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## How to Write a Literature Review Paper?

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**ABSTRACT** This paper discusses the question about how to write a literature review paper (LRP). It stresses the primary importance of adding value, rather than only providing an overview, and it then discusses some of the reasons for (or not) actually writing an LRP, including issues relating to the nature and scope of the paper. It also presents different types of LRPCs, advises on reporting the methodology used for the selection of papers for review, and the structure of an LRP. An important conclusion is that the heterogeneity in LRPCs is very large. This paper also presents some of the aspects that the authors feel are important structural and contextual considerations that help produce high-quality review papers.

### 1. Introduction

Literature review papers (LRPs) are often very helpful for researchers, as the reader gets an up-to-date and well-structured overview of the literature in a specific area, and the review adds value. This added value can, for example, be that the research gaps are made explicit, and this may be very helpful for readers who plan to do research in the same area for the first time. Alternatively, the review can outline the advantages and disadvantages of the methods used and the implications of the findings are discussed. This can be very helpful for the reader who needs to interpret and use the findings. A review can also help to refresh the information base of a researcher returning to a subject area after some time away from it. The basic question covered in this paper is about how to carry out an LRP and to illustrate this with examples from transport.

Writing an LRP is much less straightforward than writing a mainstream research paper, as many choices with respect to the structure need to be made. Therefore, some conceptual and methodological guidance for researchers planning to write an LRP would be helpful. But to the best of our knowledge there is no academic paper in the transport literature that takes the aspiring writer through the thought processes surrounding the issues about how to write an LRP. This paper aims to fill this gap.

There is a Transportation Research Board paper giving some guidance, especially for literature reviews as part of wider projects (Avni et al., 2015), and

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the paper also refers to tutorials (videos and websites). And there are papers giving guidance for LRP<sub>s</sub> in other areas. For example, Webster and Watson (2002) discuss literature review in the information systems area, and Denney and Tewksbury (2013) in the area of criminal justice. This paper aims to fill this gap. In the medical literature, many papers publish empirical results for tests of medicine, prescribing protocols for data collections (e.g. double blind), and analyses (standard methods), but in the field of transport a much larger variety of methods is applied, making LRP reviewing methods very different. In the area of engineering and physics, the stochastic component of research is much less important than in social sciences (and often absent), reducing the importance of related aspects in empirical studies. What is very important in social sciences in general, but certainly also in the field of transport, is the fact that many variables influence an independent variable (e.g. travel behaviour) in a complex way, resulting in complex causal relationships, and a multitude of data analysis methods and interpretations.

In addition to LRP<sub>s</sub>, there are many empirical papers that review the literature, but we do not discuss how this should be done in case of empirical studies and limit ourselves to LRP<sub>s</sub>. We define an LRP as a journal paper that provides a comprehensive overview of (or a selection of) the literature in a specific area, bringing together the material in a clearly structured way, and adding value through coming to some interesting conclusions. Our focus is on the more general LRP<sub>s</sub>, excluding the specifics of more quantitative methods, such as meta-analyses (see below) or scientometric analyses (see Van Meeteren, Poorthuis, Derudder, & Witlox, in press, for an example).

The approach used in this paper is the ‘learning by doing’ method. ‘Doing’ in our case is the combination of writing LRP<sub>s</sub> ourselves (often with co-authors), reviewing such papers, teaching Ph.D. students how to write such papers, deciding as editors on the suitability of papers for publication (based on external review reports), and discussing the topic with editorial board members of transport journals, and other academics. The paper aims to provide help for researchers interested in writing an LRP, but we do not provide a template. Rather, we discuss a list of topics that we hope is relevant and helpful. As there are many types of LRP<sub>s</sub> and many ways to structure high-quality reviews, it makes no sense to present a ‘one size fits all’ solution. We limit the paper to writing an LRP for an academic journal in the transport domain. Nevertheless, some of the content may be relevant for other purposes, such as discussing the literature as part of a Ph.D. thesis.

Section 2 explains why to (not) write an LRP, and it includes a discussion on the different means by which the issue of added value can be addressed in writing an LRP. Section 3 presents some examples of types of LRP, and Section 4 outlines the means by which different methodologies can be used to select papers for inclusion in the review. Section 5 gives some guidance on the different means to structure the LRP. Section 6 emphasises the important issue of choice of journal to submit an LRP to, and some of the reasons why many review papers are rejected.

