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<cn>5.<ct>Using systematic review methodology to examine the extant literature

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<a>SUMMARY

This chapter explicates systematic review methodology as an evidence-based approach for examining literature, drawing on the authors' experience of conducting a systematic review as well as on the discussion of other existing systematic reviews. Introducing key tenets, the methodology is benchmarked against alternative reviewing approaches, discussing advantages and potential disadvantages, alongside practicalities and challenges.

<a>INTRODUCTION

Human resource development (HRD) is by nature a wide, fragmented field, encompassing plurality in topics, foci and methods. This can make it challenging to obtain a distinct and concise overview of current evidence, highlighting the need to synthesize and integrate what is 'out there' to guide best practice and future research. To this effect, Briner, Rousseau and fellow scholars (e.g. Briner and

Rousseau, 2011; Rousseau and Barends, 2011; Briner, Denyer and Rousseau, 2009) call for an evidence-based rather than an intuitive approach to management, building sound practice based on the integration of findings which have not only been synthesized, but also checked for quality. We acknowledge here that others think differently. Cassell (2011) for instance openly raises the issue of what 'evidence' actually is and highlights its context-dependent nature. Be the discussion as it may, we assert that there will always be instances when there is a need to integrate an existing knowledge-base and 'take stock'. This is where systematic review methodology comes into its own, being particularly suitable when the aim is to establish current best evidence as well as gaps in the literature with regard to a (set of) specific review question(s).

<a>CHAPTER STRUCTURE

This chapter will familiarize the reader with systematic review methodology, commencing with an introduction to its key tenets. We further benchmark systematic review methodology against other reviewing approaches, using a table to guide the reader. Within this comparison, we also critically reflect on caveats and potential disadvantages of the methodology, given that systematic reviews are time-consuming and laborious to conduct. Our discussion will provide the reader with guidance on whether this methodology is suitable and applicable for their research questions. Finally, we discuss the practicalities of carrying out a systematic review in a HRD context. We hereby draw upon our own experience of conducting a systematic review on the topic of individual workplace performance. Specifically, we explain the six stages that are usually followed when doing a systematic review and

provide hints and tips for each based on our own experience with this methodology. We also discuss the various challenges that we came across when undertaking our systematic review (e.g. the very large number of references located) and identify potential solutions on how to deal with these.

<a>AN OVERVIEW OF SYSTEMATIC REVIEW METHODOLOGY

In essence, systematic review methodology is a particular way of conducting literature reviews using clear and replicable protocols and criteria to draw conclusions from any evidence. More explicitly, according to Denyer and Tranfield (2009), systematic review can be understood as ‘a specific methodology that locates existing studies, selects and evaluates contributions, analyses and synthesizes data, and reports the evidence in such a way that allows reasonably clear conclusions to be reached about what is and is not known’ (p. 671). Drawing upon detailed guidelines/a research protocol determined in advance, the available literature is critically examined in regard to how each single publication will contribute to answering one or more specific question(s) formulated at an early stage of the systematic review. Information is then analysed, synthesized (qualitatively and/or quantitatively) and discussed. Comparing systematic review methodology to the more traditional forms of literature review including narrative approaches, the following key differences have been noted (Petticrew and Roberts, 2006). First, by attempting to identify, appraise and synthesize all studies that are relevant to the review question(s), systematic reviews aim to limit systematic error (bias) in following a set of scientific processes, as opposed to traditional reviews, which can be somewhat selective in the studies included. The second, interrelated difference is

that these processes are defined a priori and reported in sufficient detail to enable replication for systematic reviews, which is not necessarily the case for other types of literature review.

