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Conducting systematic literature reviews and bibliometric analyses

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Abstract

Literature reviews play an essential role in academic research to gather existing knowledge and to examine the state of a field. However, researchers in business, management and related disciplines continue to rely on cursory and narrative reviews that lack a systematic investigation of the literature. This article details methodological steps for conducting literature reviews in a replicable and scientific fashion. This article also discusses bibliographic mapping approaches to visualise bibliometric information and findings from a systematic literature review. We hope that the insights provided in this article are useful for researchers at different stages of their careers – ranging from doctoral students who wish to assemble a broad overview of their field of interest to guide their work, to senior researchers who wish to publish authoritative literature reviews.

JEL Classification: **C18, C80, C88, M10, M20**

Keywords

Bibliographic mapping, citation graph, entity linking, HistCite, R. Bibliometrix, ResGap, science mapping, systematic literature review, text mining

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1. Introduction

Literature reviews play an essential role in academic research to gather existing knowledge and to examine the state of a field (Cropanzano, 2009; Kunisch et al., 2018). Researchers typically collect available evidence on a topic or issue prior to conducting new research to assess the state of the already available evidence. It is customary for management scholars – and researchers in related fields such as accounting and finance – to justify the pursuit of a research question based on a cursory and narrative review of the literature only. Many reviews leave it up to the reader to appraise why the authors included (or excluded) some articles, books or conference papers instead of others – often, authors will rely on citing evidence from journals that are judged as being of 'high quality', without necessarily considering a wider range of evidence (Tranfield et al., 2003). However, a literature review that only offers an arbitrary selection of evidence is often not fully representative of the state of existing knowledge, and the selection of some studies over others ultimately leads to what is known in statistical analysis as a sample selection bias – a type of bias caused by choosing a non-random sample of data for further analysis. Consequently, narrative reviews often offer no comprehensive background for theory development and testing (Sternberg, 1991; Sutton and Staw, 1995).

An important distinction between narrative reviews and systematic reviews is that

> Systematic reviews differ from traditional narrative reviews by adopting a replicable, scientific and transparent process, in other words a detailed technology, that aims to minimize bias through exhaustive literature searches of published and unpublished studies and by providing an audit trail of the reviewer's decisions, procedures and conclusions. (Tranfield et al., 2003: 209)

The rationale for systematic literature reviews has been well established in some fields such as medicine for decades (e.g. Mulrow, 1994); however, there are still few methodological guidelines available in the management sciences on how to assemble and structure such reviews (for exceptions, see Denyer and Tranfield, 2009; Tranfield et al., 2003 and related publications). This is surprising given that there is a large body of information available to researchers on various other scientific approaches (such as survey research, experimental designs or panel data analysis) that rely on replicable and scientific approaches to collect data and information. The idea behind a systematic review is to systematically collect available evidence and then offer an evaluation of the evidence against predetermined criteria, rather than offering an unsystematic review of only some studies that are deemed as suitable by the researcher (Tranfield et al., 2003). As such, a systematic review can offer a balance between comprehensively identifying a larger pool of publications and systematically identifying a smaller set of studies that fit criteria for inclusion and can inform research agendas.

In this article, we detail methodological steps for how researchers can conduct systematic literature reviews and offer examples of bibliometric approaches to visualise results. The article is structured as follows. First, we provide a background information on the increasing interest in conducting systematic literature reviews. Next, we review the different steps involved in conducting a systematic literature review. These include identification of literature for inclusion, data cleaning, analysis and synthesis, and the presentation of results. In addition, this article discusses various ways for researchers to use bibliographic mapping approaches for visualising research on a topic or theme and discusses three different bibliographic tools. Our article highlights how authoritative literature reviews can provide a rigorous and thorough assessment of literature published in a field that offers a review of the existing body of knowledge and specifies future research directions.

2. Background

Academic knowledge is expanding exponentially. Every day, thousands of new articles, reports and other materials are published. It is estimated that the number of scholarly articles surpassed 50 million in 2009 (Jinha, 2010), with rapid increases in recent years due to an increasing number of predatory journals that publish high volumes of poor-quality research, often in open-access formats (Demir, 2018). These trends mean that there is an unsystematic proliferation of knowledge across numerous different outlets and academic disciplines. It becomes increasingly difficult (even for experts in their respective fields) to keep track of new developments due to the sheer amount of information and associated time requirements for assessing and evaluating new information, including whether any given study is published in a reputable outlet. Researchers struggle to identify relevant studies on a topic of interest, to critically appraise the content and quality of existing evidence and to synthesise available results. For purposes of future research and publications, it becomes a challenge to select what evidence to build upon (or not build upon) to advance a field of knowledge.

Systematic literature review can help overcome these limitations and help with several aspects of the research process: establishing a context and delimiting a research problem; seeking theoretical support; rationalising a problem and new lines of enquiry; distinguishing what has been done from what needs to be done; identifying the main outcomes of (and methodologies used in prior studies); and avoiding fruitless research. If the researcher is contributing to existing research, a key question becomes: What is already known (and not known) about the topic or issue under investigation, and what are fruitful avenues for further investigation? Such reviews can focus on identifying major research streams and future research directions (e.g. Linnenluecke et al., 2017). In other instances, a researcher might wish to investigate a new line of research (e.g. Cai, 2018, 2019) or build new theory. In this case, a key question becomes: What is the new research field/theory, and how does it relate to existing fields or theories? Literature reviews can be useful if a researcher is motivated by a lack of research on a particular issue and topic; even though there might only be a few relevant studies, the review can still be the foundation for a discussion regarding the knowledge gap, and how a researcher intends to fill it. Increasingly, there is also a role for systematic literature reviews to provide insights and guidance to practitioners and policymakers on the best avenues or intervention – a role that has largely been of secondary importance in the management field in the past (Tranfield et al., 2003).

Generally, literature reviews can be structured according to several different criteria, and there is not necessarily a 'best-practice' recommendation – different reviews will require a different approach. A general distinction between reviews is that they can be author-centric or theme-centric in their orientation (see Webster and Watson, 2002). *Author-centric* reviews go through publications written by a certain author or team of authors one by one and present a summary of relevant findings (e.g. Author A has published on the topic and arrives at the following conclusions; Author B has also published this topic and arrives at the following conclusions, and so on). Such an approach is sometimes used for a chronological review to trace back the origins of an issue, topic, or theory over time. A significant risk with this approach is the descriptive nature of the presentation of findings, especially if there is limited synthesis or critical appraisal of individual publications.

A more common approach is a *theme-centric* review in which the researcher guides the reader through ways that prior publications have contributed to developing our understanding of themes, concepts or phenomena of interest.[1] For example, a recent review by Tweedie et al. (2019) summarises existing literature on performance management in human resource management around three major themes: literature on measurement and measurement error, literature on the social context of performance management, and the integration of performance management into

organisational strategy. Chang et al. (2018a) offer a systematic review on the topic of financial research on regulation in the Asia-Pacific region. The authors find five main themes in this literature relating to regulation: banking and financial institutions, markets and trading, corporate governance, disclosure and accounting standard-setting. Another example is the review by Lee (2008) of theories on corporate social responsibility (CSR) – even though the review uses a chronological approach and examines the evolution of the concept over time, it details various dominant themes in the literature and groups the literature accordingly. The review by Daugaard (2019) offers another recent example; this review systematically explores the literature on environmental, social and governance (ESG) investment and reveals several main themes: the heterogeneous nature of ESG investing, its costs and motivations, and its management literature origins. A further discussion of the differences between author-centric versus theme-centric approaches is provided by Webster and Watson (2002).