## **2. The Rationale for Writing an LRP and Added Value**

There are many reasons for thinking about writing a review paper, but it must have a clear rationale and the key issue of added value needs to be the central concern throughout the paper. In terms of the rationale, writing a literature review implies a wide range of reading, resulting in the researcher acquiring a

substantial amount of knowledge in the research area, and this on its own might generate the enthusiasm to write an LRP. As a consequence of this, the paper may become heavily cited and this will build the reputation of the author(s), and help in promoting their standing as a learned scholar in the field. This in turn allows researchers to position their own research clearly in the academic literature. As part of their job, many academics would read a substantial range of the literature anyway, and so writing an LRP implies one can 'harvest' all the reading in an explicit way, and get credit for doing it. It is also one of the research activities that can be carried out independently, as one only needs access to the books, the journal articles, and other literature. For example, there is no need to plan for data collection (e.g. questionnaires). Therefore, writing an LRP is to a large extent a 'stand-alone' activity, and it is one form of research output that does in some cases (but definitively not all cases) get well cited. For example, in *Transport Reviews* (since 1994), some papers have received more than 200 citations through the Web of Science (Goodwin, Dargay & Hanley, 2004; Pucher & Buehler, 2008; Yang & Bell, 1998). Literature reviews are also used for teaching, as well as research purposes. For example, we are aware of several teachers who use the Geurs and van Wee (2004) paper for an introduction to the topic of accessibility.

Apart from the positive messages given above about the reasons for wanting to write an LRP, there may also be reasons for not even thinking about the possibility. The most obvious reason might be that the LRP a researcher intends to write has already been published, and if it has the same potential scope as the author has in mind, a new review would be redundant. However, in many cases there might still be potential for an additional review, if a different literature is to be used, or if an existing review needs updating, or even if the same literature is used, but a new angle is being taken resulting in substantially different conclusions. For example, an already published review might have an empirical focus, whereas the new review might have more of a methodological focus. The topic of residential self-selection provides a nice example: Mokhtarian and Cao (2008) review the literature from a methodological angle, whereas Cao, Mokhtarian, and Handy (2009) review this literature from an empirical angle. If the review was carried out some time ago, and since then new and 'better' methodologies have been applied, then there may be a case for a new review, focusing on the recent literature. Alternatively, there may not be enough papers to include in the review, and this may be a reason for not writing an LRP, but the solution here would be to expand the scope of the review. The opposite is more likely, where there are too many papers, and then narrowing down the scope might be the solution. Writing a highly regarded LRP is not an insignificant task, and it is often a time-consuming activity. Not only does the selection and reading of literature in many cases take a considerable time, but so does the writing, as an LRP is much less straightforward than writing a mainstream research paper, and consequently the writing stage might take a considerable time.

When examining research outputs, the review paper is often given less weight than a more traditional paper, as it might not have as much 'original research' as the traditional paper, but this possibility should not reduce its value. It could be argued that a high-quality review paper is of more value to the research community than a high-quality research paper, written within a more conventional research structure and on a more focused topic. As already stated, this may in part be a consequence of the fact that there is no standard template for LRPs, and this might also deter potential authors from writing an LRP. The perception

that a review paper is of less value than a research paper (Steward, 2004) may also result from the confusion between the general overview paper and the critical review paper.

The crucial difference between the more general overview paper and the more critical review paper is central to the issue of added value (Table 1): an overview paper does not need to add value, but review paper does. The many options include the full range of paper types, ranging from conceptual, theoretical, and methodological, to more case study and practice-based reviews. The options can be synthetic, bringing together of different approaches, they can be critical in terms of the review, and they can be innovative in terms of proposing new conceptual frameworks.

Taking the option of empirical insights as an example, the results can be presented in many ways, for example, in the form of a range of quantitative effects of an independent variable on a dependent variable. Meta-analyses are a more rigorous way to present empirical results, because these do not only provide such a range, but also insights into the quantitative importance of influencing factors. For example, Brons, Nijkamp, Pels, and Rietveld (2008) present a meta-analysis of

**Table 1.** Options for the added value of LRP

Options for added value	Comments	Main output (examples)
Empirical insights	A synthesis of what is already known (and maybe what is not)	State of knowledge Gaps in literature Weaknesses of methodologies used
Methodologies	An analysis of methods used, and their advantages and disadvantages	Overview of dominant methodologies used Pros and cons of methodologies used
Theories	An investigation of different theories used, and their importance. This might cover the implications for the results	Opportunities for new methods Overview of main theories used Strengths and weaknesses Impact of theories used on results Potential for other theories
Gaps in literature and a research agenda	This can relate to reviews with an empirical, methodological, and theoretical focus — to explore omissions and limitations in approaches and suggest ways forward	Main gaps in literature Avenues for future research
Relevance for real-world applications	A discussion or synthesis of how useful the literature is for real-world applications (policy, planning, etc.) — perhaps with the use of case studies	Overview of knowledge available for real-world applications Design guidance Examples of real-world cases that are (not) underpinned by results from literature Comparison between cases or countries
Conceptual model	Provides explicit structure on how dependent and independent variables are related. Can be presented preceding or following the review part of a paper	Scheme, figure presenting the conceptual model Overview of which parts are (not) well founded/underpinned by literature

