Rationale: Why systematic review?
Mulrow (1994) described the gap that systematic reviews fill in our knowledge: “The hundreds of hours spent conducting a scientific study ultimately contribute only a piece of an enormous puzzle. The value of any single study is derived from how it fits with and expands previous work, as well as from the study’s intrinsic properties. Through systematic review, the puzzle’s intricacies may be disentangled” (p. 309-310). Petticrew and Roberts’ (2006) first chapter provides other useful ideas on why we need systematic reviews.

At NBS, we conduct systematic reviews to evaluate claims about what works and provide an informed basis for taking action. We seek to enable practitioners to make better decisions and researchers to address the most important gaps in the literature.

Definition: What is systematic review?
Tranfield et al. (2003) provide a helpful definition: “Systematic reviews differ from traditional narrative reviews by adopting a replicable, scientific and transparent process, in other words a detailed technology, that aims to minimize bias through exhaustive literature searches of published and unpublished studies and by providing an audit trail of the reviewers’ decisions, procedures and conclusions.”

Petticrew and Roberts (1996) add that: “Systematic reviews are literature reviews that adhere closely to a set of scientific methods that explicitly aim to limit systematic error (bias), mainly by attempting to identify, appraise and synthesize all relevant studies (of whatever design) in order to answer a particular question (or set of questions). In carrying out this task they set out their methods in advance, and in detail, as one would for any piece of social research. In this respect...they are quite unlike most “traditional” narrative reviews” (p. 9-10).

Briner and Denyer (2012) provide many other definitions. (We recommend their paper, and the others in the same book, from which we have drawn heavily in crafting the methodology for our systematic reviews.) They describe the key features of a systematic review:

- **Systematic/organized**: Researchers use a system or method which is designed specifically to address the review question.
- **Transparent/explicit**: Researchers explicitly state the method used.
- **Replicable/updatable**: As with many forms of primary research, the methodology is described in sufficient detail that other researchers can repeat the review, repeat it with modifications or update it.
- **Synthesize/summarize**: Results are pulled together in a structured way in order to summarize the evidence (p. 115).

In brief, systematic reviews aim to determine, based on the best evidence, what is known and not known about a particular question.
Methodology: How to conduct an NBS systematic review

NBS systematic reviews use the following methodology (inspired heavily by the Cochrane Collaboration’s and Briner and Denyer’s (2012) methodologies). Two caveats:

- Systematic reviews should be driven by principles, not a narrow protocol applied to all reviews. The specific methods should depend on the question being addressed.
- With each review, NBS methodology has improved based on input from the research team. We are always open to suggestions.

1. CLEARLY DEFINE THE REVIEW QUESTION AND STUDY OBJECTIVES

The NBS Leadership Council identifies the general questions that inspire the review. However, these questions are typically too broad for a systematic review. A more precise and answerable research question (including subquestions) is needed.

Remember that NBS systematic reviews are intended to benefit both academics and practitioners, who have different knowledge needs. Practitioners are most interested in knowledge that enables action. As a result, at least some of the questions addressed by the systematic review should consider the implications for business action. (Managers are NBS’s primary audience. We refer to practitioners and managers interchangeably here.)

In refining the research question, we consider:

- What are the study objectives? What impact do we seek? Is the current question likely to result in those impacts?
- What questions are most interesting and useful to practitioners and to researchers? What questions, if answered, are most likely to have an immediate impact on practice? Which questions are most likely to yield publishable results?
- Is the question logical? Are terms well defined and is the definition commonly accepted?
- Have reviews already been conducted on certain dimensions of the question? Have they been published?
- What data sources are required to answer the question? Are they accessible?
- How much literature is available to review? Does the scope of the review need to be narrowed or broadened accordingly? E.g., is there sufficient literature to answer the question? Does addressing the current question require reviewing too much literature?

To help answer these questions, the research team should conduct a very preliminary literature search. (Often such a search is part of the proposal.) The research team should then formulate possible research questions and identify their practical implications. This information will inform the discussion with the Guidance Committee, which will occur several weeks after the project begins (the “Scoping” call). That discussion, via conference call, will finalize the research question and subquestions.

The Guidance Committee will provide input throughout the project. The committee is primarily composed of members of the NBS Leadership Council: senior sustainability managers. The committee also includes an Academic Advisor, who is an expert on the topic and can help you decide how to respond to Guidance Committee input. A recent article on the NBS systematic review process details the role of the Guidance Committee and Academic Advisor.

