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Systematic Reviews in Business and Management: Are Business Librarians Ready?

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In recent years, there has been a trending need for library support in systematic reviews beyond the health science and medical disciplines. Splenda (2020) at Carnegie Mellon University documented the library's first collaboration with Campbell Collaboration to extend the systematic review support to the business and management field. But how ready are business librarians in supporting systematic reviews? In this article, I would like to share my recent thinking about this topic and discuss how to get us prepared for this emerging role.

Librarians' Role in Systematic Reviews: What is Expected?

Drawing upon the experiences in supporting systematic reviews in the medical field, a team of seven informationists developed a *Systematic Review Competencies Framework* and identified a set of six competencies for librarians involved in systematic reviews, which include systematic review foundations, process management and communication, research methodologies (systematic review standards and best practices), comprehensive searching, data management, and reporting (Townsend et al., 2017). Comparatively, the *Searching for Studies: A Guide to Information Retrieval for Campbell Systematic Reviews* (the "Campbell Guide") stressed the role of librarians in comprehensive searching and explicitly described the needs for the librarians' assistance in two mandatory areas of literature search, which is in line with the Methodological Expectations of Campbell Collaboration Intervention Reviews (MECCIR) Conduct Standards (Kugley et al., 2016; Methods Group of the Campbell Collaboration, 2019):

- A. Ensure that **all** relevant databases have been properly searched, and searches for studies should be as extensive as possible.

The importance of the extensiveness of a literature search in a systematic review is self-evident. The Campbell Guide made a perfect analogy by comparing the information retrieval process in the systematic review to the data collection phase of a primary research study: "[It] requires the expertise of an information specialist or a librarian... A thorough and unbiased compilation of all potentially relevant studies is one of the key characteristics of a systematic review and if the literature located is unrepresentative of the population of completed studies, the remainder of the review process will be compromised" (Kugley et al., 2016, p. 8).

Making sure "all relevant databases have been properly searched" and that "searches for studies [be] as extensive as possible to reduce the risk of publication bias and to identify as much relevant evidence as possible" is a mandatory literature search conduct standard (Methods Group of the Campbell Collaboration, 2019, p. 8). The academic librarians are expected to advise researchers on:

- a) all relevant databases to use;

- b) sources for grey literature (such as reports/dissertations/theses databases and databases of conference abstracts);
 - c) potential duplications of sources;
 - d) copyright issues related to downloading and using the databases or sources (Kugley et al., 2016; Methods Group of the Campbell Collaboration, 2019).
- B. Ensure that the search strategy is appropriate, adequate, justified, and reproducible.

An effective search strategy is necessary to ensure the retrieval of all relevant studies. Academic librarians are expected to assist researchers to:

- a) structure the search strategies around the main concepts, maximizing recall with a reasonable precision during database search, and ensure the correct use of search operators (AND, OR, NOT, etc.);
- b) develop a system of free-text terms (considering, for example, spelling variants, synonyms, acronyms, truncation, and proximity operators);
- c) offer a customized search strategy for each specific database and advanced search techniques with a thorough understanding of how the controlled vocabularies, commands, operators, expanders, limiters, and availability of search fields in a specific database works;
- d) justify the restrictions of the search strategy;
- e) document the search process “in enough detail throughout the process to ensure that it can be reported correctly in the review, to the extent that all the searches of all the databases are reproducible” (Methods Group of the Campbell Collaboration, 2019, p. 11).

Besides these mandatory conduct standards, the strategies for updating the searches for relevant databases are considered highly desirable. It is suggested that “the published review should be as up to date as possible. After the rerun of the search, the decision whether to incorporate any new studies fully into the review will need to be balanced against the delay in publication” (Methods Group of the Campbell Collaboration, 2019, p. 12).

