIS Quarterly*, we saw this effect expressed as a strong preference for publishing TCRs over other literature reviews that were not TCRs. We believe that the reason that *MISQ* did not exhibit a citation effect (gsc or tercile) for any of our operationalizations of theoretical contribution is not because they are not relevant; rather, it is likely that *MISQ* only accepts alternate forms of literature review when they are demonstrably of high scholarly value, despite not being TCRs.

Returning to the considerations that we raised in the introduction, presumably, most reviews that cited Webster and Watson (2002) attempted to increase their value by learning from at least some of their guidelines. Unfortunately, it seems that many of them might have misunderstood the guidelines concerning the presentation of theoretical concepts. Specifically, whereas 18/142 (12.7%) theoretical concept reviews cite Webster and Watson (2002), 20/139 (14.4%) reviews that are not TCRs also cite Webster and Watson

(2002)—there is virtually no difference (p(chi-square) = 0.806). One unfortunate consequence of this misunderstanding is that articles that cite Webster and Watson (2002) but do not actually present theoretical concepts might not offer as much value to readers as they otherwise might, at least from the perspective of citations by future authors as a reflection of how much value these authors derived from an article. We found that among articles that cited Webster and Watson (2002), the TCRs were cited a median of 20.4 Google Scholar citations per year, compared to 9.8 for those that cited Webster and Watson (2002) yet were not TCRs (the difference is statistically significant: p(Wilcoxon W) = 0.042).

On examining in detail exactly in what way these non-TCRs cited Webster and Watson (2002), we found that whereas many of them cited it as a general reference, several cited it as a methodology guide for their study, and at least two explicitly claimed to follow its instructions in developing a "concept-centric" approach or for developing "concept matrices", yet they presented only decidedly atheoretical concepts. Such widespread misunderstanding of what exactly Webster and Watson meant by "concept" calls for clarification with more precise naming and definitions (Rivard 2014), as we have done here.

We note a few limitations of our study. Although negative binomial regression is appropriate for citation data, we did not carry out full formal diagnostics, nor did we calculate robust standard errors. Moreover, our exclusion of outliers was based on a normal distribution, not a negative binomial distribution.

That said, the primary contribution of this article is the formal definition of a theoretical concept review and our empirical demonstration of its value using citation analysis. Its formal definition is in itself a contribution, especially naming and defining it such as to give theoretical concepts, as opposed to other kinds of non-theoretical concepts, a central role. Moreover, the establishment that such a clearly defined type of literature review is more valuable to researchers—at least in information systems—is a validation that it is worthwhile to clearly define the concept. Since a literature review is published with hope of providing value to readers, the results of our study lead us to recommend that literature review authors conduct theoretical concept reviews as a standard practice.

References

Association for Information Systems. 2011. "Senior Scholars' Basket of Journals," Association for Information Systems, December 6. (http://home.aisnet.org/displaycommon.cfm?an=1&subarticlenbr=346, accessed December 7, 2012).

Burton-Jones, A., McLean, E. R., and Monod, E. 2015. "Theoretical Perspectives in IS Research: From Variance and Process to Conceptual Latitude and Conceptual Fit," *European Journal of Information Systems* (24:6), pp. 664–679. (https://doi.org/10.1057/ejis.2014.31).

Gregor, S. 2006. "The Nature of Theory in Information Systems," *MIS Quarterly* (30:3), pp. 611–42. (http://aisel.aisnet.org/misq/vol30/iss3/3/).

Grover, V., Raman, R., and Stubblefield, A. 2014. "What Affects Citation Counts in MIS Research Articles? An Empirical Investigation," *Communications of the Association for Information Systems* (34:1). (http://aisel.aisnet.org/cais/vol34/iss1/74).

Harzing, A.-W. 2010. The Publish or Perish Book. (https://www.harzing.com/download/popbook12.pdf).

Judge, T. A., Cable, D. M., Colbert, A. E., and Rynes, S. L. 2007. "What Causes a Management Article to Be Cited: Article, Author, or Journal?" *The Academy of Management Journal* (50:3), pp. 491–506.

Loebbecke, C., and Leidner, D. 2012. "The Contribution of Top IS Publications to Subsequent Research: A Citation Analysis," *Communications of the Association for Information Systems* (30), pp. 423–438.

Mingers, J. 2008. "Exploring the Dynamics of Journal Citations: Modelling with S-Curves," *Journal of the Operational Research Society* (59:8), pp. 1013–1025. (https://doi.org/10.1057/palgrave.jors.2602428).