Action Items: month 1

1. Conduct preliminary literature search to scope the body of knowledge.
2. Formulate various possible research questions and be aware of their practical implications.
3. Finalize research question on conference call with Guidance Committee and NBS.
2. SEARCH THE BODY OF LITERATURE FOR RELEVANT STUDIES

Once the research question has been clearly defined, the research team can develop and justify the review protocol. This protocol is similar to methods and design in primary research and ensures the review is replicable and transparent.

a. Protocol content

Below is sample review protocol provided by Briner and Denyer (2012; adapted from Higgins and Green, 2009). Much of the protocol content will ultimately be integrated into the final report.

Review background
- Problem statement and importance/relevance
- Review rationale
- Previous review findings (if any exist)
- How this review will be different

Objectives
- Review’s primary objective
- Main review questions and sub-questions

Criteria for considering studies
- Types of contexts: level of analysis (e.g., product, plant, firm, industry, economy), geography, etc.
- Types of interventions
- Types of mechanisms
- Types of outcomes: social and/or environmental and/or financial, etc.
- Types of studies: academic vs. practitioner vs. both, qualitative vs. quantitative vs. both
- Types of designs: empirical, theoretical, case study, etc.

Search strategy for studies
- What databases and sources will be searched? (other sources may include reference lists, relevant researchers and institutes, etc.)
- What is the time period?
- What are search terms and key words?
- Will there be language restrictions?
- Will unpublished data be sought? If so, how?
- How will the search for practitioner literature differ from the academic search?

Eligibility
- What are inclusion/exclusion criteria for academic studies? For practitioner studies? (e.g. relevance to the research question, quality of methodology, theoretical adequacy, generalizability or context specificity, etc.)
- How many reviewers will screen the articles for inclusion/exclusion?
- How will reviewer disagreements be resolved?
- Will articles be reviewed in a blinded manner?

Data collection
- How many reviewers will extract data?
- What data will be extracted from academic sources? From practitioner sources? (e.g. title, author, citation, publication date, study type, practitioner / academic source, peer reviewed?, study context, methodological quality, methodological relevance, topic relevance, industry, geography, level of analysis, outcomes, emerging themes, etc.)
- How will the reviewers resolve disagreements?
- What other study data will be collected?

Assessment of methodological quality
• What are the overall methodological strengths and weaknesses of the included studies?
• What instrument, scale or criteria will be used to assess quality?
• How many reviewers will assess study quality?
• How will the reviewers resolve disagreements?
• How will data quality be used?

Synthesis
• What sort of synthesis (e.g., aggregation, integration, interpretation or explanation – see section 4) do you anticipate using and why?
• How will data quality be incorporated?
• How can data most clearly be represented to address review questions? Are effect size measures available, and can they be reported in a summary?

There is a trade-off between the breadth of the search (i.e., number of studies included, determined by search terms and/or inclusion criteria) and the depth of the coding (i.e., the number of codes). Including more papers (200 is average, but range has been 65-350) necessitates coding for fewer variables and extracting less data from each paper. (The average number of variables is probably 30, but the range is 20-50.)

b. Focus on academic literature
Academic research is the foundation of the systematic review. Past systematic review authors have used a variety of strategies to identify possible articles for inclusion. These include:
• Keyword searches of journal databases: e.g Academic Onefile, JSTOR, Web of Science, EBSCO, Google Scholar, SAGE, Ovid, Scopus, and Proquest.
• Requests for additional sources, including unpublished material and books, through affiliated research networks and listservs (e.g. AOM).

One systematic review research team (Gray and Stites, forthcoming) has instead chosen to search a set of specific journals, validated with experts in the field.

c. Focus on practitioner literature
Practitioner material can be a valuable complement to academic research. It may provide more timely information, due to the lag time in publishing academic research (Adams et al, 2012, p. 74). Practitioner material may also provide alternative perspectives or insights.

We define practitioner material loosely, as information that has not undergone peer review and is aimed at and/or generated by practitioners.

i. Deciding what types of practitioner material to include

Previous systematic review authors have taken different approaches to including practitioner material, and the research team’s methodology should include a thorough discussion and justification of the treatment of practitioner literature.

Three common types of practitioner material are:
• Reports published by consultants, industry associations, governments and non-governmental organizations
• Blogs and news articles
Some systematic review authors have viewed journal articles and reports (the first and second categories above) as most appropriate for inclusion in systematic reviews. Blogs and news articles, while helpful for understanding manager perspectives and needs, rarely meet quality standards.