Irrespective of the approach (author or theme-centric), many authors often only review selected publications in their literature review section and create a 'narrative', rather than a systematic review. Systematic reviews require the collection of a representative or comprehensive dataset of available research (Tranfield et al., 2003), and a replicable, scientific and transparent process to evaluate existing evidence to minimise bias that results from the random inclusion or exclusion of studies in the literature review process. The idea of a systematic review process was driven by research needs in the medical sciences and healthcare, where the only 'reliable' way to determine the outcomes of medical treatments is to synthesise available evidence on an issue, such as the effectiveness of a cancer drug (Mulrow, 1994; Tranfield et al., 2003). While a single study reporting on a successful trial using a new drug might provide some initial hope regarding its success, stronger evidence is provided by studies that pool information from across trials with similar research questions or research designs. In the medical sciences, a systematic review and meta-analysis of randomised controlled trials (i.e. the most rigorous form of experimentation) can form part of a further systematic review that provides guidance regarding the best form of treatment.

In the management sciences, where randomised controlled trials are often not available, a systematic literature review of other published studies is the next 'best' form of evidence and requires the assembly, critical appraisal and synthesis of all relevant studies that address a specific question (Akobeng, 2005). Unlike the medical sciences, management (and social sciences in general) have not developed standard, agreed-upon protocols for collecting best-practice evidence; management studies, even on the same or a similar topic, can vary in terms of their research questions, timeframes, sample selection, but also the methods employed. To overcome such limitations, management researchers are increasingly adopting meta-analytical approaches to create 'super-samples' that allow the summary of information and results from across studies (Combs et al., 2019). However, despite the availability of such approaches, there are unresolved controversies about best-practice approaches (Combs et al., 2019), and management researchers continue to face significant challenges reviewing such fragmented evidence. In what follows, we detail possible approaches for systematic reviews.

3. Towards a systematic review

As with all research, the value of a systematic review depends on rigorous methods and the clarity of reporting, as well as on the application of scientific strategies so that possible errors and biases are limited (Moher et al., 2009). Therefore, the fundamental idea of a systematic literature review is that the review is *replicable*, meaning that another researcher can replicate the review process and arrive at the same set of evidence and the same conclusion. A systematic review includes an exhaustive search of designated databases (e.g. Web of Science and Scopus), additional literature

that might not be available through these databases and requires a thorough process for analysing and synthesising relevant information. While systematic reviews are still not commonplace in the management sciences, recommendations regarding desirable steps are emerging (Tranfield et al., 2003). The typical structure of a stand-alone systematic review follows the set-up of a scientific article, including introduction/background, a method section (defining sampling and analysis), a results section outlining main findings, and a discussion and conclusion that details theoretical contributions or new research directions.

3.1. Identification of literature for inclusion

Prior to constructing a systematic review, an important step is to clarify the topic or issue under investigation. A good systematic review will have a clear focal point and focus on evidence that has been published on a topic or questions. For example, Bailey et al. (2017) review the antecedents and outcomes of employee engagement and focus on answering the question if there is a connection between employee engagement and outcomes such as employee morale and performance. Such a clear question focusing on interventions, mechanisms and outcomes in a specific context is advantageous for a review, as it delineates clear boundaries (see Denyer and Tranfield, 2009). To help with shaping up the review, a researcher might wish to form a research team or alternatively enlist the help of colleagues or advisors to guide the scope of the literature review, the review process and the triangulation of key decisions (Briner and Denyer, 2012). While systematic reviews can be completed by an individual researcher, a risk is that important elements (e.g. the selection of criteria for the inclusion/exclusion of studies) are not subject to any review, which might introduce bias. A research team might help overcome such limitations, for example, by including an expert on systematic reviews, a subject matter/content expert and possibly a methodology expert.

An initial scoping exercise should be undertaken to gain a preliminary overview of the current state of research and might prove useful even for experts in their respective area to map out a framework for a systematic review. This exercise can include a broad search of the literature to assess suitable search strategies (e.g. suitable databases/sources, time periods, search terms/keywords, language restrictions) and to gain a general overview of the body of literature (see Briner and Denyer, 2012). The researcher should investigate: Are there already existing reviews on the specific issue or research question under investigation? In this case, a replication might not be warranted, but an extension or update could prove useful. Are there many published articles on the topic? If so, it might be more fruitful to focus on literature published in recent years (e.g. since a specific date), in specific journals or in a more narrowly defined field. However, if the field is rather new, there might not yet be many peer-reviewed articles in academic journals readily available for review, but there might be conference papers, working papers or other types of 'grey' literature that should be considered. Is the available literature mostly published in one field, or have similar issues or questions be examined in other fields as well? A researcher might have to consider interdisciplinary contributions to overcome the risk that important contributions from outside 'core' journals might be missed (see Adams et al., 2017 for guidance on working with grey literature in systematic reviews). Different fields place a different emphasis on publications in books, book chapters or conference proceedings, such that some seminal publications might not necessarily appear in peer-reviewed journals.

A next important step is to decide on inclusion and exclusion criteria. A researcher would not want to incorporate just any random piece of information into a systematic review; consequently, it will be important to consider what steps will be taken to locate relevant studies. A common approach is to identify literature for inclusion through Boolean searches within established search

indices, such as the Web of Science or Scopus platforms. These databases allow a search for publications with pre-specified keywords, for example, in the title, abstracts or keywords. However, before taking this step, a researcher should carefully decide on the search strategy, including the selection or combination of keyword(s) and database(s), the inclusion/exclusion of papers from other disciplines (many databases allow the researcher to restrict a search to business/management, but this might miss important contributions), as well as the inclusion/exclusion of conference papers/proceedings, books, book chapters, reports and other grey literature. There is not necessarily a 'right' or 'wrong' way to make these decisions. To ensure consistency, researchers can follow the search strategies of similar reviews. Furthermore, and to avoid bias, decision steps should be peer-reviewed and documented to add transparency to the search process. A detailed example of a search strategy is the review of Vitamin D supplementation by Martineau et al. (2017) – the researchers provide a supplementary appendix that details the specific search strategies and search terms used to uncover a comprehensive set of studies from various databases and other sources.

3.2. Data cleaning

Once a range of suitable studies is identified, duplicates need to be removed from the analysis. In addition, studies that are not relevant need to be removed. 'False positives' in the search process can occur, for example, if an article mentions a keyword or phrase that was used to retrieve the article but happens to identify a different or unrelated topic. No single study should be excluded because the researcher deems that the quality of a study is low or that there are methodological or other flaws – this would bias the review. Instead, such studies should be retained and properly critiqued. The data cleaning process can be conducted in a similar fashion to the triangulation process in qualitative research – two or more researchers serve as reviewers and examine the literature that was obtained through the search process and examine the studies for suitability for inclusion in the review. Typically, the reviewers would check the title, abstract and keywords of each record, but sometimes it might become necessary to refer to the full publication text to determine the suitability of the publication for inclusion in the review. Any cases of disagreement should be carefully reviewed. Further data cleaning steps can involve a cited reference check (examining the references cited by other studies to see if any contributions were missed) and further triangulation of search results from multiple databases to ensure that no important contributions were missed. Some programmes (e.g. HistCite, see below) offer functionality to remove duplicates and to carry out a cited reference check automatically.