Systematic review methodology, which originated in the Medical Sciences, gained acceptance also in other disciplines, such as the Social Sciences, over the past two decades (Harlen and Crick, 2004). More recently, its value for evidence-based research has further been acknowledged by researchers in the Management and Organization Sciences (MOS), who have adapted this reviewing approach to suit the particular needs of their field (e.g. Denyer and Tranfield, 2009). Considering the field of HRD more specifically, systematic review methodology has started to gain popularity here also. One of the earlier examples of a systematic review in HRD is Cho and Egan's (2009) examination of the action learning literature. This study resulted, amongst others, in the development of a conceptual framework illustrating key dimensions of action learning, grouped under the four headings of antecedents (initiation of action learning), process (action learning intervention deployment), proximal outcomes (action learning implementation) and distal outcomes (action learning evaluation). Recent examples of systematic reviews in HRD include studies by Greer and Egan (2012) as well as Olckers and Du Plessis (2012). In the first of these, the authors systematically reviewed the literature on role salience and its implications for employees and organizations (e.g. in relation to organizational policies, HRD practices or employee performance) as well as for HRD professionals. The second study by Olckers and Du Plessis is a systematic review of the literature on psychological ownership. Based on their findings, these scholars conclude that

psychological ownership is a multidimensional construct that can be distinguished from other, similar constructs (e.g. work-related attitudes); further, they highlight the importance of psychological ownership in regard to the retention of skilled employees within organizations.

Systematic reviews are meant to adhere to four core principles in the MOS (Denyer and Tranfield, 2009). First, they aim to be transparent, in other words open and explicit about the process and methods employed as well as any underlying assumptions, such as prior knowledge held by the reviewer(s). Second, systematic reviews should be inclusive, meaning the reviewer needs to consider carefully whether or not a publication contributes to answering the review question(s) and adds something new to the understanding of the field (Pawson, 2006; cited in Denyer and Tranfield, 2009). When deciding whether or not to include a primary study in the review, a quality checklist is used to specify and justify inclusion/exclusion criteria (Wallace and Wray, 2006). The third principle is about the systematic review being explanatory; this relates to the synthesis of the included publications, which can be undertaken qualitatively (e.g. interpretive and explanatory syntheses) and/or quantitatively (e.g. meta-analysis). Finally, systematic reviews should strive to be heuristic, in that any conclusions made (e.g. heuristic conclusions, such as generic suggestions on how to progress both in academic and organizational settings) should refer back to the specific review question(s) asked.

These four principles can be applied by adhering to the six distinct stages of systematic reviewing as suggested by Denyer and Tranfield (2009; also Petticrew and Roberts, 2006; Wallace and Wray, 2006). The first stage is a pre-review scoping

study, undertaken to determine (i) if a systematic review is required in the first place (or would rather be mere replication of existing reviews) and (ii) the basis of the literature search. This is followed by determining one or more questions used to guide the systematic review. At this stage of the process, to assist with specifying the review questions, a range of stakeholders (e.g. scholars in the subject area, practitioners and/or policy makers with a relevant background and experience, librarians with subject knowledge), functioning as an advisory panel, is usually involved. Upon having determined the questions, the reviewer carries out an exhaustive search of the literature, by way of attempting to examine all the evidence available that will contribute to addressing the questions; this should take account of a range of sources (e.g. databases, conference proceedings, personal requests to scholars in the field). Next, using pre-determined criteria for judging the relevance and quality of any references found in the literature search, it is necessary to select and evaluate them, to assert which ones will be useful for addressing the review questions. Having decided upon those publications to be employed for answering the review questions, this body of literature needs to be integrated in either a narrative way, in other words by describing, summarizing and relating the studies to one another, and/or statistically, by means of a meta-analysis. Last, once all the available evidence pertaining to the review questions has been analysed and synthesized, findings are summarized and discussed overall in terms of what we know, what we do not know yet and where future research should take up; some thought might also go into how the findings might inform future research and practice.

We provide further detail about these six stages in the section explaining our personal experience of applying systematic review methodology in the field of HRD.