Several previous systematic review authors (e.g. Bertels et al., 2010; Stephan et al., 2012) have screened practitioner materials by looking for an empirical component. They have also used a length requirement. Bertels et al. write: “We [decided] that articles with fewer than 7 pages were highly unlikely to discuss empirical findings in any depth sufficient to be useful for the review” (p. 61).

ii. Searching for practitioner material

Articles published in practitioner-oriented journals are generally easy to find because they are included in electronic databases used for the academic portion of the search.

Strategies used by previous research teams to identify additional practitioner material include:

- Searching Google using the same keywords used in the academic search. If the number of search results is overwhelming, one can search for only PDF documents or consider only a certain number (e.g. 100) search results. This is the easiest and ‘dirtiest’ approach to finding practitioner literature.
- Searching specific practitioner websites (e.g. NBS.net, WBCSD.org, BusinessInSociety.eu, www.caseplace.org, www.bitc.org.uk, etc.). Use keywords or browse the existing categories.
- Searching consultancy websites (e.g. SustainAbility.com, Deloitte, PwC, KPMG, McKinsey, BCG, AccountAbility, etc.).
- Requesting information through listservs, both academic and practitioner (e.g. AoM ONE/SIM, Wayne Visser’s CSR-International, etc.)
- Requesting relevant information from practitioners, such as the Guidance Committee, colleagues in practice, industry associations, the above organizations, etc.
- Searching topic-specific practitioner knowledge portals.

Search functions on many websites do not support intricate keyword searches, but you can use Google to search a specific website. Search for: “keyword1 keyword2 keyword3 site:websitetosearch.com”

**d. Protocol review and search**

Researchers should get input on the protocol from the Academic Advisor and NBS. If necessary, NBS can coordinate a conference call with the practitioners on the Committee. Researchers will revise the protocol with this input and begin the search.

Researchers should conduct the search according to the protocol, documenting and explaining any divergences.

A secondary screening process is used to establish final appropriateness of material. Typically, at least two reviewers apply the eligibility criteria established in the protocol, resolving disagreements through discussion. Abstracts often suffice to assess eligibility, but sometimes the full paper must be read. The research team should document why each study was included or excluded (perhaps only at an advanced stage of filtering).
Once the search is complete, researchers provide NBS with a written progress report, presented to the Committee on a conference call a week later. It should identify:

- What has been done
- Issues requiring input/discussion
- Next steps
- If possible, emerging findings and a preliminary outline for the final report.

The Committee will flag any concerns. With the Committee’s advice, NBS will sign off on progress and the research team will proceed to the next step.

**Action Items: months 2, 3 & 4**

1. Develop and justify the review protocol and get input from NBS and Academic Advisor.
2. Conduct the literature search, including the practitioner literature.
3. Apply eligibility (inclusion/exclusion) criteria to each study.
4. Submit written progress report to NBS; present it on conference call with Committee a week later; NBS signs off.

### 3. ANALYZE AND CRITICALLY APPRAISE THE STUDIES

Once researchers have identified studies to be included in the review, they should analyze each and extract the relevant data, following the protocol. The research team may find certain data difficult to extract because of the state of the literature. Consequently, researchers may need to revise the protocol (documenting and justifying changes) in real time.

Some past research teams have used Excel to capture each study’s relevant data, but this approach has proven less systematic than we would like. If the research team is dealing with qualitative research, we strongly encourage the use of software such as NVivo or Atlas. It is very difficult to keep track of all the details and be rigorous without documentation.

In addition to extracting the relevant data from the studies, the research team should attempt to assess data quality. Such assessment allows the research team to weight evidence, which can resolve conflicting findings and is necessary for synthesis. As Briner and Denyer (2012) note, establishing the quality criteria in advance, in the protocol, eliminates biased quality judgments based on journal or researcher ‘brand.’

The state of the literature may make assessing study quality impossible. If it is possible, the reviewer may follow checklists provided by Briner and Denyer (2012). For example, the EPPI Centre uses the following scheme to assess each study’s quality and relevance: Judgment of overall weight of evidence = function of [assessment of trustworthiness of results judged by the quality of the study within the accepted norms for undertaking the particular type of research design used in the study (methodological quality), appropriateness of the use of study design for addressing the research question (methodological relevance), appropriateness of focus of the research for answering the review question (topic relevance)].

