Systematic Review and Evidence Synthesis as a Practice and Scholarship Tool

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Abstract

Reviews of existing research evidence have the potential to inform both practice and scholarship. This opportunity is currently not being fully realized in management and organization studies due to the limitations of traditional methods of review, which fail to identify clearly what is known and not known about a given topic. For practitioners, systematic review can help address managerial problems by producing a reliable knowledge base through accumulating findings from a range of studies. For scholars, systematic review can enhance methodological rigour as well as highlight opportunities for further research. Systematic reviews are guided by a set of principles rather than a specific, inflexible and restricted protocol. By revealing these principles, outlining a systematic review methodology and offering examples we hope that this chapter helps both practitioners and scholars to use systematic review to inform their practice.

How do experts know what they know? And what they don't know? Academics and practitioners claim to possess expertise which informs the opinions they offer and the decisions they make. But what is the basis for this expertise? One of the cornerstones and a pre-requisite of EBMgt is that it draws on systematic reviews of existing knowledge and evidence to inform decisions about research or practice. A systematic review addresses a specific question, utilizes explicit and transparent methods to perform a thorough literature search and critical appraisal of individual studies, and draws conclusions about what we currently know and do not know about a given question or topic. Systematic simply means that reviewers follow an appropriate (but not standardized or rigid) design and that they communicate what they have done. In essence, conducting systematic reviews means applying the same level of rigor to the process of reviewing literature that we would apply to any well-conducted and clearly-reported primary research.

This apparently simple, straightforward and even "common-sense" approach is widely-used in many fields such as medicine, healthcare, social policy and education but is rarely used in management and organization studies. Without conducting a systematic review how do you know that the evidence that you are using to inform your research or practice is reasonable? What degree of certainty can you claim about your contribution, intervention or decision? Could other evidence exist that refutes your current thinking or offer an entirely new insight or perspective?

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In this chapter we explain how systematic review can be used as a key tool for advancing scholarship in management and organization studies and improving the practice of management. In what follows, we explain how poor quality reviews and syntheses can hinder scholarship and practice. We then consider current approaches to literature review in management. We next define and describe systematic reviews and their uses. We provide an overview and introduction to the processes involved in conducting a systematic review and research synthesis. We conclude by discussing how the findings of systematic reviews can be used to inform practice and scholarship and identify the prospects for systematic reviews in management. At the end of the chapter we provide details about available resources and information useful for conducting systematic reviews.

Why Academics and Practitioners Need Systematic Reviews and Evidence Syntheses

The overall intent of management and organization studies is simultaneously to advance knowledge and to give insights into the practice of management. Currently both of these aims are being hindered by the inability of the field to effectively accumulate evidence across a body of previous research. The idea that research is formed on the basis of and by extending existing knowledge is well-expressed in Isaac Newton's statement -- "If I have seen a little further it is by standing on the shoulders of Giants" -- even though the Giant metaphor over-personifies knowledge. Given the importance placed on building on prior research by developing a deep understanding of the existing state of knowledge it

is somewhat surprising that management academics seem more preoccupied with identifying new research questions than consolidating knowledge around a defined and agreed agenda. The emphasis on empirical contributions rather than reviews and syntheses has resulted in a voluminous, fragmented and contested field.

Research methods courses and textbooks focus almost exclusively on techniques for conducting primary research (collecting and analyzing new data) rather than secondary research (researching existing research). Few management researchers are trained in how to review literature. The result is primary research that is often informed by partial, haphazard and opinion-driven syntheses of previous research findings.

Within business schools the rigorous research that academics publish in high quality journals is seldom used in management education. Programs such as the MBA, rarely train students in how to scrutinize literature around practice questions or how to keep abreast of emerging research once out of school. This is in sharp contrast to other domains, such as medicine, law and engineering, in which developing such skills forms the basis for exercising and sustaining professional judgement and expertise. In business and management, practitioners rarely access and use academic research. Instead they are more likely informed by the "lessons learned," "best practices," "cutting edge practices" and "world class techniques" gleaned from single case studies frequently offered by consultancies, popular journals and management books of apparently successful

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organizations. However, implementation of these recipes often produces outcomes that are unanticipated and potentially suboptimal.

As a consequence of the above many academics and practitioners have a relatively patchy understanding of the current state of the body knowledge relating to any given topic. Despite this, academics and practitioners often make quite broad and confident statements such as "previous research has shown that team building improves performance" or it has been demonstrated that management development is effective. Similarly, the existence of a relationship between two phenomena, such as "networking leads to increased innovation," is often stated as fact and then simply followed by a bracketed list of half a dozen or so citations to earlier studies or reference to admired and thriving organizations. For scholars and practitioners, statements like these should raise important and challenging questions such as: Did *all* previous research show this? What proportion of previous research? How many studies? How strongly or clearly or consistently was this shown? Were the study designs such that the conclusions reached could be justified? What did the authors do to avoid the biases of pre-existing beliefs? We do not believe that the current approaches to reviewing literature in management and organization studies effectively address such questions.

Current Approaches to Reviewing Management Knowledge

Literature reviews are found mainly in five main contexts: Introductions to papers reporting empirical studies; papers, chapters or books whose principal aim is to review literature; meta-analyses; textbooks for students; and trade and management practice books for practitioners. The literature review practices in each of these contexts will be considered in turn.