<a>ADVANTAGES AND POTENTIAL DISADVANTAGES OF SYSTEMATIC REVIEW

METHODOLOGY

Undertaking a systematic review is often a time-consuming and laborious activity, reportedly taking a team of reviewers an average of seven months (Allen and Olkin, 1999). Yet, this disadvantage in terms of increased use of resources is seen to be offset by some distinct advantages (e.g. Rojon, McDowall and Saunders, 2011; Briner and Rousseau, 2011; Denyer and Tranfield, 2009; Petticrew and Roberts, 2006) the methodology offers over alternative reviewing and synthesis methods, such as meta-narrative approaches (e.g. Greenhalgh et al., 2005), critical appraisals (e.g. Hill and Spittlehouse, 2003) and realist reviews (e.g. Pawson et al., 2005). We outline these advantages in Table 5.1, which directly compares systematic review methodology to two of the most commonly used reviewing approaches, namely traditional narrative review (cf. Jesson, Matheson and Lacey, 2011) and (statistical) meta-analysis (cf. Hunter and Schmidt, 2004).

Table 5.1 Advantages of systematic reviewing in comparison to alternative approaches for reviewing literature

Systematic review methodology	Traditional narrative review	Meta-analysis
	(e.g. Jesson, McDowall and Saunders, 2011)	(e.g. Hunter and Schmidt, 2004)

(e.g. Denyer and Tranfield, 2009; Petticrew and Roberts, 2006)

Greater rigour, replicability, thoroughness and objectivity possible by adhering to a set of review principles and stages

- Less rigour, transparency and replicability, as usually no formal methodology
- Yet: more flexibility possible in exploring researcher's own ideas

Processes of locating, evaluating, selecting and coding studies need to be documented in detail to enable replicability (e.g. for statistical meta-analysis)

- Especially useful when aware of main themes, but unsure of the actual evidence in relation to the review topic, since all potentially relevant sources of information are considered and reconciled

Possibility/danger that scholars concentrate on a personal, purposive selection of materials they believe to be important (e.g. 'preferred' journals), thus potentially introducing a one-sided (or even biased) argument

Potential danger of researcher bias:

- Scholars can be very selective as to which studies to include in their meta-analysis
- Not always evident why some studies have been included

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- As such: when others have not been comprehensive collation of all existing evidence across relevant studies and integration of different schools of thought and research findings

Where researchers are faced with a vast and heterogeneous body of literature, reviewing of a topic is facilitated by following an a priori developed protocol that specifies tasks and stages in the reviewing process	Scholars might have difficulty in identifying and reviewing a topic when faced with a vast and heterogeneous body of literature, since there is no set protocol to follow in most cases	Adherence to statistical and psychometric principles of meta-analysing data can allow for greater ease in dealing with a large number of studies – especially if findings are contradictory
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Possibility to combine methods of analysis and synthesis (e.g. integration of qualitative and	Review usually focuses on narrative component (qualitative synthesis) only	Review usually focuses on meta-analytical component (quantitative synthesis) only
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quantitative reviewing

elements)

Source: Adapted from Rojon, McDowall and Saunders (2011).

<a>THE SCOPE OF SYSTEMATIC REVIEWS

Systematic reviews vary greatly in the scope (from narrow to wide) and nature of their research questions and the number of primary studies reviewed and included. Some systematic reviews can take years to complete, particularly where evidence is difficult to obtain or time-consuming to interpret. Review scope is concerned with the breadth of the research questions covered. Our own review, discussed below, can be considered to have a wide scope, as it cuts across two strands of research (MOS and also Industrial/Organizational (I/O) Psychology). Yet, a systematic review might also change from having a wide scope at the outset to a narrow scope once it has been completed. An example of the latter is Joyce and colleagues' review of interventions relevant to flexible working (Joyce et al., 2010) and their impact on health outcomes. The authors started off reviewing a large number of databases ($N = 12$), eliciting a huge number of potentially relevant 'hits'. Due to their stringent inclusion criteria (randomized controlled trials, interrupted time series or controlled before and after studies, examining the effects of flexible working interventions on employee health and wellbeing), in the end the authors only reviewed ten primary studies by means of narrative synthesis, offering tentative conclusions, such as 'these findings seem to indicate that flexibility in working patterns which gives the worker more choice or control is likely to have positive effects on health and

wellbeing' (Joyce et al., 2010, p. 2). This example illustrates that whilst the field of flexible working is wide, as arguably is the range of potential health outcomes, resulting in a wide research question, a systematic review's scope will also be defined by its inclusion criteria.