3.3. Analysis and synthesis

A vital step for any systematic review is the analysis and synthesis of the available evidence and depends on the number of studies that will be included in the review; the type of research method(s) used by individual studies (if applicable) and the quality of the evidence, and the chosen analytical or visualisation technique. For systematic reviews that comprise only a small number of studies not suitable for any meta-analysis, the researcher can consider preparing tables to overview criteria such as the research question of the study, the context for the analysis, the method(s) used (or whether the publication is conceptual), the sampling method, as well as key findings. For systematic reviews that contain larger samples of studies, the analysis will partially depend upon the type of evidence that the systematic review has uncovered – if the evidence is primarily qualitative in nature, or if studies are diverse in terms of their methods, qualitative techniques (including qualitative meta-analysis) can be used to thematically code and categorise studies according to the insights that they are generating. Other avenues are quantitative systematic reviews in which the researcher

systematically collects primary studies. If the available data allows doing so, the researcher may also statistically combine findings and offer an analytical overview using approaches for meta-analytical analysis (e.g. meta-analytic structural equation modelling or meta-analytic regression analysis) (Combs et al., 2019).

3.4. Presentation of results

There are numerous ways to present the results of a systematic literature review. If the studies underlying the review use mainly qualitative data, the researcher can prepare a qualitative analysis, but would not necessarily offer a statistical combination – aside from perhaps incorporating some traditional descriptive statistics (e.g. frequency tables) to summarise basic information, such as the number of publications on a topic over time. Hoon (2013) offers an example of how findings from a qualitative meta-analysis can be presented in a more dynamic fashion – the researcher constructed causal networks based on case evidence presented across different studies that mapped the various variables and their inter-relationships into a coherent picture. Evidence from quantitative meta-analytical analysis (e.g. meta-analytic structural equation modelling or meta-analytic regression analysis) would normally follow presentation patterns used in quantitative articles.

Alternative options for the presentation of results are offered by various software packages and bibliographic mapping approaches that can be used for visualising research on a topic or theme. A central part of this technique is the production of a bibliographic map of the topic of interest for visualising the intellectual origins of that topic and the structure of the literature over time. While these tools do not necessarily offer the opportunity to review all studies on a given topic area in detail (e.g. not all tools presented below will offer a comprehensive analysis of all papers of interest), they nonetheless provide systematic (replicable) ways to map knowledge developments over time, as well as trends of topics of interest in the research literature (see Linnenluecke, 2017 on resilience; or Linnenluecke and Griffiths, 2013 on sustainability). Visualisation techniques can be useful in situations where there are thousands of papers published on a topic in order to help identify those that have been impactful in terms of informing research agendas (see Linnenluecke and Griffiths, 2013).

3.5. Bibliographic mapping tools

In the following sections, we present a brief example using different bibliographic tools to demonstrate how they can be used for bibliographic modelling and topic modelling. Several possible analytical tools are available across a suite of different programmes. It would be beyond the scope of the article to review all in detail. Instead, we summarise a few possible approaches here to provide researchers with insights into their application. For purposes of providing an easily accessible example, we focus our efforts on articles published in the *Australian Journal of Management* (AJM) over a 10-year period (2008–2018). Our broad research interest is to see how these articles can be mapped using the various techniques. To identify the articles of relevance for the review, we located published articles based on a search of the Web of Science database by Clarivate Analytics. This database can be readily accessed through most universities' online library systems. The database hosts citation records (including their cited references) from scholarly journals and conference proceedings across various areas of research and can be searched by specific keywords in fields such as the title, abstract, topic, author or source title.

3.5.1. Bibliographic mapping with HistCite. HistCite is a programme that allows the researcher to map influential publications within a field of research and their interrelations and allows for an

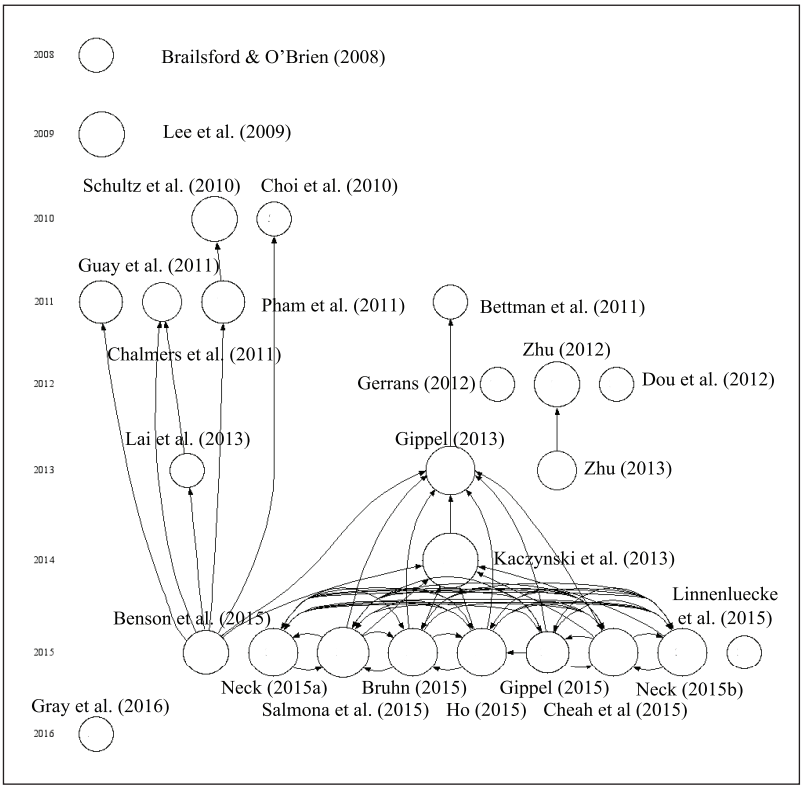

Figure 1. Citation map of the research conversation with AJM (LCS ⩾ 4).

assessment of the development of thought on a topic (Börner et al., 2003; Janssen, 2007; Janssen et al., 2006). HistCite has been developed to import data identified through Boolean searches within the Web of Science. Data collection and analysis follow the methodological steps outlined above. The first step is the compilation of a comprehensive dataset of relevant publications and their citation records. In our example, we limited our search in the Web of Science database to articles published in the AJM from 2008 to 2018, as described above. In the next step, we downloaded the full citation record of the 295 papers identified through this search and imported their full bibliographic record into HistCite (i.e. a full record of the article's citation information, including the title, abstract and the cited references list). For more complex searches, the records would undergo further manual cleaning by reviewers to remove publications unsuitable for inclusion; however, given that we only imported publications from one outlet, we conducted a check for completeness.

In Figure 1, we limited the display of publications to the top 25 publications with a Local Citation Score (LCS) of 4 or greater, which refers to the count of citations to each paper *within* the data set by other papers within the data set (e.g. our example focuses on the count of citations of papers *within* the AJM to other papers within this publication). It is also possible to analyse papers based on their Global Citation Score (GCS), that is, the number of citations that the publication has received in total (see next section). There is no established rule as to where a cut-off should be set – if the idea is to comprehensively map a field of research, a researcher may wish to display all publications and their interrelations to avoid biasing this analysis towards higher-cited (i.e. 'older')

papers. Here, we decided to focus on the top 25 papers here for purposes of visual clarity and brevity. Relevant papers in the AJM are displayed as nodes (circles). The citation connections between them are shown as arrows. The size of each node reflects the number of citations that the publication has received from other publications within the dataset.