<u>Literature Reviews Motivating Empirical Studies</u>

Most literature reviews are short summaries at the beginning of empirical journal articles. Their main purpose is to build a case for why the research reported in the article is interesting, important and fills gaps in knowledge. As the aim of these reviews is to build an argument some cherry picking: published research that supports the rationale for the study is included but research that does not is omitted. Given space limitations in journal articles, these reviews rarely provide an in-depth, comprehensive, balanced or detailed account of previous research. They rarely tell the reader how the review was conducted or how the authors arrived at their conclusions. Although peer-review process is intended to screen out erroneous conclusions, the wide acceptability of unsystematic reviews suggests that management researchers take a fairly relaxed or ad hoc approach to building on previous research.

<u>Formal Full-Length Literature Reviews by Academics</u>

The purpose of full-length reviews is to provide an analysis and summary of existing literature on a particular topic. These are published in a range of outlets including specialist review journals (e.g. *International Journal of Management*

Reviews, *Psychological Bulletin*) or regular review issues of journals (e.g. *Journal of Management*), annual series (e.g. *International Review of Industrial and Organizational Psychology*, *Annual Review of Psychology*) and book chapters. These often take the form of either an argument/thematic review or an expert review (Gough, 2007). Argument/thematic reviews explore and usually support a particular argument or theme and rarely claim to use explicit rigorous methods. An expert review is informed by the skill and experience of the reviewer in that particular field but has no clear method so open to hidden bias. Most reviews in management are of the argument/thematic or expert type, for example in the majority of *Academy of Management Review* articles the methods of review are rarely discussed or considered. Some literature reviews in management and organization studies claim to be systematic but do not follow any particular methods, whereas others may use rigorous methods but these are not stated or explicitly discussed (see Gough, 2007 for a discussion of different review types).

Meta Analyses

Meta-analysis is a technique used to quantitatively combine the data from comparable individual studies that address the same topic in order to reach some general conclusions. In a meta-analysis research studies are collected, data from each individual study is coded and interpreted using statistical methods similar to those used in primary data analysis. Meta-analyses can demonstrate that effects occur even if the individual studies that were included in the review lacked the power to show such effects (Ohlsson, 1994). The aim is to produce results that are generalizable and can be used to make reasonable predictions of future events.

While meta-analysis can be considered to be a form of systematic review it is not being discussed in detail in this chapter mainly because it is a specific technique and considerable guidance is available elsewhere (e.g. Hunter & Schmidt, 2004; Geyskens, Krishnan, Steenkamp & Cunha, 2009).

<u>Reviews in Current Textbooks</u>

A fourth category of publications that reviews literature and previous research is textbooks aimed at the mass education market. Given the purposes of textbooks, their audience and the very limited space available to discuss a large number of topics it is inevitable that they tend to choose pieces of research that the author believes best exemplify an area of research. There are no criteria for textbook quality or adequacy. In some fields, certification bodies authorize books. However, in the management field, literature cited in texts can be from newspapers and magazines or from scholarly works combined with business articles. In general instructors choose which text to adopt perhaps more on the basis of whether or not they will appeal to students than the quality of referencing.

Research findings are inevitably presented in an over-simplified way in order to present a clear and coherent narrative about how research has developed and what has been found emphasizing the linear development and progress of knowledge and the importance of a few key individuals in the style of the "Great Man" theory of history.

<u>Reviews in Popular Management Books</u>

Popular management practice books vary considerably but most aim to provide practical advice or insights to managers and other practitioners. Although reviews

of literature or the exploration of previous research findings are not usually central aspects of such books they do nonetheless draw on published research or unpublished research from case studies or testimonials that support the use of the particular ideas or approaches the book promotes. These and similar popular books rarely claim to offer a comprehensive or balanced review of the literature. Again extensive cherry picking of research is the norm in order to support the books' claims. Unlike academic papers, there is no peer-review process to help identify any misrepresentation or inaccurate conclusions.

Popular management books advise practitioners to take up new, "leading-edge" or "cutting-edge" management techniques. However, by definition these techniques are not well-established enough to have been well-researched. For example, in 1982, Tom Peters and Robert Waterman published *In Search of Excellence* claiming that there were eight keys to excellence that were shared by the 43 firms in their study. The book quickly became one of the most quoted management books and seemed to provide a blueprint for effective performance in a competitive market. However, critics have questioned the way Peters and Waterman conducted their research and the validity of their findings. For example, Hitt and Ireland (1987) re-examined the performance of Peters and Waterman's excellent firms by comparing them with a general sample of Fortune 1,000 firms. They discovered that only three of these excellent firms performed better than the average Fortune 1,000 firms and several excellent firms did not exhibit the keys to excellence to a greater extent than other firms in the Fortune 1,000 sample. Without systematic reviews of research evidence there is a danger

that managers searching for 'quick fixes' to complex problems may turn to popular books that seldom provide a comprehensive and critical understanding of what works, in which circumstances, for whom and why.

What are Systematic Reviews and Research Syntheses?

Systematic reviews have become an essential tool of evidence-based practice. They:

> "...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 reviewers' decisions, procedures and conclusions." (Tranfield, Denyer, & Smart, 2003)

> The benefits of this approach to reviewing are that it is "systematic and replicable, giving confidence to the users it informs regarding the status of present knowledge on a given question" (Rousseau, Manning, & Denyer, 2008, p. 500). However, it is important to note that:

> "systematic reviews never provide 'answers'. What they do is report as accurately as possible what is known and not known about the questions addressed in the review" (Briner, Denyer, & Rousseau, 2009, p. 27).