gasoline price elasticities, including as explanatory factors short-term versus long-term focus, geographic area, year of the study, data type, time horizon, and the functional specification of the demand equation. Another example: reviews can aim to be relevant for real-world applications. For example, Givoni (2006) reviews the literature on high-speed rail, disentangling components of high-speed rail operations, and translating these into design guidance.

A sign of a good review is that the value added permeates the whole review and not just the conclusions. For example, Schwanen's review (2013, p. 232) states,

Thinking about sociotechnical transitions comes, however, in many varieties. One could mobilise, for instance, evolutionary economic theory (Dosi, 1982; Nelson & Winter, 1982); long-wave economic theory (Freeman & Louca, 2001); the multilevel perspective and affiliated approaches (Geels, 2011; Nill & Kemp, 2009); practice theory (Shove & Walker, 2010); and sociologies of complexity (Urry, 2011). Nonetheless, whilst expanding rapidly, applications of transition thinking in transport and mobilities research are as yet fairly limited in number and tend to be animated by the multi-level perspective, practice theory and sociologies of complexity.

This quote demonstrates both a wide-ranging knowledge about several different literatures, and it imposes a clear structure on their usefulness in thinking about sociotechnical transitions.

The key lessons from this section relate to the scope of the review and the added value. The scope needs to take a balance between specificity and generality, as being too specific restricts the range of literature that can be covered and being too general makes it much harder to produce a high-quality review, as there is so much material available. The key here is to have a clear focus to the review, as it is easier to 'grow' a review by extending its scope, rather than trying to 'restrict' a review as the scope is already too large.

In terms of the added value, an LRP needs to have a clear message and interpretation, and this should indeed be a central part of the rationale for writing the paper in the first place. Perhaps it is best to take a problem that can be specified as a series of objectives, and then to structure the review around these. This type of review is very much evidence-based and is similar to a conventional paper. Alternatively, there is also the potential to use a more heuristic approach and leave the objectives more open-ended. This might provide a more appealing approach, but it means that the clear conclusions need to be drawn at the end. In both cases, the interpretation of the material used is central to a high-quality LRP, and a paper with weak or no conclusions must be avoided. Some of these issues are now discussed in more detail.

### **3. Types of LRPs**

Building on the typology outlined in Table 1, LRPs come in many different forms. A classic LRP would first outline the structure and purpose of the review, and it would then present the literature in a logical way, commenting on the differences and similarities between the materials cited, and this would then be followed by discussion and conclusions — it is this last part that relates to the added value of the LRP. But there are many more types. In some cases, a paper can have an

empirical question, and the method adopted in the review is to answer the question by reviewing the literature. A literature review is then used to answer these questions. An alternative is to take a new or non-conventional approach to a well-known problem — this can be important for many reasons, such as to shed new light on an existing topic, to disentangle concepts in subcomponents, or to put the results in another perspective. An example is provided by Geurs and Van Wee (2004), which reviews the literature on accessibility measures. Instead of taking the standard perspective of categories of accessibility measures, they examine the components that contribute to the accessibility measures (land use, transport, the temporal, and the individual component). Another alternative is a paper that does not aim to review all (main) literature in an area, but to cover a specific theme. For example, Banister, Anderton, Bonilla, Givoni, and Schwanen (2011) review on transport and the environment had a clear focus on low-carbon transport systems, behavioural and technological options, demand reduction, and the role of international agreements. But the real core of the review was on rethinking governance with respect to low-carbon transport systems and the means to implement policy change within a fragmented decision-making process. This example illustrates how an under-researched area can be identified for further investigation, even though it is embedded within a well-covered research area. It provides a starting point for new research. A final alternative might be to present a conceptual model and then to explore the literature that might help support such an innovative framework. As for theme papers, not all (main) literature then needs to be reviewed, but the references discussed serve the purpose of underpinning the conceptual model. Van Acker, Van Wee, and Witlox (2010) adopted this approach in their study of travel behaviour by introducing a new framework at an early stage in their paper, and then review the literature on travel behaviour from this perspective. The heterogeneity of types of LRP s all contribute to the fact that writing an LRP is not straightforward, but interesting, challenging, and rewarding.