As can be seen from Figure 1, two separate clusters of citations stand out. Citations on the left side are publications on various topical issues in management, accounting and finance research, including corporate social and financial performance, the adoption of the International Financial Reporting Standards (IFRS), and methodological issues such as spurious ratios and endogeneity (see Table 1). This stream of research was subsequently reviewed by Benson et al. (2015). The cluster on the lower right side starts with a paper by Gippel (2013) on the revolution in finance. In this article, Gippel (2013) argues for the need to introduce more cross-disciplinary and innovative research in finance research through the adoption of a wider range of theoretical and methodological avenues. A subsequent paper by Kaczynski et al. (2014) expanded on Gippel's point that finance research is dominated by quantitative modelling and presented a case for the adoption of qualitative research in finance. This call was followed by the 40th-anniversary issue on Qualitative Research, which led to the adoption of qualitative techniques by several authors within this issue (see Table 1). Other researches (see Linnenluecke et al., 2015) extended Gippel's (2013) call for more interdisciplinary research.

The approach outlined in Figure 1 can be used to derive insights for future research that builds upon the mapped knowledge development. For example, the qualitative research avenues (right side of Figure 1) could be fruitfully combined with other topics typically investigated through a quantitative lens (left side of Figure 1), or research could build further on select topics of interest. HistCite also allows the researcher to carry out a cited reference search. This search function identifies all references cited by publications within the dataset and allows the user to identify publications that have been cited (and are thus possibly relevant to the topic under investigation), but that are not included in the data collection themselves (Garfield, 2004). Additional citations can be added to the review (not needed in our case, since we only focused on articles published in the AJM).

3.5.2. Systematic review using R. R is a highly capable statistical programming language which has gained immense popularity globally among researchers, data analysts and in analytical professions (R Core Team, 2019). R provides a flexible and extensible free environment to conduct research and analysis. Researchers can contribute open-source routines and packages, which promotes reproducibility. R's package ecosystem is one of its major advantages; packages are available for most widely used statistical, data analysis and visualisation techniques. Also, it is updated almost daily to accommodate new and upcoming methods published by academic researchers or industry practitioners. R provides packages for various areas of interest, including systematic literature review or the related field of meta-analysis.[2] These include Bibliometrix (Aria and Cuccurullo, 2017), Revtools (Westgate, 2018) and Litsearchr (Grames et al, 2019) of the Metaverse project,[3] as well as Adjutant (Crisan et al., 2018) and Metagear (Lajeunesse, 2016) which provide various functionalities.

Bibliometrix is by far the most popular R package and is used in a growing number of publications (see, for example, Addor and Melsen, 2019; Lajeunesse, 2016).[4] Bibliometrix allows R users to import a bibliography database from SCOPUS or the Web of Science, stored either as a Bibtex (.bib) or Plain Text (.txt) file. The package has simple functions which allow for descriptive analyses, for example, in terms of most relevant authors by the number of publications, or the most cited documents sorted by GCS (Figure 2). The researcher will be able to produce the same results with HistCite, given that both programmes use measures such as LCS and GCS for this type of analysis.

Table 1. Details of papers included in the citation network (chronological order).

Paper	Topic	LCS	GCS
Brailsford T and O'Brien MA (2008) *Australian Journal of Management* 32: 463–484	Momentum in equity returns	4	14
Lee DD, et al. (2009) *Australian Journal of Management* 34: 21–49	Corporate social and financial performance	7	48
Schultz EL, et al. (2010) *Australian Journal of Management* 35: 145–163	Endogeneity	7	54
Choi JS, et al. (2010) *Australian Journal of Management* 35: 291–311	Corporate social and financial performance	4	74
Guay W (2011) *Australian Journal of Management* 36: 125–149	Implied cost of capital using analysts' forecasts	6	63
Chalmers K (2011) *Australian Journal of Management* 36: 151–173	IFRS adoption and change in value relevance	5	45
Pham PK, et al. (2011) *Australian Journal of Management* 36: 371–386	Firm performance and corporate governance	6	32
Bettman JL, et al. (2011) *Australian Journal of Management* 36: P 200–216	Asset growth effect in the Australian equity market	4	10
Gerrans P (2012) *Australian Journal of Management* 37: 415–439	Retirement savings investment choices	4	15
Zhu YS (2012) *Australian Journal of Management* 37: 283–295	Spurious ratios when examining the relationship between financial leverage and firm characteristics	7	16
Dou Y, et al. (2012) *Australian Journal of Management* 37 461–479	Anomalies in the Australian stock market	4	10
Lai CY, et al. (2013) *Australian Journal of Management* 38: 491–521	Impact of the mandatory adoption of IFRS	4	15
Gippel JK (2013) *Australian Journal of Management* 38 125–146	New research directions	8	16
Zhu YS (2013) *Australian Journal of Management* 38: 429–439	Spurious ratios when examining the relationship between capital leverage and firm profitability	5	8
Kaczynski D, et al. (2014) *Australian Journal of Management* 39 127–135	Qualitative research	10	24
Benson K, et al. (2015) *Australian Journal of Management* 40: 36–88	Review of accounting research in the Asia Pacific region	7	43
Neck C (2015a) *Australian Journal of Management* 40: 488–510	Qualitative Finance Special Issue (why women leave senior finance roles)	8	11
Salmona M et al. (2015) *Australian Journal of Management* 40: 403–413	Qualitative Finance Special Issue (application of qualitative theory in finance research)	9	12
Bruhn AG (2015) *Australian Journal of Management* 40: 459–477	Qualitative Finance Special Issue (personal and social impacts of financial loss)	8	9
Ho L (2015) *Australian Journal of Management* 40: 562–583	Qualitative Finance Special Issue (Investment in tuna fishing in Viet Nam)	8	8
Gippel J (2015) *Australian Journal of Management* 40: 538–556	Qualitative Finance Special Issue (contemporary research practices in the academic field of finance)	6	10

(Continued)

Table 1. (Continued)

Paper	Topic	LCS	GCS
Cheah KK, et al. (2015) *Australian Journal of Management* 40: 414–434	Qualitative Finance Special Issue (long-term financial choice)	8	10
Neck C (2015b) *Australian Journal of Management* 40: 511–537	Qualitative Finance Special Issue (why women leave senior finance roles – further evidence)	8	11
Linnenluecke MK, et al. (2015) *Australian Journal of Management* 40: 478–487	Fossil fuel divestment	4	17
Grey S, et al. (2016) *Australian Journal of Management* 41: 3–26	Political and government connections of boards	4	12

LCS: Local Citation Score; GCS: Global Citation Score.
Papers are listed in this table in an abbreviated format for illustrative purposes and have not been included in the reference list.

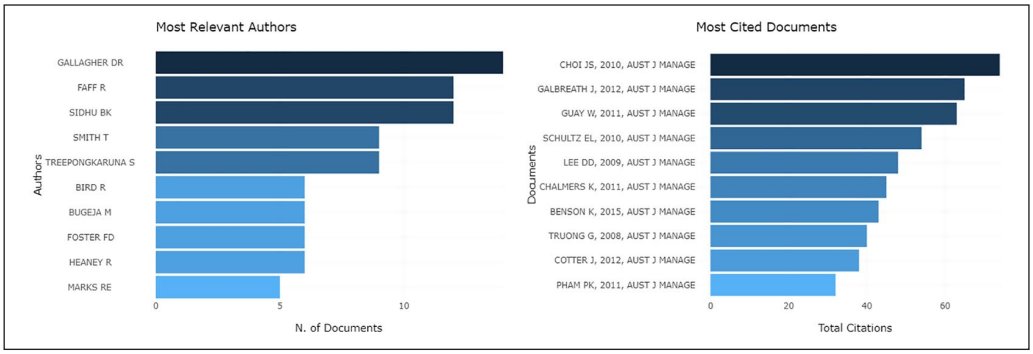

Figure 2. Descriptive statistics (2008–2018).