> Systematic review involves five key steps: planning the review, locating studies, appraising contributions, analysing and synthesizing information and reporting "best evidence." They also adhere to a set of core principles:

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- Systematic/organized**:** Systematic reviews are conducted according to a system or method which is designed in relation to and specifically to address the question the review is setting out to answer.

- Transparent/explicit: The method used in the review is explicitly stated.

- Replicable/updatable: As with many forms of primary research, the method and the way it is reported should be sufficiently detailed and clear such that other researchers can repeat the review, repeat it with modifications or update it.

- Synthesize/summarize: Systematic reviews pull together in a structured and organized way the results of the review in order to summarize the evidence relating to the review question.

It is important to note that systematic reviews are therefore different from the vast majority of literature reviews that currently exist and are undertaken in management research.

What do Systematic Reviews do?

Systematic reviews allow us to draw conclusions, though of course with varying levels of certainty, consistency and confidence about what is known and not known about the answer to the review question. One important difference between systematic and the traditional forms of literature review described above is that such limitations are acknowledged and, as the review method it is made explicit it can be seen and critically evaluated. "Being specific about what we

know and how we know it requires us to become clearer about the nature of the evaluative judgments we are making about the questions that we are asking, the evidence we select, and the manner in which we appraise and use it" (Gough, 2007, p.214).

Although the conclusions of systematic reviews do vary, it is not uncommon for reviews to find that there actually is far less evidence on a given topic than assumed and that it is in turn more inconsistent and less robust than widely believed. People, including researchers, tend to form strong beliefs even though information may be ambiguous and limited. One good example is a meta-analysis (De Dreu & Weingart, 2003) which showed that the relationship between task conflict, team performance and team satisfaction was largely negative even though both academic papers and textbooks regularly report that task conflict has a generally positive effect.

For a range of reasons, both individual researchers and research communities tend to emphasize their knowledge rather than their ignorance, their certainty rather than their doubt and their ability to find something rather than find nothing. However, finding an absence of evidence (what we do not yet know) is equally as important as finding "evidence" (what we currently know) though social science in particular does not usually recognize this (Collins, 2003). This leads to the cherry-picking approach found in some traditional literature reviews discussed earlier which produces distorted and over-confident views about the state of knowledge which then becomes widely-accepted and the "taken as givens" of a particular field. Another consequence is publication bias whereby

journals tend only to publish studies that show positive findings relevant to a given question. This in turn leads to the "file-drawer problem" in which researchers feel they cannot publish or use null or negative results from well-conducted studies so abandon such findings to their file-drawer (see Rosenthal, 1979; Geyskens et al., 2009).

In systematic reviews researchers make extensive efforts to locate all studies, including those that show negative or contradictory findings. This is achieved by comprehensively searching the grey literature (working documents, conference papers, pre-prints, statistical documents and other difficult-to-access materials that are not controlled by commercial publishers). When synthesized and taken together with these partial and positive findings systematic reviews can produce a more mixed and less clear answer to the question than had been previously assumed. It is therefore not surprising that the conclusions from systematic reviews are sometimes received with something less than enthusiasm as they often challenge established views and positions.

In spite of not providing *the* answer, particularly if one is looking for those that are clear, unambiguous and definitive, systematic reviews are very useful and potentially very important for both research and practice in a number of ways which will be discussed towards the end of the chapter.

The use of Systematic Reviews in Other Areas

Management is a relatively late adopter of systematic review methods with the first paper published discussing the use of systematic reviews in management by Tranfield et al (2003) though their use in healthcare management (Axelsson,

1998), organizational psychology (Briner, 1998), human resource management (Briner, 2000) had been mentioned a little earlier. Some of the earliest formal attempts to conduct reviews in a systematic way and synthesize evidence though small in number can be found in psychology and psychotherapy research (Petticrew & Roberts, 2006). More recently in the early 1990s the Cochrane Collaboration was formed to produce systematic reviews to support the growing interest in evidence-based medicine. A social policy equivalent, the Campbell Collaboration, was founded in 1999. Since this time, systematic reviews have been produced and discussed in a number of disciplines such as social work research (e.g. Littell, Corcoran, & Pillai, 2008), education research (e.g. Davies, 2004) and criminology (e.g. Bennett, Holloway, & Farrington, 2006). A more complete list of other fields in which evidence-based approaches and the role of systematic reviews have been discussed can be found on Pfeffer and Sutton's Evidence-Based Management (2010) website (http://www.evidence-basedmanagement.com/).

As one of the main purposes of systematic reviews is to help practitioners access research, systematic reviews are often made available in on-line databases. For example, the Cochrane Collaboration focuses on healthcare decision-making, and publishes the Cochrane Database of Systematic Reviews (2010). In 1995 the database contained 36 reviews, 1000 reviews by 2001, and by early 2010 over 4000 reviews had been published. In 2008 its impact factor placed it 14th of 100 international journals in medicine (internal and general category). Other online databases include:

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- The Campbell Collaboration (2010) whose current mission is to help people "…make well-informed decisions by preparing, maintaining and disseminating systematic reviews in education, crime and justice, and social welfare". Examples of topics covered by reviews include the impact of after-school programs on student outcomes, effects of closed circuit television surveillance on crime and the effects of correctional boot camps on offending.