Challenges for Systematic Reviews in Business and Management

Are business librarians ready to meet these expectations and take on the tasks of advising on all relevant databases and search strategies? Compared to the systematic reviews in health science and other science fields, systematic reviews in the business and management field face greater challenges. The most significant challenge is that the studies in business and management areas are often narrative and qualitative by their nature and have a higher level of subjectivity associated with the synthesis process. Researchers often do not accept a tight protocol, because it may inhibit the researchers’ capacity to explore, discover and develop ideas (Tranfield et al., 2003). Business and management studies are often multidisciplinary with many intersections with economics, psychology, sociology, education, public administration, and even more diverse considering the content that is in industry-related segments such as healthcare, hospitality, manufacturing, retail, and entertainment. This situation poses challenges to identify relevant databases and, in many cases, searches across a wide range of databases become necessary. The subject headings, thesaurus system, and so-called controlled vocabularies are much less controlled in the business and management field. Reproducibility is a high standard to achieve

considering the non-transparent search algorithm and constantly changing content in business databases. Besides, most business librarians do not have a whole team to rely on and get support for systematic reviews. The reality is that access to business databases is greatly constrained by institutional subscriptions. Not all libraries can afford to subscribe to Business Source Ultimate, although a greater number of libraries have access to Business Source Complete (BSC), for example. In facing these challenges, more fundamental work needs to be done to build an infrastructure and supportive network to get business librarians more prepared for systematic reviews.

How to Get Business Librarians Ready?

To meet the challenges of systematic reviews in business and management areas and get us ready for supporting systematic review requests, the following works can be done to build the infrastructure and the supportive network:

A. Conducting Journal-level Business Knowledge Mapping in Databases to Understand Where to Search

Utilizing high-impact journal rankings to identify the core databases for business systematic reviews. Journal rankings such as Journal Impact Factor, CiteScore, SCImago Journal Rank provide a list of high-impact journals in business, management, finance, accounting, and economics subject areas. These journal titles can be used to identify the essential/core databases to use for business systematic reviews. Business Source Ultimate, Business Source Complete, and ABI/INFORM are considered comprehensive databases for business literature search. But how representative or how extensive these databases are for systematic reviews would still be a mystery until we can have a journal-level understanding of the database coverage. We cannot assume that the databases purported to be comprehensive are indeed comprehensive, especially for the coverage of full-text. For example, my early review of ProQuest Business Premium Collection (ABI/INFORM) in 2018 compared its journal titles with the 1st quartile (400 titles) of CiteScore titles under the management, business, and accounting categories and found about 80% of the titles' abstracts were included in ABI/INFORM. However, between 2000 and 2018, only 21% of the top 100 CiteScore journals and 33% of the top 400 CiteScore journals were covered by ABI/INFORM in full-text (Liu, 2018).

Identifying the gaps of the core databases for high-impact journal coverage. This gap is often more apparent for the most recent content due to the embargo period or the logistics to include the full-text or index into an aggregated database. In this case, publisher databases such as Emerald Insight, ScienceDirect, Wiley Online Library, Taylor & Francis Online, or publisher websites need to be included for business systematic reviews. For example, the Manufacturing & Service Operations Management is a 1st quartile journal under SJR ranking and No. 6 under strategy and management subcategory with the impact factor of 4.281. The full-text coverage of this journal in BSC delays 60 months. The index in BSC shows current, but the articles in the most recent issue included in the BSC were published a year ago online. From the publisher's (INFORMS: Institute for Operations Research and the Management Sciences) website, over 100 newly published articles listed under the "Articles in Advance" tab are not available in BSC (INFORMS, 2021).

Developing a multidisciplinary database search approach. Facing certain multidisciplinary business research topics, librarians need to develop an approach to extend the searches to other disciplines, which can include the combination of a) consulting subject experts; b) using subject-specific databases in other disciplines; c) using a multidisciplinary database such as Academic Search Ultimate; d) using publisher aggregated search interface such as EBSCO Host; e) using federated search tools, such as Google Scholar.

Extending the journal-level knowledge mapping beyond the high-impact journals. This is a more challenging task while it can potentially be done by reverse-mapping of the journal coverage of core databases and identifying the gaps with reference to journal directories with broader coverage, such as Directory of Open Access Journals and Ulrich Periodicals Directory. In this process, it is important to be aware of the low-quality journals, predatory journals, and journals with a high volume of retracted papers.