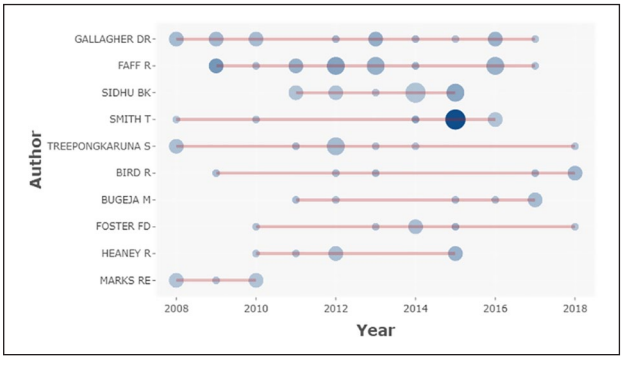

Figure 3. Top authors' production over time (2008–2018).

A graph of author statistics over time can also be produced. Figure 3 shows a graph of the top 10 authors over time. The information from these plots can be easily extracted in table format for further analysis.

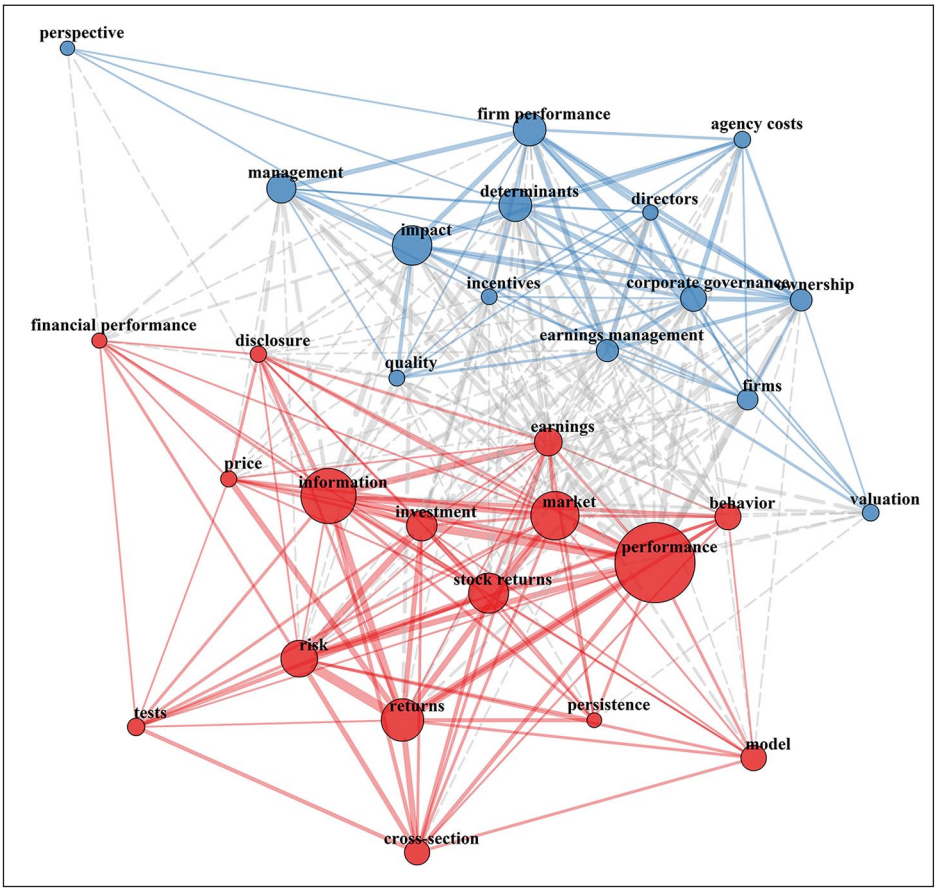

Figure 4. Keyword co-occurrences as network plot.

The package also facilitates various network analyses, including co-citation analysis, coupling analysis, collaboration analysis or co-occurrence analysis. Figure 4 shows a keyword co-occurrences plot.

Bibliometrix provides another useful function to plot a Sankey diagram to visualise multiple attributes at the same time. For example, Figure 5 provides a three-field plot (Sankey Diagram) listing the respective authors (middle), the Author Keywords (left side) and their Cited References (right side).

Systematic reviews generally involve analysis of the conceptual structure among the articles analysed. Bibliometrix has many additional functions, such as thematic maps or the thematic evolution of concepts. Bibliometrix can also produce a map similar to the HistCite output generated above, which we have not reproduced here for purposes of brevity. The analysis here has been conducted in R, using RStudio (RStudio Team, 2019). RStudio Team has developed the Shiny package (Chang et al., 2018b), a powerful package to support web applications for interactive analysis. Bibliometrix also facilitates an easy-to-use interface built on Shiny, which can be easily used through Rstudio and provides the analysis without any code. Overall, R provides numerous resources to conduct systematic reviews; we have barely scratched the surface with Bibliometrix in this example.[5]