- The EPPI-Centre (2010) (Evidence for Policy and Practice Information and Co-ordinating Centre) conducts and publishes systemic reviews in a range of areas such as education, health promotion, employment, social care and crime and justice. Examples of review topics include children's views about obesity and body shape, effectiveness of interventions to reduce gang-related crime and the impact of head teachers on student outcomes. The EPPI-Centre also develops tools and methods around systematic reviews and provides systematic review training.

Examples of Systematic Reviews in Management

Given the growth of evidence-based medicine, it is not surprising that researchers in healthcare management were among the first to apply the idea of evidence-based management (e.g. Kovner, Fine, & D'Aquila, 2009) and to consider how systematic reviews might be made more useful to healthcare managers (Lavis et al., 2005).

In relation to management research more generally Briner et al. (2009) provided some examples of management-relevant systematic reviews (some published and unpublished) funded by a range of organizations and government agencies. Table 1 provides further examples of systematic reviews published in management journals.

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Whilst published and unpublished systematic reviews exist in management they are few in number compared to medicine and policy-oriented areas of social science.

Conducting a Systematic Review

Although a fair amount has been written on how to conduct systematic reviews and research syntheses in medicine (e.g., Glasziou, Irwig, Bain, & Colditz, 2001; Khan, Kunz, Kleijnen, & Antes, 2003; Higgins & Green, 2008) and social science and social policy (e.g. Pawson, 2006; Petticrew & Roberts, 2006; Gough, Oliver, & Thomas (in press)) there is relatively little writing on this topic in the area of management (with the exceptions being Tranfield et al., 2003; Rousseau et al., 2008; Denyer & Tranfield, 2009).

There are fundamental and important differences between medicine and management and, as we have noted elsewhere (Briner et al., 2009), systematic review techniques cannot and should not be simply transferred directly from medical research to management research. Review methods need to be adapted to

fit the question the review is setting out to address and the underlying assumptions of the research being reviewed. Having said that, there is however broad consensus across all of these areas about the stages or steps involved in systematic review (see Table 2). In practice these stages are often not as linear as implied and, given that so much depends on the review question, the process may vary quite a lot across reviews. Some stages may, for example, be particularly difficult, prolonged or significant. Also, some stages may in practice actually involve a series of smaller and more detailed steps.

---------- Insert Table 2 about here ----------

In addition to reading the guidance provided here and elsewhere about conducting systematic reviews there are two other, perhaps more direct, ways of understanding how such reviews can be conducted. The first is to become familiar with a few systematic reviews (see above for examples) and the second is to plan or actually do one. Designing a review and thinking through in principle what would need to be done can give insight into the underlying principles and logic. Some of the key aspects of conducting a systematic review are described briefly below.

<u>Identify the Review Question</u>

As with any research, developing a precise, answerable and meaningful question is both difficult and crucial: Difficult because questions that can initially seem clear and sensible often turn out to be not clear enough and not really the right

question; crucial because a badly-formulated or otherwise inappropriate question will produce a weak review. A good systematic review is based on a well-formulated, answerable question. The question guides the review by defining which studies will be included, what the search strategy to identify the relevant primary studies should be, and which data need to be extracted from each study. Ask a poor question and you will get a poor review (Counsell, 1997, p. 381).

So how can a good review question be developed and identified? Several techniques have been suggested. First is using an advisory group of experts and users to help shape and formulate the review question. Through discussing the purposes of the review with subject area experts and potential users the review questions formulated will be both more answerable and relevant to the field and/or to practice. Using advisory groups is considered to be standard practice in contexts where systematic reviews are more common and will be discussed in more detail later.

A second way of developing the review question which may involve members of the advisory group or members of the review team itself is to test the question logically. By this we mean examining whether or not in principle the question makes sense, is specific enough, and will facilitate the development of the review method by, for example, allowing reasonably clear judgements about what sorts of data from what types of sources might answer the question.

Table 3 illustrates some of the broad initial questions that a systematic review team might start with which then will be made more specific so they can be addressed in a systematic review.

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---------- Insert Table 3 about here ----------

Taking the last question - does team-building work? - as an example, a

range of other questions need to be asked first in order to narrow it down

sufficiently to address it in a systematic review. Further questions such as:

- What is meant by "team?" And what is not included as a "team?"

- What kind of teams?

- In which particular contexts or settings?

- What is "team building?" and what is not "team building?"

- What does "work" mean?

- Why "work" compared to any other outcome?

- How does teambuilding compare to any other intervention or taking no action at all?

- What outcomes are relevant?

- What are the mechanisms, processes and theory which might account for possible effects of team building on outcomes?

- What time periods are relevant for observing any possible effects?

- What about possible negative effects or harm?

- What types of data from what sorts of designs would in principle provide good quality, medium quality and poor quality evidence?

The answers to these questions will help refine the review question, make

it more specific and answerable and also possibly break down the question into a

number of review questions. It is not uncommon to find that what initially seems to be a single review question is actually several inter-linked questions.

A third and similar means of making the review question more specific is to use a framework that helps focus the question. One used in systematic reviews in medicine (with the acronym PICO) where the review question is concerned with the effectiveness of an intervention asks the reviewer to consider: (i) The patient (P) group(s) with the condition or problem; (ii) the intervention (I), action or activity under consideration; (iii) the comparison (C) or alternative to the intervention; and, (iv) the possible outcomes (O) or effects of the intervention or activity (e.g. Higgins and Green, 2008). An example of such a PICO question might be: For children with earache, does taking antibiotics compared to not taking antibiotics reduce levels of reported pain?