<a>PERSONAL EXPERIENCE OF APPLYING SYSTEMATIC REVIEW IN HRD

As part of a large research project aimed at closely examining how individual workplace performance can be defined, conceptualized and measured, a systematic review was conducted at the outset (in 2009/2010). This was to provide the basis for subsequent studies by way of determining what the current understanding is of individual workplace performance, what is not yet known and how future research can contribute to the existing body of evidence. A systematic review was considered a particularly useful approach in our context for examining the literature, because its structured, standardized and rigorous procedure was perceived to facilitate integration of the large and heterogeneous body of evidence across MOS, I/O Psychology and related areas.

As outlined above, there are usually six stages in the process of systematic reviewing. We will now explain how we conducted our systematic review on aspects of individual workplace performance along those stages, in so doing also outlining the various challenges we encountered and how these might be dealt with.

1) Pre-review Scoping Study

An exploratory scoping study, aimed at determining the scope and focus of the literature search, typically precedes the actual systematic review. This was undertaken by (i) assessing the types of studies carried out to date and where these

had been published, (ii) identifying the focus of the investigation and (iii) considering whether, and if so how, the systematic review would contribute to the knowledge in the field. We had determined during this stage that our systematic review would be the first of its kind on the topic of workplace performance. Whilst there are a number of important meta-analytical studies (e.g. Viswesvaran, Schmidt and Ones, 2005) and traditional literature reviews (e.g. Arvey and Murphy, 1998) examining aspects of workplace performance, none of these can be characterized as a systematic review, suggesting a need for such an approach. In general, it is important to examine whether or not previously conducted systematic reviews have focused on your topic of interest to minimize the risk of duplication.

Results of the scoping study indicated that there are a variety of understandings of the construct of individual workplace performance, in particular concerning its definition and conceptualization and, as a consequence, its measurement. One fundamental question, for example, was whether performance is unidimensional (one general factor) or multidimensional (different elements) (e.g. Borman and Brush, 1993; Bartram, 2005). This general lack of a common consensus pointed to a need for further investigation. The matter of understanding and conceptualizing workplace performance, particularly concerning its potential underlying structure, was therefore chosen as the central point of investigation for the systematic review.

2) Determination of Review Question(s)

Clearly framed research (review) questions were formulated, being defined precisely to facilitate the decision as to whether or not a potentially relevant publication

would contribute to answering them (Greenhalgh and Peacock, 2005). We involved a range of stakeholders as an advisory group to assist with specifying the review questions. Members of such a group are usually individuals with academic knowledge and practical expertise in the subject area (Denyer and Tranfield, 2009; Petticrew and Roberts, 2006; Tranfield, Denyer and Smart, 2003), where each subject matter expert should bring unique insights to the panel to represent a range of interests and perspectives. As such, we recruited a heterogeneous group of ten individuals: academics with a research interest in workplace performance, but each with a different focus of interest, as well as private and public sector practitioners (personnel/HR professionals). Broad semi-structured telephone interviews were conducted with each person, questions focusing on individuals' definition and understanding of individual workplace performance, how the literature (e.g. academic articles, trade magazines) links to this view, pertinent practical concerns research should address and any specific questions they would like to see addressed in a literature review. By adopting a flexible approach to interviewing, we aimed to ensure that any resulting review questions would be useful and practically relevant to a wider audience, whilst still being aligned with the focus of our review as deduced from the scoping study.