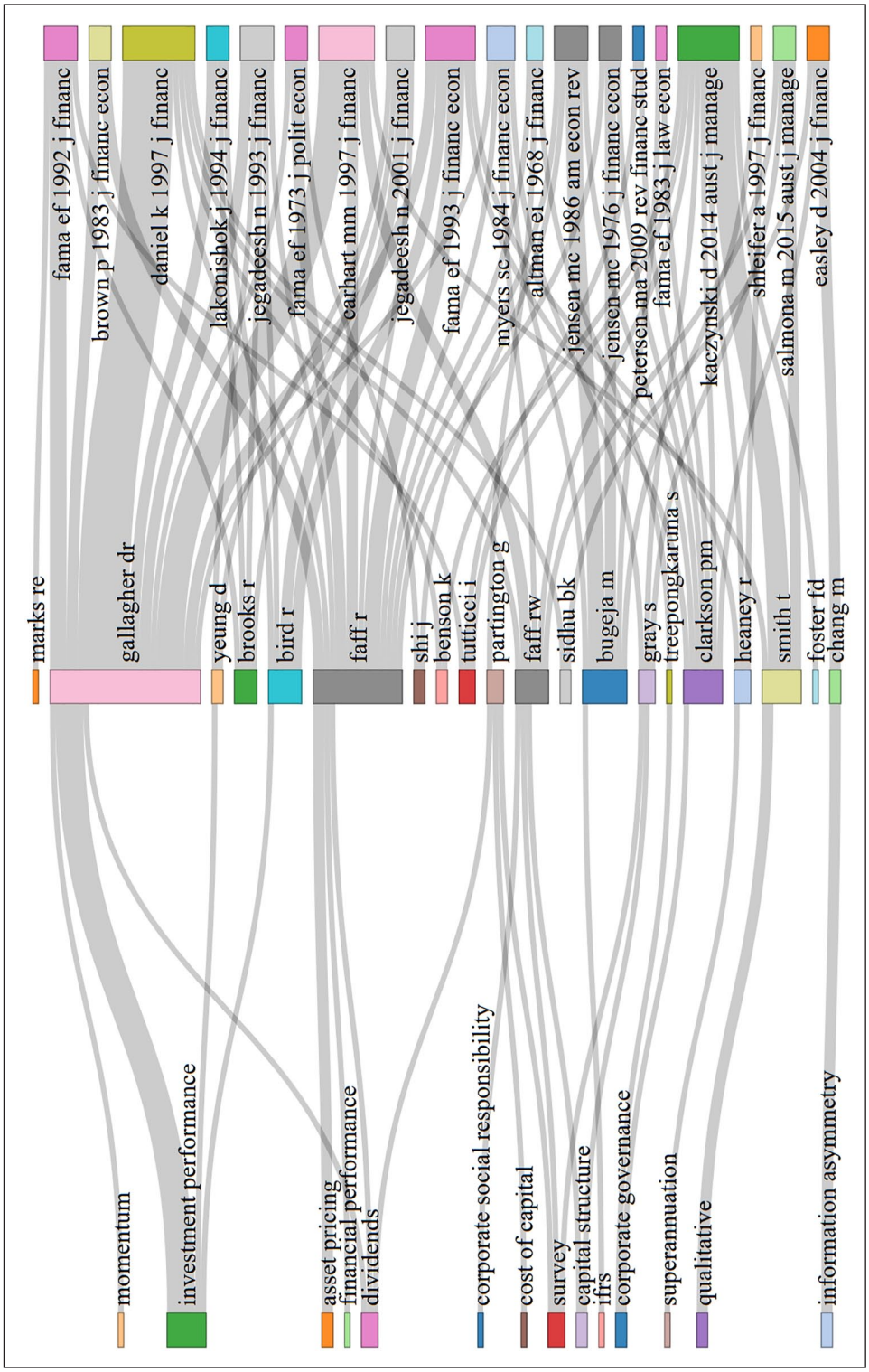

Figure 5. Sankey diagram.

Table 2. Example of using topics extracted by an entity linker.

Publication (Bender, 2014)	*Sedgman is a **mining engineering** company based in **Brisbane** with offices globally and mine operation sites across **Australia**. It has more than 650 staff. Reid said his IT responsibilities include operations, **service desk**, service management, network, **server**, engineering applications for the company globally.*
TAGME result	Mining engineering, Brisbane, Australia, service desk (ITSM), server (computing)

Source: Marrone and Hammerle (2017).

3.6. Topic extraction tools

While citation analysis is useful to identify influential papers within a certain body of literature (as measured by their citation score), another avenue for analysing and visualising a body of literature is the use of text mining. Here, we illustrate text mining using the tool ResGap (http://resgap.com) that allows the researcher to extract topics within a body of research. ResGap can also be used to map 'topic trends' (e.g. topics referred to with increasing or decreasing frequency) to identify conceptual developments in the literature over time, or to identify promising areas of research (i.e. emerging trends) that might be fruitful avenues for future research (Lee and Kang, 2018). The ability to analyse and synthesise historical and emerging concepts allows the researcher to gain insights into how a field or body of research has developed (Nederhof and Van Wijk, 1997). Finally, the researcher can also use this analysis to determine theories, concepts and methods that can be applied to the researcher's fields of interest (Westgate et al., 2015).

ResGap uses entity linking to recognise and disambiguate topics present in documents such as journal article abstracts, newspaper articles or government publications. Entity linking allows for the identification of short and meaningful sequences of terms (entities) in an input text and annotates (disambiguates) these terms using unambiguous identifiers from a larger catalogue of text (Cornolti et al., 2013). As an example, different variations of a term are linked, meaning that 'U.S.', 'USA' and 'America' would be normalised to 'United States of America' (Khalid et al., 2008). One of the most widely used catalogues for entity linking is Wikipedia, as it covers a vast and ever-increasing number of entities, has wide content coverage and includes features such as disambiguation pages and unique identifiers for each page (Cornolti et al., 2013; Ferragina and Scaiella, 2010; Khalid et al., 2008). An example of the results provided by an entity linker is shown in Table 2.

3.6.1. Burstiness. First, we show how text mining can detect 'bursty' topics (i.e. topics that become suddenly prominent for a short period of time) by combining the entity linking methodology described above with Kleinberg's (2003) burst-detection algorithm. The burst-detection algorithm identifies popular topics in a data-driven way, which helps to complement the researcher's intuitive sense of what topics are popular within a field of research (or in our case, a particular journal) with a statistical assessment. For purposes of consistency and to be able to compare results, we use the above-mentioned dataset from the AJM; however, the analysis of burstiness does not require a cited references list. To arrive at the results presented in Figure 6, we first compiled our dataset as a Comma Separated Values (CSV) file containing the publication year, title and abstract information for each article. Second, we uploaded the CSV file to ResGap and selected TAGME as our entity linker. Within ResGap, we produced the burst-detection visualisation, by setting the resolution of state jumps to 2 and the gamma to 0.5. Figure 6 shows the top 30 'bursting' topics in the AJM.

Figure 6 essentially provides a 'heat map' that details which topics were of interest in a particular year. For instance, the topic, 'Research and Development' (R&D) became prominent in 2017

Figure 6. Top 30 topic bursts in AJM papers 2008–2018.

and 2018. Articles have looked at R&D valuation (Chen et al., 2018), investments in R&D (Hamada, 2017) and market orientation (Bucic et al., 2017). Other topics that have recently attracted attention in the AJM include research on the board of directors as well as decision making with regard to investments (He et al., 2018; Hutcheson and Newell, 2018), bank locations (Heard et al., 2018) and the effects of board independence on decision making (Bird et al., 2018). The

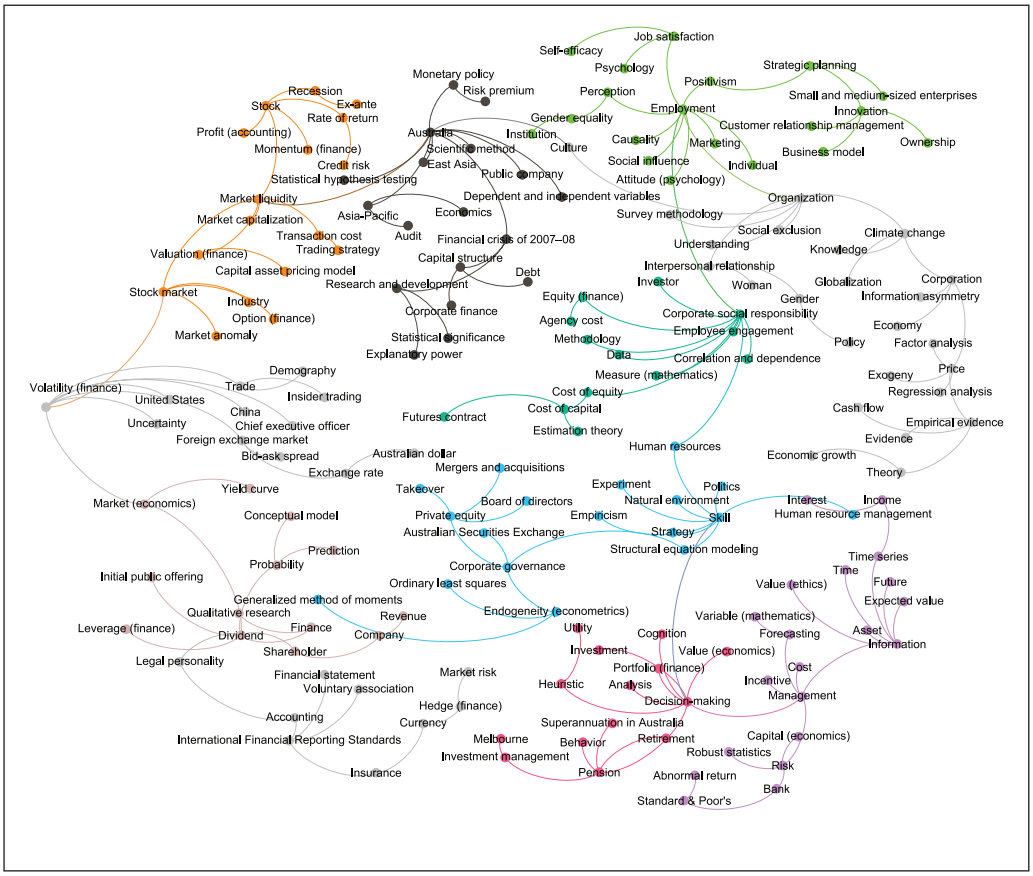

Figure 7. Maximum spanning tree.

influence of the 2015 Qualitative Finance Special Issue is also visible in this map through the bursts in topics such as culture, employment and pension (i.e. topics investigated in the special issue papers). This approach of burstiness also allows us to observe how certain methodologies increase in prominence, such as the usage of the survey methodology in 2018 (Batra et al., 2018; Hutcheson and Newell, 2018; Johnson et al., 2018). The results of the burstiness detection differ from those in the bibliometric analyses as the focus here is not on citations, but on topic popularity at a given point in time.