A version of this framework adapted for social science is called SPICE (Booth, 2004) and considers setting (or context), perspective (of the stakeholder asking the question), the intervention or phenomenon of interest, comparison and evaluation (the way in which success is evaluated). Another social science version of this framework is that of Denyer and Tranfield (2009), drawing on Pawson's (2006) work on evidence-based practice from a realist perspective. Their CIMO framework similarly includes context (C), interventions (I) and outcomes (O) but one crucial difference is the inclusion of a consideration of the mechanisms (M) through which the intervention may affect outcomes.

Last, review questions can be made more specific and revised by actually testing them through attempting to locate and select relevant studies. If no

relevant studies are found this does not mean the question needs to be changed as, if the question is reasonable, the absence of relevant data or evidence is in itself a potentially very important review finding. Rather, what may happen through the process of trying to use the question is that, for example, it becomes apparent that the intervention has been defined too narrowly or perhaps incorrectly, or that additional outcomes need to be considered which hadn't initially been considered.

<u>Locate and Select Relevant Studies</u>

Before conducting the review and starting to search for relevant studies, a protocol based on and incorporating the review questions should be developed. A protocol is a project plan for the review and is the equivalent of the method and design used in primary research and "includes a description of and rationale for the review question, and the proposed methods, and includes details of how different types of study will be located, appraised, and synthesized" (Petticrew & Roberts, 2006, p. 44). A protocol ensures that the review is systematic, transparent and replicable -- the key features of a systematic review. Having a protocol also means the review method can be challenged, criticized, and revised or improved in future reviews.

---------- Insert Table 4 about here ----------

When the review questions and objectives become reasonably clear so too should be the types of studies which will be relevant, the criteria for including and excluding studies and where such studies are more likely to be found. When

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relevant databases and search terms have been identified a scoping study can help ensure that the search strategies are effective. Such a scoping study may show, for example, that the search strategy is picking up too many irrelevant studies, missing highly relevant ones or may not have identified all the relevant search terms.

One important question that will strongly shape the search strategy is whether or not to include unpublished data and the grey literature. As systematic reviews should ideally include *all* studies and data relevant to the review question that meets the inclusion criteria they should therefore ideally seek out as much unpublished data and grey literature as possible. Publication bias and the file-drawer problem are already well known in relation to quantitative data (e.g. Geyskens et al., 2009) and the same problem will also apply to qualitative research. Data that unequivocally support a particular theory or approach are more likely to get published than data that show mixed or no support for the theory, or even show the opposite of what was expected.

Searching electronic databases is unlikely on its own to be sufficient. Other techniques for identifying more studies include looking through the reference lists of published reviews, citation searches and contacting researchers, research groups and institutions known for conducting research relevant to the review question for unpublished or in press studies.

Next, the inclusion and exclusion criteria need to be applied to each paper and study found to determine whether or not the paper is relevant to the review. This is usually done by at least two reviewers. Mechanisms also need to be in

place to help resolve disagreements among reviewers. Typically, resolution is achieved through a process of discussion between the reviewers but if this is unsuccessful other reviewers can also become involved. Too many disagreements suggest that the reviewers need further training or that the inclusion and exclusion criteria are insufficiently clear.

Sometimes enough information is provided in the abstract to know whether or not the study meets the inclusion criteria and does not meet any of the exclusion criteria. In other cases full copies of the paper have to be obtained so that details such as the method can be checked.

At the end of this stage, all those studies deemed to be relevant to the review question will have been selected. The next stage is to examine each of these in order to reach some conclusions about the quality of each study included in the review.

Critically Appraise the Studies

A key part of systematic review is that each study is critically appraised in relation to the quality criteria devised as part of the systematic review protocol. This allows review findings to state clearly the quality levels of the studies included in the review. So, for example, a systematic review might report that of the 28 relevant studies found, four were appraised as meeting the highest quality standards, eight were found to be of moderate to good quality, while the remainder were of relatively poor quality. This means the review can be quite specific in identifying what, if any, differences might be occurring across studies that are appraised as having different quality levels. It also provides a good

overall sense of what the quality of evidence is in relation to the review question and the weight or confidence that can and should be placed on the review's findings.

When judging the quality of a study in more traditional forms of review many of us are sometimes swayed by the "brand" of the journal in which the study is published thus conflating journal properties which are believed to signal quality -- such as impact factor (a rating based on the average number of times articles published in that journal are cited), rejection rate (the percentage of articles submitted to the journal which are not accepted for publication), and whether or not the journal is recognized in some way by highly-ranked business schools with the quality of an individual study that happens to be published in that journal. We may equally be swayed by the 'brand' of the individual researcher. By applying the quality a criterion that has been designed in advance and in relation to the review question we can avoid such potential biases.

One contentious and potentially misleading idea is that the "hierarchy of evidence" used specifically in medicine to critically evaluate studies of the efficacy of interventions. This hierarchy privileges randomized controlled trials (RCTs) and suggests that all other research methods are less valuable. However, even in medicine there is growing recognition that RCTs may not be the best form of evidence for research questions that are not about the effectiveness of interventions. The field of management and organization studies is notoriously methodologically eclectic and so systematic reviews cannot be restricted to certain research designs but involve tracking down the best external evidence

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from a variety of sources with which to address the review questions. Since the issues confronted by managers are varied and multifaceted which evidence is "best" depends on its pertinence to the question being asked (Boaz & Ashby, 2003). Some questions are addressed best via quantitative evidence, some qualitative evidence, some theory or a combination of all of these sources as noted elsewhere:

> "…it is unfeasible and undesirable for management research to simply adopt the benchmark of the Cochrane model or any other field's approach toward the review process or the hierarchy of evidence. All academic fields are different. Which evidence is "best" depends entirely on its appropriateness to the question being asked…" (Briner et al., 2009, p 26).