Curating an extensive list of sources for grey literature. The grey literature includes conference proceedings, government documents, unpublished research reports, white papers, working papers, internal documentation, theses and dissertations, presentations, etc. Splenda (2020) mentioned the following grey literature sources: “National Bureau of Economic Research (NBER) Working Papers, Bureau of Economic Analysis, Board of Governors – Federal Reserve, Federal Reserve Economic Data, American Economic Association Papers & Proceedings, Social Sciences Research Network (SSRN), Research Papers in Economics (RePEc), and The Conference Board” (p.3). Google Scholar is recognized as an effective tool for discovering grey literature, but researchers also found its gap and suggested it should not be used standalone for finding grey literature (Haddaway et al., 2015).

Including Google Scholar and the other federated search solutions in the systematic reviews. A recent informetric study investigated over 3 million sample citations of highly-cited documents and discovered that “Google Scholar found 88% of all citations, many of which were not found by the other sources, and [Google Scholar found] nearly all citations found by the remaining sources (89–94%). A similar pattern held within most subject categories” (Martín-Martín et al., 2021, p. 871). In the Business, Economics, and Management subject category (with the total citation of 235,338), Google Scholar found 88% of these citations as compared to Microsoft Academic (47%), Scopus (34%), Dimensions (32%), Web of Science (29%) and OpenCitations’ COCI (19%) (Martín-Martín et al., 2021, p. 885). My test searches with the Manufacturing & Service Operations Management showed that Google Scholar was able to retrieve the most recent published online articles from the publisher’s website, which were not included in BSC. Google Scholar seeks wide access to sensible web content, and its typical update frequency is several times a week (Google Scholar, n.d.), so it might be a more effective tool than library databases to find more recent article indexes. Researchers need to carefully consider including Google Scholar as a safety net to fill the gap of subscribed databases.

Incorporating other sources, research tools, and techniques. The Campbell Guide is explicit about using hand-searching, citation tracking, web searching, literature in other languages, personal contact to extend the database search and minimize bias during the information retrieval phase. Although book chapters are mentioned in the database searches, the Campbell Guide is not explicit about using library catalogs or incorporating print books or ebooks to complement the literature search. Researchers may need to make their judgment call and make justifications when books or book chapters are excluded from their literature search.

B. Experimenting with Database Search Engines and Different Search Options to Understand How to Search

Understanding how to transform the research questions to key concepts and develop an open system of key search terms and phrases. The iterative nature of literature searches indicates that the search terms must be an open and flexible system that allows growing and a shift of focus if necessary. The traditional approaches of constructing one query to find all may need to be examined for its effectiveness in discovering all related literature. It is also necessary to understand how search terms work with the thesaurus systems and applied expanders (i.e. equivalent subject or related words in BSC) in databases. We also need to be aware of the institutional default setup for expanders and limiters in databases and make sure its exclusion or inclusion is well-documented to ensure the reproducibility of the search.

Developing customized and advanced search techniques for an individual database. Expert search techniques are one of the core skills of librarians. This requires a thorough understanding of how the controlled vocabularies, commands, operators, expanders, limiters, and availability of search fields in each database works. Without an in-depth understanding of how a search engine works, the extensiveness of the search can be comprised. However, understanding how a search engine works is not an easy task, including the search engines in library databases. Sometimes, we need to go beyond the information available from the search “Help” page and do our own experiments to understand the why behind the results. For example, when searching BSC, what is the difference between searching [tourism industry], [tourism AND industry], [Tour* AND Industry], and [“tourism industry”]. You may find that truncation search [Tour*] ends up with fewer results than not using a truncation because EBSCO search engines apply a generic default thesaurus to searches and it doesn’t work together with truncation searches (EBSCO, 2018a). Test searches can be run like [tourism AND industry] NOT [tourism industry] to understand the gap between searching the two phrases. The searchers may find that EBSCO phrase search [tourism industry] has applied a default proximity search N5 but can be customized by the institution's administrators (EBSCO, 2018b). In the case that databases allow customization, it is critical to document the default institutional setup to ensure the search is reproducible. The constant changes in the search functionalities in databases also require librarians to not solely rely on their previous search knowledge (EBSCO, 2018a). They need to be aware of the potential changes and keep themselves up-to-date about these changes in functionalities.