Once researchers have extracted data and assessed quality, they will deliver a written progress report and tables with the extracted data to NBS, and present these to the Committee on a conference call a week later. The progress report should address the same items as the previous progress report (what has been done, any issues, next steps, emerging findings). The Committee will again flag concerns and help the research team resolve questions. With the Committee’s advice, NBS will sign off on progress and the research team will proceed to the next step.
Briner and Denyer (2012) explain that “the aim of the analysis is to dissect individual studies into [components] and explain how the components relate to one another” (p. 123), synthesis is the process of combining studies to create knowledge that was not apparent from individual studies. Quoting Campbell et al. (2002, p. 2), they describe synthesis as seeking “to bring together 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 any individual empirical study’” (p. 28).

NBS requires that research teams perform two forms of synthesis:

a. **Descriptive mapping**

The easier form of synthesis is systematic descriptive mapping—painting a picture of the ‘shape’—of the body of research. This reveals what research has been done and what gaps exist. Mapping can be done by year, journal, keyword, language, methods used, study design, key characteristics, etc. Maps reveal the amount and focus of extant research and thus where future research is unnecessary. Maps also provide a context for interpreting the synthesis. This part of the synthesis is less interesting to practitioners, so we typically place it in appendix with tables and graphs.

b. **Synthesis of research findings**

We also require a systematic synthesis of the research findings; this synthesis forms most of the body of the report. This synthesis will lead to higher-level generalizations than those found in individual studies. It may include numeric data, categorical data and/or free-text narrative data. It allows conclusions to be drawn and often yields an overarching framework for thinking about the body of knowledge.

No single formula exists for this form of synthesis. The research topic, the maturity of the field, and the methods used determine appropriate approaches. Ideally, synthesis achieves four things:

i. **Telling the story (‘narrative synthesis’):** Narrative synthesis involves “tak[ing] a collection of studies that address different aspects of the same phenomenon and build[ing] them into a bigger picture, map or mosaic ...to ‘tell the story’ of studies included in the review” (Briner and Denyer, 2012, p. 124).

ii. **Categorizing constructs (‘interpreative synthesis’):** The same labels may have been used for multiple constructs, or different labels may have been used for similar constructs. The synthesis should identify, define, and categorize the constructs relevant to the research topic.

iii. **Drawing relationships (‘explanatory synthesis’):** Identifying relationships between constructs, especially antecedents and consequences, lets people identify when an event will occur and its effects/impacts. Describe the theoretical model and the strength/likelihood of the relationship in prior research (if possible reporting the effect size and confidence).

iv. **Prescribing ‘how to’:** To guide managers, specify ‘how to’: actions indicated. Managers want to know what practices can help them reach sustainability goals. Specifically, managers seek to (1) assess their current actions/ stage; (2) identify appropriate goals (i.e. actions/ stages which are more effective or
sustainable) and (3) understand how to transition to new actions/stages. Please see the Appendix for more detail on the ‘how-to’ recommendations that managers seek.)

Academic work is often context-specific, making such information difficult to synthesize. Therefore, the researcher needs to be creative in inferring these insights. Researchers may synthesize high quality practitioner-targeted research or infer good/worst practices from the relationships uncovered.

NBS urges researchers to develop a relatively simple (e.g. 1-2 page) graphic framework that represents the research findings and their implications for managers. We have found that such “boundary objects” (Star, 2010) are powerful tools that facilitate both action by managers and dialogue between academics and managers. A recent example of such a graphic framework can be found in NBS’s review on Embedding Sustainability in Organizational Culture (Bertels et al., 2010, p. 14). NBS staff can help with the graphic design challenges of creating such frameworks.

c. Writing the report
NBS does produce an Executive Report, which is the entry point to your longer report for most practitioners. However, managers should still be able to understand the Systematic Review. We recommend modifications to traditional academic writing; please see the Appendix for details.

d. Gathering feedback
Synthesis and writing can be the most difficult part of the process. Getting input from others, including practitioners, can be invaluable. Thus, as many as two conference calls with the Committee will provide the research team with input on the emerging synthesis and report.

- The first committee call will occur after the first month of synthesis work. The research team should aim to present the Committee with the emerging framework.
- The second call will occur after the first draft of the report has been delivered. This draft should be minimum 30 pages, plus appendices and references.

In 2013, NBS arranged an additional workshop with practitioners for complementary feedback; we may repeat this approach.

Once researchers receive feedback from the Committee and NBS, they will have a month or so to finalize the report and submit all final deliverables to NBS.