In other words, decisions about the design of the quality criteria and the critical appraisal process, as with every other design decision, are taken to ensure that the review is fit for purpose: To answer the review question.

Many checklists and tools have been devised to help with critical appraisal of many different study types (see Petticrew & Roberts, 2006) including qualitative studies of various kinds, observational studies, interrupted time series studies and questionnaire surveys. The power of these qualitative contributions is their ability to help develop an understanding of participant experience and give insights into the nature of competing values issues. For qualitative research quality checklists might include (depending on the orientation of the researchers in relation to ideas about the nature of knowledge) questions covering issues such as (Cohen & Crabtree, 2008):

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- Research ethics

- The theoretical and practical importance of the research

- The clarity and coherence of the study report

- The extent to which methods were appropriate and rigorous

- The role of reflexivity or attending to researcher bias

- Consideration given to establishing validity or credibility

- Consideration of verification or reliability

For a questionnaire survey a quality or critical appraisal checklist would include questions covering areas such as:

- Clarity and basis of research question or hypotheses

- Appropriateness of sample selection

- Known reliability and validity of measures used and reliability and validity of measures as used in current study

- Appropriateness of design to research question

- Appropriateness of data analysis and inferences made.

For each study, one or more reviewers would answer each of the specific questions contained in the checklist thus producing an overall quality score or rating or category.

As with each aspect of the systematic review process, the method used for critically appraising the studies needs to be explained in sufficient detail such that someone from outside the review team could replicate the method. Similarly, the rationale for the choice of quality criteria needs to be clearly described so that the reader can understand why some study designs and attributes are judged to reflect

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higher study quality. For example, if the review question is one about

understanding *causes* or *processes* in relation to some phenomenon then it would

be reasonable to expect that study designs which allow for some inference of

causality or process (e.g. longitudinal) would be appraised as having higher

quality in relation to the review question than studies designs which do not allow

for inference of causality (e.g. cross-sectional). In this particular example, studies

with cross-sectional designs may have already been excluded from the review at

the previous stage as not generating findings relevant to the review question.

Analyze and Synthesize the Findings from the Studies

Once all the studies relating to the review question have been collated and

appraises, the next stage of the systematic review is analysis and synthesis. The

aim of the analysis is to examine and dissect individual studies and explore how

the components relate to one another. In contrast, synthesis is a process of putting

the findings from individual studies together "into a new or different arrangement

and developing knowledge that is not apparent from reading the individual studies

in isolation" (Denyer & Tranfield, 2009, p 685). The process usually begins with

the extraction of data from individual studies using data extraction forms, which

are tailored to the specific requirements of each review. Examples of such forms

can be found at the websites, which produce SRs such Cochrane, Campbell and

EPPI. The data extraction forms allow the reviewer to explain in descriptive

terms the nature of the field of study. For example, "who are the key authors,

how many of the core contributions are from the USA, how many are European?

What is the age profile of the articles? Can the fields be divided into epochs in

terms of volume of orientation of study? Do simple categories divide up the field? For example, can the field be divided sectorally? By gender?" (Tranfield et al., 2003, p. 218). This information, when cross tabulated and presented in the appendices of a systematic review, provides the reader with an extremely useful summary of the field.

The aim of synthesis is to bring together the "the findings on a chosen theme, the results of which should be to achieve a greater level of understanding and attain a level of conceptual or theoretical development beyond that achieved in any individual empirical study" (Campbell et al., 2003, p. 672).

There are numerous established methods of research synthesis. Dixon-Woods, Agarwall, Young, Jones and Sutton (2004) identified almost 20 approaches to research synthesis. Rousseau et al. (2008) group the multitude of syntheses into four categories aggregative, integrative, interpretation and explanation. Each of these approaches adopts different principles and methods. Aggregative methods, such as meta-analysis, quantitatively combine the findings from multiple homogeneous single studies using statistical techniques. Meta-analysis, "allows for an increase in power and thus based on a summary estimate of the effect size and its confidence interval, a certain intervention may be proved to be effective even if the individual studies lacked the power to show effectiveness" (Ohlsson, 1994, p. 27).

Integrative approaches often incorporate qualitative and quantitative studies. For example, in many systematic reviews the findings of qualitative studies are summarized and compared with the findings of the quantitative

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studies. Bayesian meta analysis goes further by combining the two data sets

(Roberts, Dixon-Woods, Fitzpatrick, Abrams, & Jones, 2002). Interpretative

synthesis involves translating and comparing the data across the studies to

develop categories and higher-level themes (Noblitt & Hare, 1988). The

explanatory approach to synthesis attempts to ascertain causal mechanisms in the

data and explain how they function. The aim is to produce a transferable theory

in the form of "what works for whom in what circumstances" (Pawson, 2006).

Although there are multiple novel and powerful approaches to synthesis,

examples of their use in the management field are limited. As such, narrative

synthesis remains the most common approach. Narrative synthesis attempts to

take a collection of studies that address different aspects of the same phenomenon

and build them into a bigger picture, map or mosaic (Hammersley, 2001) or to

"tell the story" of studies included in the review (Popay et al., 2006, p. 5) through,

for example, describing how they fit within a theoretical framework and the size

or direction of any effects found. Narrative synthesis is a flexible method that

allows the reviewer to be reflexive and critical (Hart, 1998) through their choice

of organizing narrative. However, it is often criticized because authors can

privilege certain findings or studies over others and it is feasible that two

reviewers who synthesize the same set of studies using this method of synthesis

could reach different conclusions (Rumrill & Fitzgerald, 2001).