Mingers, J., and Xu, F. 2010. "The Drivers of Citations in Management Science Journals," *European Journal of Operational Research* (205:2), pp. 422–430. (https://doi.org/10.1016/j.ejor.2009.12.008).

Okoli, C. 2015. "A Guide to Conducting a Standalone Systematic Literature Review," *Communications of the Association for Information Systems* (37:43), pp. 879–910. (http://aisel.aisnet.org/cais/vol37/iss1/43).

Okoli, C. 2019. "Definitional Definitions and the Bare Minimum of Theory" in *25th Americas Conference on Information Systems*, Cancun, Mexico: Association for Information Systems, August 2019.

Paré, G., Trudel, M.-C., and Jaana, M. 2012. "Stand-Alone Literature Reviews in Information Systems Research: Development of a Taxonomy of Review Types and Assessment of Current Practices," in *Proceedings of the Administrative Sciences Association of Canada Conference*, St. John's, Newfoundland, Canada: Administrative Sciences Association of Canada.

Paré, G., Trudel, M.-C., Jaana, M., and Kitsiou, S. 2015. "Synthesizing Information Systems Knowledge: A Typology of Literature Reviews," *Information & Management* (52:2), pp. 183–199. (https://doi.org/10.1016/j.im.2014.08.008).

Paré, G., Tate, M., Johnstone, D., and Kitsiou, S. 2016. "Contextualizing the Twin Concepts of Systematicity and Transparency in Information Systems Literature Reviews," *European Journal of Information Systems* (25:6), pp. 493–508. (https://doi.org/10.1057/s41303-016-0020-3).

Rivard, S. 2014. "The Ions of Theory Construction (Editor's Comments)," *MIS Quarterly* (38:2), Iii–xiii.

Rowe, F. 2014. "What Literature Review Is Not: Diversity, Boundaries and Recommendations," *European Journal of Information Systems* (23:3), pp. 241–255. (https://doi.org/10.1057/ejis.2014.7).

Salipante, P., Notz, W., and Bigelow, J. 1982. "A Matrix Approach to Literature Reviews," in *Research in Organizational Behavior* (Vol. 4), JAI Press Inc., pp. 321–348.

Schryen, G., Wagner, G., and Benlian, A. 2015. "Theory of Knowledge for Literature Reviews: An Epistemological Model, Taxonomy and Empirical Analysis of IS Literature," in *ICIS 2015 Proceedings*, Fort Worth, USA, December 13. (http://aisel.aisnet.org/icis2015/proceedings/ResearchMethods/8).

Tams, S., and Grover, V. 2010. "The Effect of an IS Article's Structure on Its Impact," *Communications of the Association for Information Systems* (27:1), pp. 149–172. (http://aisel.aisnet.org/cais/vol27/iss1/10).

Templier, M., and Paré, G. 2015. "A Framework for Guiding and Evaluating Literature Reviews," *Communications of the Association for Information Systems* (37:6), p. 27.

Templier, M., and Paré, G. 2018. "Transparency in Literature Reviews: An Assessment of Reporting Practices across Review Types and Genres in Top IS Journals," *European Journal of Information Systems* (27:5), pp. 503–550. (https://doi.org/10.1080/0960085X.2017.1398880).

Wagner, G., Prester, J., and Schryen, G. 2017. "Exploring the Scientific Impact of Information Systems Design Science Research: A Scientometric Study," in *Thirty Eighth International Conference on Information Systems*, South Korea: Association for Information Systems, p. 23.

Wagner, G., Prester, J., Roche, M., Benlian, A., and Schryen, G. 2016. "Factors Affecting the Scientific Impact of Literature Reviews: A Scientometric Study," in *ICIS 2016 Proceedings*,, December 11. (http://aisel.aisnet.org/icis2016/GeneralIS/Presentations/9).

Weber, R. 2012. "Evaluating and Developing Theories in the Information Systems Discipline," *Journal of the Association for Information Systems* (13:1), p. 2.

Webster, J., and Watson, R. T. 2002. "Analyzing the Past to Prepare for the Future: Writing a Literature Review," *MIS Quarterly* (26:2), Xiii–xxiii.

Whetten, D. A. 1989. "What Constitutes a Theoretical Contribution?" *Academy of Management Review* (14:4), pp. 490–495.