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Review

A "Metasurvey" analysis in Operations Research and Management Science: A survey of literature reviews

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ABSTRACT

This manuscript provides a survey of 343 literature reviews of the last 15 years (2000 through 2014) in Operations Research and Management Science. It provides information on journals that are publishing literature reviews, volume trends, geographic sources of literature reviews, and citation analysis for the surveys. It further provides an analysis of topical coverage and relationships between areas of research. Finally, it suggests subject areas that may be ripe for more extensive survey coverage.

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1. Introduction

Literature reviews (or surveys) play an important role in the Operations Research/Management Science (OR/MS) literature. They serve a useful purpose for researchers and students to stay abreast and up-to-date in broad subject areas without delving deeply into specific technical details or methodological advances. They can add value by providing new perspectives and taxonomies of the literature for experienced researchers, and valuable introductions and sources of reference and tutorials for novices. Further, they identify under-researched areas within specific areas of research that can create avenues to new areas of research. As such, they provide valuable structure and updates to the constantly changing field of OR/MS.

This manuscript sets out to describe the coverage provided by a sample of 343 literature reviews over the last 15 years (2000–2014) as a way to characterize OR/MS literature, evaluate the coverage of such reviews, and potential over-coverage or gaps in that coverage. Such coverage provides a mosaic of these articles which, as a collection, would provide valuable insight into the shifting landscape of the OR/MS literature to a wide spectrum of researchers. Editors will benefit from the visualization of the coverage of literature reviews in OR/MS and where more or less coverage is in need. Experienced researchers can develop a sense of how their fields of expertise are (under) represented. Novice researchers can begin to understand how the OR/MS field is structured and interrelated, and perhaps see gaps in the structure that they can seek to fill.

The sample of surveys covered in this manuscript reveal broad and disparate coverage of the growing field of OR/MS, with a heavy concentration, and perhaps a disproportionate one, in just a few

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fields of research. Some burgeoning areas of OR/MS research may be underrepresented.

2. Literature review

Survey research has grown in volume over the last 15 years (as will be shown later in this manuscript). There could be a number of reasons for this growth. First, some existing journals have shown increased willingness to publish surveys. (As a testament to the importance of such literature reviews, this journal, *Surveys in Operations Research and Management Science* was created in 2011, in part as a result of this trend.) It could be that well written survey articles have a tendency to be widely cited; a researcher who wants to provide a solid and broad reference to an area of research can cite a recent survey that gives ample introduction, breadth of coverage, and background. Second, the field of OR/MS has generally grown in scope as new methods have been introduced to the field. For example, the broader (or at least slightly different, yet closely related) field of analytics has grown in popularity [1]. Topics such as machine learning, text analytics, soft or behavioral OR/MS, and empirical and statistical methods, among others, are more commonly appearing in the OR/MS literature as the field grows and evolves. New areas of research are developed and accepted (at least tangentially) under the OR/MS umbrella, so does the need for surveys and tutorials describing the methods and pointing to the best sources for recent coverage of these approaches. Third, in general, more is being published in the field of OR/MS, so it is hardly surprising that surveys have grown with the rising tide of OR/MS literature, which provides a broader and deeper research fodder from which to develop surveys.

It is important to understand what is being covered in these surveys and to evaluate coverage needs in the literature. Until 2007, a series of coordinated literature reviews known as *Handbook of Operations Research* was printed with concentration areas in topics such as transportation, discrete optimization, and the like (See, for examples, [2,3]). This series has been discontinued to allow for more frequent and timely releases of surveys (with a more standard journal format in *Surveys in Operations Research and Management Science* taking its place), so the remaining sources for literature reviews are journal articles rather than organized handbooks. This format has the potential advantage of being timelier, on narrower topics, and more specialized, but are less coordinated, as individual authors typically choose topics and rarely, if ever coordinate coverage. Even prior to the termination of the *Handbook* series, there were a large number of surveys in journals that had no coordinated topical coverage. There are examples of special journal issues containing solely literature reviews, but the topics are not organized or coordinated in any way (such as Bouyssou, Martello and Plastria [4], and Waller [5]). In short, similar to primary research in OR/MS, survey research is a function of author and editor interest in a topic, with no coordination, and little assurance of consistent, nonduplicative or complete coverage.

Thus, there is a growing need to take account of what literature is being reviewed. However, to the author's knowledge, very little, if any, research has been conducted which evaluates the coverage and linkages of these surveys. Only one article, [6], conducts a review of literature reviews in the supply chain management (SCM) literature reviews from 1989 to 2012. The article is limited to SCM and logistics journals, and focuses on the linkages between supply chain collaboration and supply chain performance. To the author's knowledge, there are no other surveys of literature reviews.

The objective here is to canvas the OR/MS (and closely related) literature to evaluate what research areas are being covered by literature reviews, and how the topics are related. By extension, this research will also help to identify which areas of research are active, but are not being covered in a literature review format.

3. Methodology

Google Scholar was used as the method of search for literature review articles. Any article with "literature review" or "survey" in the title or keywords from a journal that is generally recognized as an OR/MS journal was included. The set of journals was limited to those found in OR/MS journal quality study by Gorman and Kanet [7], which covered journals that previous OR/MS journal quality articles had covered, thus the list is considered journals that are generally considered OR/MS journals. Articles were reviewed to ensure that they were, in fact, a literature review. For example, in some cases, "survey" resulted in finding empirical articles which included surveys of organizations, and these were excluded.

Clearly, not all surveys will be captured with this search; capturing all surveys is not feasible. Some examples I found of missed articles were in the special issues in *Annals of Operations Research* issue described in [4] and *International Journal of Logistics Management* described in [5] which contain exclusively survey articles, many of which do not contain those search terms. However, for expediency and consistency of method, the search was limited to those articles described as surveys or reviews in the title or keywords. This approach will not capture the population of survey articles, but will return a random sample with a clear and simple search criteria from which to base the analysis. There is no reason to think that any article types or journals will be systematically omitted. Though we cannot assure of no bias, the large sample and large cross section of journals helps to mitigate that risk.

3.1. Article Count by Year

The time horizon is from the years 2000 to 2014, or the most recent 15 years of data. The time frame was chosen to get a reasonable time frame to discuss trends, but recent enough to capture recent surveys. Somewhat arbitrarily, the cutoff year of 2000 was chosen to capture a full 15 years of data and surveys solely from this century. Fig. 1 shows that there is a strong upward trend in the number of literature reviews each year. The trend is strong and pronounced; the last three years in the sample average four times the number of survey articles than the first three years in the sample. This upward trend could be a function of Google Scholar's coverage, which may be more complete in more recent years. It could also be a function of higher publication rates in general over time as new journals have come into existence over the time period; it cannot be claimed that surveys constitute a greater portion of the total literature. However, it is unlikely that there are approximately four times as many articles being produced now than 15 years ago (especially among this set of journals), yet the frequency of surveys as nearly quadrupled. However, because the trend is so strong, it is very likely that literature reviews have grown in relative frequency over the last 15 years.

3.2. Article Count by Journal

Table 1 reports the frequencies of articles by journal. Journals with only one review article over the time frame are summarized into "other" for brevity.[1] (Abbreviations used in this article for

[1] "Other Journals" include: International Journal of Operations Research, Journal of Supply Chain and Operations Management, California Journal of Operations Management, Logistics Research, Project Management Journal, Mathematical and Computer Modeling, Journal of Purchasing and Supply Management, International Journal of Logistics Research and Applications, International Journal of Logistics Research and Applications, International Journal of Operations and Logistics Management, Transportation Research Part F, and Journal of Production Economics.

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