So which approach should be adopted? As with other aspects of the

systematic review process, the approach should be fit-for-purpose, taking into

account the review question and the nature of the available evidence. Whatever

the chosen method, the approach should be made explicit and a justification given for all decisions.

Disseminate the Review Findings

As one of the main purposes of systematic reviews is to make findings from research more accessible to practitioners, the dissemination of review findings is fundamental to the purpose of conducting a systematic review -- whether those practitioners are other management researchers (in the case of a more research-focused review), managers and organizational decision makers, or both.

In medicine and other fields of practice where systematic reviews are common there are relatively well-developed systems for getting the results of systematic reviews to practitioners (e.g. websites, journals, summaries, secondary journals, continuing professional development and professional bodies) and in forms that allow the results to be fairly directly applied to practice (e.g. guidelines, checklists, protocols).

For example, The UK's National Institute of Health Research Centre for Research and Dissemination (2010) in addition to producing systematic reviews, providing training and developing systematic review methodology, also produces regularly updated databases of abstracts of systematic reviews published around the world. Its own guidance on undertaking systematic reviews (Centre for Reviews and Dissemination, 2009, p. 85) defines dissemination as "…a planned and active process that seeks to ensure that those who need to know about a piece of research get to know about it and can make sense of the findings" and recommends that a dissemination strategy be built into the review protocol.

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The dissemination of systematic reviews in healthcare is far from simple or straightforward and, even where systematic reviews produce relatively unequivocal findings these are not, for a range of reasons necessarily reflected in the practice of healthcare professionals. The dissemination of systematic review findings in management presents even greater challenges. First, management research is very broad with limited consensus about what counts as evidence (Rousseau et al., 2008) or indeed the purposes of management research or the activity of managing. Second, the sorts of decisions managers make are not usually "life or death," as they may be for healthcare practitioners, and thus the benefits of using research evidence and the costs of not using it are less salient. Third, as mentioned above, it appears that many areas of management practice are about adopting new or "cutting-edge" practices which by their nature have not been researched or evaluated. Indeed, it may be the case that practices sufficiently researched to enable a systematic review are also those very practices which are perceived by organizations as old-fashioned and unappealing even where review findings suggest they are effective. Fourth, in contrast to healthcare and other areas of practice, managers are not usually required to belong to regulated professional bodies which often prescribe the content of initial training, continuing professional development, and promote evidence-based practice among their members. One way to enhance the uptake and use of the findings of systematic reviews in management would be to teach evidence-based approaches on MBA programs in order to help develop the critical appraisal skills which might help managers find systematic review findings attractive and usable.

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A final challenge for disseminating the findings of systematic reviews is that at the present time management researchers and management practitioners have almost no exposure to such reviews. And initial exposure to systematic reviews may not be a wholly positive experience. Compared to the sometimes over-confident and air-brushed presentation of research findings in more traditional reviews, systematic review findings are more nuanced, qualified and presented in a "warts and all" fashion making them more difficult to swallow. However, this particular challenge should be overcome as more systematic reviews become available and are used in teaching, training and to help inform managerial decision-making.

Using the Resources Available for Conducting Systematic Reviews

Some examples of guidance and help have been briefly described above and at the end of the chapter are more details of how to access specific sources of support. Here, we consider some of the ways in which these resources can be used during the process of planning, conducting, and reporting the results of a systematic review.

As mentioned earlier, it is considered fairly standard practice in some fields to draw together a review advisory group. It consists of users or potential users of the review findings and might include, for example, users of services or those whom the intervention affects (e.g. employees and employee representatives), practitioners and organizational policy makers (e.g. managers and directors) other researchers. The Campbell Collaboration in social science suggests that the tasks of the group might include:

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- Refining the review question

- Identifying interventions and populations to be included

- Setting priorities for outcomes to be assessed

- Helping to interpret the findings of the review

- Commenting on the review protocol and draft report

- Advising on the dissemination plan and helping to disseminate findings.

The review team is the group of researchers who actually conduct the review and often consists of a mix of more senior researchers, research assistants and/or PhD students. The team is vital not only because it gets the work done but, as discussed above, conducting a systematic review can be quite an iterative process and one which also requires judgments from several people about each paper and study identified. Understanding and articulating the bases of agreements and disagreements is an essential part of the process as these help refine and develop the design of the review. The quality of the final review depends a lot on how well the review team functions and develops a critical, challenging, though collaborative approach to their task.

Previous reviews of both the systematic and traditional types can be a useful resource in at least a couple of ways. First, simply studying how previous systematic reviews have been designed and conducted can help provide guidance about what to do -- and in some cases what not to do. A review that addresses a similar sort of question found in other review protocols can be a useful template. Second, more traditional reviews often make claims about where gaps in

knowledge are or where findings are relatively consistent. Such claims are a useful starting point for identifying systematic review questions where the aim is in part to test or challenge conventional wisdom. For example, if there appears to be general consensus in previous reviews that a particular theory has been well-supported by empirical evidence, a systematic review enables a more specific examination of how much and what sort of research exists, its quality, and what the findings of each study suggest individually and collectively.