Action Items: months 7 & 8
1. Synthesize the findings, aiming for a framework to run by the Committee.
2. Discuss the emerging framework on a conference call with the Committee (after month 6).
3. Write the full report and submit to NBS (after month 7).
4. Discuss the report on a conference call with the Committee and NBS.
5. Rework the report and submit it and all final deliverables to NBS (after month 8).
6. Make a final review of any changes suggested by NBS

Outputs: What are the deliverables?
Outputs from past NBS systematic reviews can be found here. The review on Embedding Sustainability in Organizational Culture (2010) is an excellent model.
NBS systematic reviews have several deliverables (described in the Call for Proposals for the project). The primary deliverable is a report targeting ‘thinking practitioners’ and researchers. Below is an outline for a typical report, but they can vary drastically based on the topic being reviewed. Reports should be 30-40 single-spaced pages plus appendices.

1. Executive summary, including highlights of the research (2 pages)
2. Introduction (2-5 pages)
   a. background/need
   b. readers’ guide: e.g. ‘How to Use this Report’
3. Framework (overall synthesis of the body of knowledge and how it is useful) (2-5 pages – often graphic presentation)
4. Details of the synthesized body of knowledge (several sections/chapters – 20 pages)
5. Discussion of how practitioners and researchers can use the knowledge; this should be foreshadowed in the introduction and framework (2-5 pages)
6. Conclusions (including next steps and calls to action to practitioners and researchers) (2-5 pages)
7. Appendices (15-20 pages)
   a. Methodology
   b. Description of body of knowledge (descriptive statistics, tables and figures describing the ‘shape’ of the body of literature, etc.)
   c. References

Impact: What will happen with the deliverables?
As you are wrapping up your project, the NBS Communications Team will work to increase its impact. We hire professional designers to lay out your report in PDF. We also work with you to develop a shorter version of the report targeting senior executives. This “Executive Report” typically serves as the entry point to your longer report for most practitioners. You will also present your findings directly to the full NBS Leadership Council or another practitioner group.

NBS will develop a media and outreach plan. The report will be made publicly available on our website. It will be pitched to mainstream and niche media, as well as various industry groups. Past reviews have been covered in Canada’s national media (CBC, Globe and Mail, National Post) and many niche outlets, and presented at the United Nations, OECD, Conference Board and at other conferences and private corporate events.

You can choose to what extent you wish to be involved in these dissemination efforts. NBS can organize webinars or online videos for you and set up speaking engagements.

The most successful research teams have a clear vision for how they will rework the report delivered to us for different publication outlets. Past NBS reviews have been reworked for submission to practitioner outlets such as the Harvard Business Review and California Management Review. Importantly, and with our strong encouragement, research teams have also reworked them into papers for academic publication. Past reviews have been published in outlets such as Journal of Business Ethics and Journal of Management. None of our reviews has yet been submitted to the International Journal of Management Reviews, although it is an obvious potential outlet and has a relatively high impact factor (of 2.286 in September 2010). LePine & Wilcox-King (2010) suggest how reviews might be positioned for the Academy of Management Review; we suggest reading this article for perspectives on the value that your systematic review will create.
Appendix: How to Make Review Content Useful to Managers

Developing a report that managers can use has implications for content and style.

Regarding content:

- Managers value information that they can use to shape their actions. Consider this focus as you develop questions and as you write the report. Managers seek information that will help them evaluate their current behavior and identify appropriate goals and how to reach them. They value specificity: detailed recommendations and examples. It’s helpful to identify priority actions or suggested sequences of actions.

Regarding style:

- Managers are pressed for time, and appreciate reports that focus on key findings, succinctly and directly addressing the questions raised.
- They value a streamlined writing style that avoids jargon and uses active voice. They appreciate headings for orientation. See NBS’s writing guidelines for more writing suggestions.
- They appreciate graphic presentations of findings. As mentioned on p. 8: NBS urges researchers to develop a relatively simple (e.g. 1-2 page) graphic framework that represents the research findings and their implications for managers. A recent example of such a graphic framework can be found in NBS’s review on Embedding Sustainability in Organizational Culture (Bertels et al., 2010, p. 14). NBS staff can help with the graphic design challenges of creating such frameworks.
- Managers are more interested in findings than in sources; try to start sentences with insights rather than citations.

The Guidance Committee, a subset of NBS’s Leadership Council, is a great source of managerial input. Guidance Committee members are experienced sustainability managers at leading companies. They can advise researchers on what questions, content, and presentation managers will find meaningful. Be sure to take advantage of them as a resource, in consultation with the project Academic Advisor.

NBS will develop a shorter version of the report: an “Executive Report” specifically targeting managers. However, managers should be able to draw on the systematic review for additional detail.
Useful References

Articles on Systematic Reviews (or related topics)


Actual Systematic Reviews