Qualitative content analysis of the interviews determined main themes, the degree of consensus between panel members and questions suggested for the review. One of the main themes centred on performance being a complex construct in a number of ways, for example in terms of different levels of performance (individual, team/group and organizational performance), relationships between

individual input and organizational output or underlying performance components (e.g. task and contextual performance). Further, individuals indicated that not enough research had concerned itself with the underlying structure of performance and how to operationalize and measure it, this being similar to findings from the scoping study. When asked specifically about areas or questions research should address, panel members mentioned again that more research should look at how to measure performance (e.g. objectively versus subjectively) and that further exploration is required as to whether performance should be assessed in terms of overall job performance or in a more differentiated way. A related aspect is that of the validity of predictors of performance – how can different performance criteria be predicted best? In summary, experts were mostly interested in seeing questions concerning the conceptualization and measurement of performance being addressed. Overall, we note that it was not always easy to reconcile different stakeholder perspectives; this we tried to address by balancing academic and practitioner foci in the final review questions. As such, resulting from the scoping study and the findings from the expert interviews, we deduced the following specific research questions for the systematic review, which were fed back to the experts to obtain their approval (Dillman et al., 2009):<nl>

1. How is individual workplace performance defined and conceptualized?
2. How is individual workplace performance measured? What are the reasons for using certain methods of measurement and how solid are the arguments presented for different approaches?

3. What are the relationships, if any, between overall versus criterion-specific measures of individual workplace performance and established predictors (i.e. ability and personality measures)?

3) Search of the Literature

An exhaustive search of the literature was carried out to enable us to examine all the evidence available in relation to the three review questions. Upon having undertaken pilot database searches by way of assessing the utility of search strings and determining a start date, we decided to combine four search strings for databases searches. Each of these refers to a key concept addressed by the systematic review, the asterisk enabling searching on truncated word forms; synonymical words or similar concepts were included in each string to ensure that any relevant references would be found in the searches:

1. perform* OR efficien* OR productiv* OR effective* (key concept captured is performance)
2. work* OR job OR individual OR task OR occupation* OR human OR employ* OR vocation* OR personnel (key concept: workplace)
3. assess* OR apprais* OR evaluat* OR test OR rating OR review OR measure OR manage* (key concept: measurement)
4. criteri* OR objective OR theory OR framework OR model OR standard (key concept: criterion)

Several sources of evidence were considered in the searches to help ensure maximum saturation and inclusion of any potential key references, namely 12 databases (e.g. Business Source Complete, PsycInfo, Chartered Institute of Personnel

and Development database), alongside proceedings and contributions from four conferences (e.g. Academy of Management Annual Meeting). Moreover, manual searches of three journals inaccessible through the databases (e.g. *The Industrial-Organizational Psychologist*) were conducted and requests for further publications (e.g. papers still in preparation) sent to scholars with relevant research interests (outside the advisory group).

The searches took approximately two weeks (full-time). All the results were exported into a program designed for the management of references. Upon removal of duplicate references, we retained 59,465 references.

4) Selection and Evaluation of References

All references retrieved by the literature search underwent an initial screening, first by title only and second by both title and abstract. The purpose of this was to exclude any papers that did not appear to address any or all of the specific review questions at least to some extent from any further investigation. It was crucial hereby to apply caution and not to discard of any potentially relevant references prematurely.

This initial screening led to a radical reduction in reference numbers: screening by title alone, which involved an examination of all publications' titles with regard to their applicability to the review questions, reduced their number from 59,465 to 3,010. The vast majority of these irrelevant references pertained to areas completely unrelated to the topic of investigation, such as medicine (mostly concerned with various illnesses and conditions and their treatments), chemistry and physics, technology (e.g. automobile industry), marketing and so forth.

Screening further by title and abstract reduced the number to 315. This second screening was more challenging, as it was not always immediately obvious when a reference was potentially relevant or not. In order not to lose focus, it was therefore important at this stage to keep in mind the specific questions the systematic review set out to answer. Any research outputs for which the abstract indicated potential relevance for the review questions were kept at this stage. References that were sifted out pertained, amongst others, to the broader area of performance management, to organizational performance, to methods of administering appraisal feedback and so forth.