3.6.2. Maximum spanning tree. In addition, ResGap can map how the topics in our dataset are linked, by creating a maximum spanning tree network. A maximum spanning tree aims to connect all topics together, without cycles, and with maximum possible total edge weight. In this way, we only show the strongest connections between two topics. The maximum spanning tree for AJM in Figure 7 shows connections between topics that appear at least five times in the journal (a total of 178 topics). We export the results from ResGap and import these to Gephi (see Gephi.org), a network analysis and visualisation tool. To determine the different 'community' structures within our tree, we run the Modularity community detection algorithm, with the default resolution setting of 1. A total of 13 communities were detected; a unique colour shows each community. By creating

communities, we can observe how topics cluster within our dataset and may help new researchers publishing in an area to understand the different communities of research and the topics that exist within them.

4. Discussion and conclusion

The various ways for visualising literature reviews presented in this article have unique advantages and disadvantages. The citation networks that can be generated with HistCite (a similar function is available in Bibliometrix) are well suited to map highly cited publications and their interrelations over time. However, citation network mapping typically requires the researcher to select a minimum citation threshold for including publications into a citation network – unless the researcher wishes to display all publications, which can create issue for visual clarity if the number of papers to be included is large. This threshold is most likely to exclude more recent publications that have not met the minimum number of citations, and thus biases the display of citations to 'older' papers in the dataset. It may take several years for an article to be cited a certain number of times and some articles only become widely recognised after several years – and this process takes even longer for fields with smaller scales and/or that develop more slowly (Liu et al., 2013). A possible solution to overcome this limitation is for a researcher to manually examine recently published papers (e.g. Linnenluecke, 2017).

The burst-detection algorithm that we used to detect 'trending' topics focuses less on individual papers and is more generally suited to model topic emergence over time. This approach is therefore more appropriate in situations where a researcher wishes to visualise topic development over time, irrespective of whether the associated papers receive citations and counters criticisms that the number of citations that a paper receives is not a direct measure of either its quality or importance (Bennet et al., 2019). The maximum spanning tree (see Figure 7) offers an extension to this topic mapping approach by showing research communities within the literature. However, while topic extractions remove the bias associated with relying on citation statistics, the approach does not necessarily allow to detect the interconnectedness of various publications and research streams over time and provides limited insights into the specific contributions of individual papers to a debate.

Ultimately, the suitability of the chosen approach for conducting and visualising a systematic review depends on the aims set out by the researcher. Our article has been an attempt to detail methodological steps to assist researchers with the various decision steps involved in conducting systematic literature reviews, and we emphasise the important role that systematic literature reviews can play in academic research to gather existing knowledge and to examine the state of a field. There are several journals that accept systematic literature reviews as a stand-alone literature review (such as the *International Journal of Management Reviews*), but a systematic review can also (in a shortened form) accompany a larger scientific study. We hope that the steps provided in this article are useful for researchers at different stages of their careers – ranging from doctoral students who wish to assemble a broad overview of their field of interest to guide their future work, to senior researchers who wish to publish authoritative literature reviews that guide future research directions.

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Notes

1. It should be noted here that reviews can also focus on a review of research methods used within a field of research.
2. See https://cran.r-project.org/web/views/ for a list of task views grouping packages according to their functionality.
3. See https://rmetaverse.github.io/.
4. The package webpage (http://www.bibliometrix.org/Papers.html) provides a list of publications utilising the package.
5. The code used in the analysis can be obtained from the authors.

References

Adams RJ, Smart P and Huff AS (2017) Shades of grey: Guidelines for working with the grey literature in systematic reviews for management and organizational studies. *International Journal of Management Reviews* 19: 432–454.

Addor N and Melsen L (2019) Legacy, rather than adequacy, drives the selection of hydrological models. *Water Resources Research* 55: 378–390.

Akobeng AK (2005) Understanding systematic reviews and meta-analysis. *Archives of Disease in Childhood* 90: 845–848.

Aria M and Cuccurullo C (2017) bibliometrix: An R tool for comprehensive science mapping analysis. *Journal of Informetrics* 11: 959–975.

Bailey C, Madden A, Alfes K, et al. (2017) The meaning, antecedents and outcomes of employee engagement: A narrative synthesis. *International Journal of Management Reviews* 19: 31–53.

Batra S, Sharma S, Dixit MR, et al. (2018) Does strategic planning determine innovation in organizations? A study of Indian SME sector. *Australian Journal of Management* 43: 493–513.

Bennet L, Eisner DA and Gunn AJ (2019) Misleading with citation statistics? *The Journal of Physiology* 597: 2593–2594.

Benson K, Clarkson PM, Smith T, et al. (2015) A review of accounting research in the Asia Pacific region. *Australian Journal of Management* 40: 36–88.

Bird R, Huang P and Lu Y (2018) Board independence and the variability of firm performance: Evidence from an exogenous regulatory shock. *Australian Journal of Management* 43: 3–26.

Börner K, Chen C and Boyack K (2003) Visualizing knowledge domains. *Annual Review of Information Science and Technology* 37: 179–255.

Briner RB and Denyer D (2012) Systematic review and evidence synthesis as a practice and scholarship tool. In: Rousseau D (ed.) *Handbook of Evidence-Based Management: Companies, Classrooms and Research*. New York: Oxford University Press, pp. 112–129.

Bucic T, Ngo LV and Sinha A (2017) Improving the effectiveness of market-oriented organisation: Empirical evidence from an emerging economy. *Australian Journal of Management* 42: 308–327.

Cai CW (2018) Disruption of financial intermediation by FinTech: A review on crowdfunding and blockchain. *Accounting & Finance* 58: 965–992.

Cai CW (2019) Nudging the financial market? A review of the nudge theory. *Accounting & Finance*. Epub ahead of print 28 March. DOI: 10.1111/acfi.12471.

Chang M, Jackson AB and Wee M (2018a) A review of research on regulation changes in the Asia-Pacific region. *Accounting & Finance* 58: 635–667.

Chang W, Cheng J, Allaire J, et al. (2018b) *Shiny: Web Application Framework for R* (R package version 1.2.0). Available at: https://CRAN.R-project.org/package=shiny

Chen S, Srinidhi B, Su L, et al. (2018) The separate and joint effects of the market for corporate control and board effectiveness on R&D valuation. *Australian Journal of Management* 43: 203–224.

Combs JG, Crook TR and Rauch A (2019) Meta-analytic research in management: Contemporary approaches, unresolved controversies, and rising standards. *Journal of Management Studies* 56: 1–18.