Another important resource is information scientists and librarians (see chapter in this volume by Roye Werner). As noted earlier, management scholars are not usually trained in how to perform literature reviews and therefore have little technical knowledge about how to search the literature and find relevant publications. Information scientists, on the other hand, study the efficacy of different literature search techniques. These can be more complicated in social science and management than medicine not least due to the number of different terms used by social science researchers for the same or very similar phenomenon. Most university librarians are trained in information science and, in our experience, can provide very valuable information and guidance.

Strengths and Weaknesses of Systematic Reviews

The major strength of systematic reviews is that they attempt to establish in an explicit and methodical way what is known and not known in relation to a given question. Clearly this knowledge has limits but as the process of reaching conclusions is made clear such limits should also be obvious.

Though systematic reviews do have weaknesses, we believe that many but certainly not all of the perceived weaknesses (e.g. Learmonth & Harding, 2006; Morrell, 2008) are a result of some of the more popular myths that have developed around the purposes of systematic reviews, what they can and cannot achieve and their status relative to other forms of review and primary research. Examples of these myths are discussed below.

Perhaps more relevant in the context of this book and this chapter is to consider how we can judge the quality of systematic reviews. As with any type of research, it may be done well or badly. So how can systematic review quality be judged?

One means of doing this is through using some sort of critical appraisal checklist such as the one in Table 5.

---------- Insert Table 5 about here ----------

From some perspectives, systematic reviews are seen as intrinsically or fundamentally weak *in principle* and question the legitimacy and usefulness of this approach to reviewing literature. If, on the other hand, the idea of attempting to identify and critically appraise existing knowledge in relation to a specific question is seen as potentially useful then techniques such as the above checklist can help ensure the systematic review is of reasonable quality and minimize weaknesses.

Using the Findings of Systematic Review

As discussed, the findings of systematic reviews set out what is known, and not

known about the review question. They are also explicit about what that

knowledge is and the bases on which it is claimed to shed light (or otherwise) on

the question. Systematic reviews usually start with a question from practice

rather than a question from research. However the findings from any sort of

systematic review have the potential to inform both practice and research.

Systematic reviews help identify the best available research evidence.

However, it must be remembered that practitioner expertise and judgment,

evidence from the local context, and the perspectives and views of those people

who might be affected by the decision also play a critical role in management

decisions (Briner, et al., 2009). As noted by the Cochrane Handbook (Higgins &

Green, 2008, p. 167):

> "the primary purpose of the review should be to present information,
>
> rather than offer advice, the discussion and conclusions should be to help
>
> people to understand the implications of the evidence in relationship to
>
> practical decisions."

Simply reporting the best available evidence is rarely enough to alter

practice. Research in healthcare has shown that user involvement in systematic

reviews greatly enhances the uptake and use of research evidence (Oliver et al.,

2004). Our own work has shown that collaboration between the various

stakeholders who use and create research evidence is at the heart of fostering

effective EBMgt. Through this socialization the best available research evidence

can support, challenge and combine with practitioner experience, tacit knowledge and judgment.

In terms of research, systematic reviews can provide researchers with a solid understanding of the current state of knowledge in their field. A well conducted systematic review can produce multiple outputs. For example, a systematic review on the relationship between networking and innovation (Pittaway, Robertson, Munir, Denyer, & Neely, 2004) was published as a working paper by the Advanced Institute of Management Research (AIM) together with a short "executive briefing" for managers. The review was then rewritten for publication in the *International Journal of Management Reviews* and has become one of the most cited papers in that journal. Subsequently, the systematic review was used by several of the authors to support their own empirical research.

Conclusion

In this chapter we have argued that many management scholars and practitioners claim to base their decisions at least in part on research evidence, yet the training of scholars and managers and the very limited availability of rigorous, relevant and digestible summaries of research findings mean that they can only do so to a very limited extent. We have argued that systematic reviews are an efficient and effective method of developing an understanding of what we know and what we do not know about a given topic.

Systematic review methods are now well established in many other fields and we believe that they are potentially of great value to both management researchers and management practitioners. However, the adoption and use of

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systematic reviews is constrained by objections based largely on myths and misconceptions (Briner et al., 2009). Tackling and discussing some of these, as described in Table 6, should encourage more management scholars to look more closely at the possible benefits of systematic review methods.

---------- Insert Table 6 about here ----------

We have argued that systematic reviews are driven by a set of principles or a guiding logic rather than a single rigid and narrow protocol. By revealing these principles and outlining a systematic review methodology we hope that this chapter helps reviewers to create a fit for purpose systematic review approach that meets the specific requirements of their project. We believe that systematic reviews and syntheses of research evidence have the potential to inform both research and inform management practice by making known the best available academic evidence so that it can be integrated with judgment and experience of scholars and practitioners to help them make better decisions.

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SYSTEMATIC REVIEW RESOURCES

Websites

http://www.cochrane.org/ - The Cochrane Collaboration - database of systematic reviews relevant to healthcare and resources for conducting systematic reviews

http://www.campbellcollaboration.org/ - The Campbell Collaboration - library of systematic reviews related to education, crime and justice, and social welfare plus some guidance for conducting reviews

http://eppi.ioe.ac.uk/cms/ - Evidence for Policy and Practice Information and Co-ordinating Centre part of the Social Science Research Unit at the Institute of Education, University of London – a library of systematic reviews relevant to education and social policy. Also has guidance about conducting reviews and systematic review software.

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