Next, upon having obtained full text copies of the remaining references, these were examined in more detail by way of deciding which publications to use in addressing the review questions. As such, we read the full text critically by applying 13 previously determined criteria for inclusion/exclusion (e.g. Is the paper well informed by existing theory? Are the methods chosen appropriate to the stated purpose? Are the conclusions well linked to the purpose and aims of the research?), which were derived and adjusted from guidelines/criteria for the evaluation of academic publications (Cassell, 2010; Briner, Denyer and Rousseau, 2009; Denyer, 2009; Cuevas, 2006). A total of 172 publications met the inclusion/exclusion criteria relating to both contribution to answering the review questions and satisfactory quality. To facilitate the synthesis of the evidence retrieved, we completed a data extraction form for each of these, summarizing key points.

We note at this point that the selection and evaluation of references was a time-consuming process, which took us approximately three months. To avoid

digression, it was necessary at this stage to ensure a constant focus on the review questions and to only accept those publications for the final pool of references that meet the inclusion/exclusion criteria.

5) Analysis and Synthesis of Findings

Descriptive statistics (i.e. document type, publication outlet, year of publication and quality) were obtained for the final pool of references. We found that the vast majority of references were peer-reviewed journal articles, having been published in a wide variety of journals ($N = 52$), but with half coming from six different journals only. Literature outputs had been published between the years of 1959 and 2010; yet more than 75 per cent were concerned with research conducted in the last 20 years.

The body of evidence from the data extraction forms was integrated in two ways, combining analytical methods. For review questions 1 and 2, findings were integrated in a narrative, qualitative manner by describing and summarizing the studies and further determining how they relate to each other (Rousseau, Manning and Denyer, 2008). For review question 3, findings were aggregated quantitatively by means of statistical meta-analysis (Hunter and Schmidt, 2004).

6) Discussion and Utilization of Findings

Upon having analysed and synthesized all the available evidence pertaining to the three review questions, we summarized and discussed findings in terms of what is known, what is not yet known, where future research should take us and potential implications for practice and policy.

At this point, we would like to draw the reader's attention to three challenges that we faced across the six stages of the review. The first of these pertains to time management: systematic reviewing is a time-consuming, laborious activity, and the reviewer (or indeed reviewing team) should be aware that many tasks will take longer than anticipated. Further, time should be factored in for the acquisition of potentially required knowledge, skills and abilities in relation to the systematic review process (e.g. how to use reference management software). The second overarching challenge is linked to the first and relates to a potential danger of decreasing motivation; we tried to avoid this by regularly discussing progress and next steps amongst ourselves as well as with other scholars involved in conducting systematic reviews. The third, and perhaps biggest challenge in our case, was handling the very large number of references our literature search had revealed. We believe this may have been a result of our review questions being relatively comprehensive and would therefore recommend that the reader consider his/her own review question(s) carefully, ensuring these are sufficiently focused.

<a>DISCUSSION

We are advocates of systematic review methodology, given its power to assist researchers in synthesizing diverse and potentially variable original sources to evaluate current evidence. This power lies in the transparency, the replicability and the firmness of conclusions if the systematic review has been done well. Our own work illustrates that the process is laborious and not without motivational challenges, but offers worthy rewards in the end. The biggest challenge in our view is that systematic review methodology in itself can be considered simultaneously a

strength and a weakness. The strength lies in the fact that protocols are so clearly stipulated in advance, detailed and easily replicable. Such a priori protocols necessitate clarity throughout the review process and render the researcher(s) very accountable for their work. As a result, we have become very sensitized to other, more narrative reviews, which claim to offer state-of-the-art evidence, but fail to justify which primary studies were included in the review and which ones were not. Yet, stipulating the process in advance also has disadvantages. For instance, when we conducted our own review, our search strategy elicited many more hits than we had originally anticipated, meaning that it became a rather fulsome task to do full justice to all three review questions. Researchers might at this point in time be tempted to change or abandon the process, but 'pure' systematic review methodology would caution against any post hoc changes. So the benefit of hindsight can be a wonderful thing, but does not always work to the advantage of conducting a systematic review! By offering this insight, we do not mean to deter other HRD researchers from carrying out systematic reviews, but would rather like to make explicit that such a review should not be undertaken lightly. The process takes time, skill, effort and considerable determination. But without systematic reviews, moving the HRD field towards evidence-based management will be difficult.

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<a>ANNOTATED FURTHER READING

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