Experimenting searches with Google Scholar and other federated search tools. The lack of transparency in search algorithms of federated search engines and the changing dynamics of the content makes the reproducibility of the searches less possible. Some hidden rules can hardly be discovered without an intentional experiment. For example, the Advanced Google Scholar search offers two options for where the words occur: “anywhere in the article” or “anywhere in the title of the article”. The “anywhere in the article” search works with Boolean operator symbols “OR” and “-”, but does not work with AND NOT (Lin et al., 2020). It uses automatic stemming and does not recognize truncation symbols and does not allow the use of parentheses to group words (Booleanstrings, 2018). However, the “anywhere in the title of the article” search does not recognize Boolean search operators at all. It considers AND, OR, NOT as a search term. The search is also verbatim and does not have automatic stemming, even for plural forms. For example, for allintitle search, you will find different search results for the following search terms:

Google Scholar Search Term *The search is conducted on 4/21/2021.	Number of results including citation without duplication
allintitle: tourism industry innovation	256
allintitle: tourism industries innovation	34
allintitle: tourism industry innovations	48
allintitle: tourism industrial innovation	31
allintitle: tourism industry innovative	128
allintitle: tour industry innovation	4
allintitle: tour industry innovations	1
allintitle: tourist industry innovation	27
allintitle: tourist industry innovations	2
allintitle: tourist industry innovative	23

This means that we probably have not used the Google Scholar allintitle search to its full potential which can yield a considerable number of relevant articles with combined search results and is much less overwhelming than regular Google Scholar “anywhere in the article” search.

Developing strategies for updating searches. The search update is highly desirable due to the often long publication cycles. Most of the research tools provide a function that allows users to set up an alert for specific search terms. However, more comprehensive approaches need to be developed to coordinate the search updates with different databases and search tools and to tackle instances such as a Google Scholar title search where the search cannot be done with a single constructed search query.

Monitoring the development of bibliographic data sources and federated search engines. Elsevier’s Scopus and Clarivate Analytics’ Web of Science are the most influential bibliographic research tools but they are very selective in their content coverage (Visser et al., 2021). An increasing number of free bibliographic record sources beyond Google Scholar are available,

such as Dimensions (<https://app.dimensions.ai/discover/publication>), Microsoft Academic (<https://academic.microsoft.com/home>), Crossref (<https://search.crossref.org/>), Semantic Scholar (<https://www.semanticscholar.org/>), and JURN (<http://www.jurn.org>). Each of these research tools has its distinctive features and advantages in assisting subject-related scholarly research. More efforts are needed to follow up with the development of the AI-powered search tools and understand how to incorporate them into the systematic review process.

C. Promoting a More Disciplined Approach for a Literature Search and Systematic Review

Systematic review often follows a highly structured and disciplined approach. The systematic review standards and guidelines provide granular level guidance to ensure the systematic review is extensive, transparent, and reproducible. Researchers who have not developed a structured or disciplined approach for their literature search would find the systematic review standard very challenging. Some researchers intend to use a systematic review or meta-analysis research design, but their practices of literature searches fall short of the high standard of systematic reviews. Also, due to various reasons, researchers may be reluctant to seek external search advice for their systematic reviews. In these situations, helping researchers develop a more disciplined approach for a literature search and even techniques to improve the productivity of a regular literature review may be helpful, for example, suggesting researchers use a search log to keep track of their searches, use a synthesis matrix to organize research findings, use a critical appraisal checklist to evaluate scholarly articles, follow systematic review protocols if needed, use citation management software, etc. Such efforts will scaffold researchers' self-efficacy and help them build their confidence in conducting a comprehensive literature search and systematic review on their own. As an example of this type of effort, this is an [infographic guide](#) that I recently created for students in the doctoral public administration program who need to conduct comprehensive literature reviews for their dissertations.

D. More Collaborations

The essential work that I discussed above can hardly be done by a single librarian, while any small effort from any one of us would add up to build the infrastructure that one day can benefit us all. The PRESS (Peer Review of Electronic Search Strategies) for systematic reviews is an example of how collaborative effort can make a difference. The further development of evidence-based guidelines for a systematic review in business and management areas requires extensive collaboration among researchers, academic business librarians, and information specialists. Eventually, I am hopeful that the real sense of systematic reviews that breaks down the barriers of institutional subscriptions can be achieved one day with more cross-institutional collaborations and collaboration with information providers.

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