Cornolti M, Ferragina P and Ciaramita M (2013) A framework for benchmarking entity-annotation systems. In: *Proceedings of the 22nd International Conference on World Wide Web*, Rio de Janeiro, Brazil, 13–17 May 2013, pp. 249–260. New York: ACM.

Crisan A, Munzner T and Gardy JL (2018) Adjutant: An R-based tool to support topic discovery for systematic and literature reviews. *Bioinformatics* 35: 1070–1072.

Cropanzano R (2009) Writing nonempirical articles for journal of management: General thoughts and suggestions. *Journal of Management* 35: 1304–1311.

Daugaard D (2019) Emerging new themes in environmental, social and governance investing: A systematic literature review. *Accounting & Finance*. Epub ahead of print 13 April. DOI: 10.1111/acfi.12479.

Demir SB (2018) Predatory journals: Who publishes in them and why? *Journal of Informetrics* 12: 1296–1311.

Denyer D and Tranfield D (2009) Producing a systematic review. In: Buchanan DA and Bryman A (eds) *The SAGE Handbook for Organizational Research Methods*. London: SAGE, pp. 671–689.

Ferragina P and Scaiella U (2010) TAGME: On-the-fly annotation of short text fragments (by wikipedia entities). In: *Proceedings of the 19th ACM International Conference on Information and Knowledge Management*, Toronto, ON, Canada, 26–30 October, pp. 1625–1628. New York: ACM.

Garfield E (2004) Historiographic mapping of knowledge domains literature. *Journal of Information Science* 30: 119–145.

Gippel JK (2013) A revolution in finance? *Australian Journal of Management* 38: 125–146.

Gippel JK (2015) Masters of the universe: What top finance academics say about the 'state of the field'. *Australian Journal of Management* 40: 538–556.

Grames EM, Stillman AN, Tingley MW, et al. (2019) An automated approach to identifying search terms for systematic reviews using keyword co-occurrence networks. *Methods in Ecology and Evolution*. Epub ahead of print 20 July. DOI: 10.1111/2041-210X.13268.

Hamada K (2017) Incentive for innovation and the optimal allocation of patents. *Australian Journal of Management* 42: 692–707.

He LY, Wright S and Evans E (2018) Is fair value information relevant to investment decision-making: Evidence from the Australian agricultural sector? *Australian Journal of Management* 43: 555–574.

Heard C, Menezes FM and Rambaldi AN (2018) The dynamics of bank location decisions in Australia. *Australian Journal of Management* 43: 241–262.

Hoon C (2013) Meta-synthesis of qualitative case studies: An approach to theory building. *Organizational Research Methods* 16: 522–556.

Hutcheson T and Newell G (2018) Decision-making in the management of property investment by Australian superannuation funds. *Australian Journal of Management* 43: 404–420.

Janssen MA (2007) An update on the scholarly networks on resilience, vulnerability, and adaptation within the human dimensions of global environmental change. *Ecology and Society* 12: 9–27.

Janssen MA, Schoon ML, Ke W, et al. (2006) Scholarly networks on resilience, vulnerability and adaptation within the human dimensions of global environmental change. *Global Environmental Change* 16: 240–252.

Jinha AE (2010) Article 50 million: An estimate of the number of scholarly articles in existence. *Learned Publishing* 23(3): 258–263.

Johnson A, Nguyen H, Groth M, et al. (2018) Workplace aggression and organisational effectiveness: The mediating role of employee engagement. *Australian Journal of Management* 43: 614–631.

Kaczynski D, Salmona M and Smith T (2014) Qualitative research in finance. *Australian Journal of Management* 39: 127–135.

Khalid MA, Jijkoun V and De Rijke M (2008) The impact of named entity normalization on information retrieval for question answering. In: Macdonald C, Ounis I, Plachouras V, et al. (eds) *European Conference on Information Retrieval*. Berlin: Springer, pp. 705–710.

Kleinberg J (2003) Bursty and hierarchical structure in streams. *Data Mining and Knowledge Discovery* 7: 373–397.

Kunisch S, Menz M, Bartunek JM, et al. (2018) Feature topic at organizational research methods: How to conduct rigorous and impactful literature reviews? *Organizational Research Methods* 21: 519–523.

Lajeunesse MJ (2016) Facilitating systematic reviews, data extraction and meta-analysis with the metagear package for R. *Methods in Ecology and Evolution* 7: 323–330.

Lee H and Kang P (2018) Identifying core topics in technology and innovation management studies: A topic model approach. *The Journal of Technology Transfer* 43: 1291–1317.

Lee MDP (2008) A review of the theories of corporate social responsibility: Its evolutionary path and the road ahead. *International Journal of Management Reviews* 10: 53–73.

Linnenluecke MK (2017) Resilience in business and management research: A review of influential publications and a research agenda. *International Journal of Management Reviews* 19: 4–30.

Linnenluecke MK and Griffiths A (2013) Firms and sustainability: Mapping the intellectual origins and structure of the corporate sustainability field. *Global Environmental Change* 23: 382–391.

Linnenluecke MK, Chen X, Ling X, et al. (2017) Research in finance: A review of influential publications and a research agenda. *Pacific-Basin Finance Journal* 43: 188–199.

Linnenluecke MK, Meath C, Rekker S, et al. (2015) Divestment from fossil fuel companies: Confluence between policy and strategic viewpoints. *Australian Journal of Management* 40: 478–487.

Liu X, Jiang T and Ma F (2013) Collective dynamics in knowledge networks: Emerging trends analysis. *Journal of Informetrics* 7: 425–438.

Marrone M and Hammerle M (2017) Relevant research areas in IT service management: An examination of academic and practitioner literatures. *Communications of the Association for Information Systems* 41: 517–543.

Martineau AR, Jolliffe DA, Hooper RL, et al. (2017) Vitamin D supplementation to prevent acute respiratory tract infections: Systematic review and meta-analysis of individual participant data. *The BMJ* 356: i6583.

Moher D, Liberati A, Tetzlaff J, et al. (2009) Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *Annals of Internal Medicine* 151: 264–269.

Mulrow CD (1994) Systematic reviews: Rationale for systematic reviews. *The BMJ* 309: 597–599.

Nederhof A and Van Wijk E (1997) Mapping the social and behavioral sciences world-wide: Use of maps in portfolio analysis of national research efforts. *Scientometrics* 40: 237–276.

R Core Team (2019) *R: A Language and Environment for Statistical Computing*. Vienna: R Foundation for Statistical Computing.

RStudio Team (2019) *Rstudio: Integrated Development Environment for R*. Boston, MA: RStudio Inc.

Sternberg RJ (1991) Editorial. *Psychological Bulletin* 109: 3–4.

Sutton RI and Staw BM (1995) What theory is not. *Administrative Science Quarterly*: 371–384.

Tranfield D, Denyer D and Smart P (2003) Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British Journal of Management* 14: 207–222.

Tweedie D, Wild D, Rhodes C, et al. (2019) How does performance management affect workers? Beyond human resource management and its critique. *International Journal of Management Reviews* 21: 76–96.

Webster J and Watson RT (2002) Analyzing the past to prepare for the future: Writing a literature review. *MIS Quarterly* 26: Xiii–xxiii.

Westgate MJ (2018) Revtools: Bibliographic data visualization for evidence synthesis in R. *bioRxiv*. Available at: https://www.biorxiv.org/content/10.1101/262881v1

Westgate MJ, Barton PS, Pierson JC, et al. (2015) Text analysis tools for identification of emerging topics and research gaps in conservation science. *Conservation Biology* 29: 1606–1614.