#### **4. Methodology: Selection of Papers**

One of the weakest elements in LRP s is that they are not explicit in the methodologies used. The issue here is different to the conventional paper, where there is often a section in the paper devoted to the methods that will be used, and comments are then made at the end of the paper on the strengths and weaknesses of the methods used. In LRP s, the section on methods is often very short or not present at all, as the literature used in the review is ‘drawn’ from the extensive publications available. There are different ways to address this limitation and our strong recommendation is for authors to be explicit on the methodologies being used and the selection of the material that forms the source material for the review. In case a paper aims to review more or less all main literature in an area, the most obvious sources are the numerous databases that are widely available (e.g. Web of Science, SCOPUS, Scholar Google, and TRID), and information needs to be given as to how these have been systematically ‘searched’. For example, comments would need to cover the key words used for the search (including strings, such as ‘transport\*’ to include both transport and transportation), and if the selection has been heavily influenced by the Boolean operators (AND, OR, and NOT). In all cases, we recommend making the use of these operators explicit. An excellent example of making explicit the search strategy is the

LRP produced by Scheepers et al. (2014), where they explicitly report on databases, languages included, keywords, search strategy, and some other aspects. In addition, the languages covered should be made explicit, especially if literature in other languages than English is covered. The time frame should also be made explicit, as well as the reasons for the choice. For example, an LRP could consider the post-1998 literature only, because an LRP describing the literature up to that year already exists, or because the methods reviewed were first introduced in that year. In some cases, LRPs can be limited to specific contexts, for example, a country or category of countries, because the context may have an important impact on results. For example, the impact of land use on travel behaviour in the USA can differ from several EU countries because of differences in the public transport system, cycling culture, fuel prices, and the availability of sidewalks, legitimating an LRP on studies carried out in the USA or (a selection of) EU countries only.

Often snowballing is used, and this should be made explicit. Forward snowballing implies finding citations to a paper, whereas backward snowballing implies finding citations in a paper (Jalali & Wohlin, 2012). Even if the selection of papers to be included in the review is based on more subjective criteria, such as personal knowledge, extensive research in an area, brainstorming with experts, and other open-ended approaches, there is a methodological section that needs to be written on the process by which papers have been selected, together with comment and reflection on the strengths and weaknesses.

A search often results in too many papers being found for inclusion in the review, even after narrowing down the scope. We do not provide a precise threshold value, but LRPs in most cases might have a minimum threshold of 30 papers cited, and it is unlikely that more than 100 papers would be covered in the field of transport. If there are 'too' many papers, the solution may be to not include all papers, but to impose a (stratified) selection. This process should also be made explicit, and there should be a clear rationale to the logic of the process adopted for final selection. Reasons could relate to impact of papers (e.g. measured by citations — total or per year), geographical area, quality, whether the paper is recent or not, whether it is seminal or not, and many more criteria.

There are more methodological issues that deserve attention. As authors of LRPs should avoid criticising authors of original papers for things they did (not) do that do not match the scope of the LRP. For example, an LRP may review a paper on different levels of cycling, but an empirical study may only focus on utilitarian cycling, excluding recreational cycling. Excluding recreational cycling then should not be a criticism, but just an observation. The same applies to authors of empirical papers having used methods that were considered state of the art at the time of doing the research that in recent years have been considered as not the state of the art anymore. Reviewers should avoid simple averaging quantitative results. For example, if multiple studies review the impact of one variable on another, but some studies are based on only a few cases, whereas others include many more, averaging is misleading. It is better to present the individual results, combined with the number of cases, or weighing results in case of calculating averages. If averages are presented we also recommend presenting the range of results because probably the range is at least as important as the average. It is also very important to make explicit if conclusions and interpretations are provided by the authors of the original papers, or by the authors of the LRP.

Finally, a discussion on the ‘why’ behind results can be very helpful for the reader. This may be speculative to some extent, as long as this is made explicit. Speculation on reasons for patterns in the results may not only be helpful in trying to understand these patterns, but may also inspire readers in their own future research.

## 5. The Structure of a Paper

The LRP can be written in many different ways, and here we present a set of options but no recommended practice. The introduction can be very similar to a conventional research paper, discussing the background of the topic, what is already known in terms of the main lines of enquiry, the gap(s) in the literature, the motivation and aim of the paper related to the gap(s), the research questions, and for whom is the review targeted. The precise scope should be explained, preferably presented in a clear storyline. The methodology to be used could also be included in the introduction, but in light of the comments in Section 4 there may be a case for a separate methodology section. If there are already literature reviews in the same area this needs to be made explicit, as well as the position of the current LRP compared to those previously published LRPs in the same area.

Next, one would expect to see the presentation of an overview of the literature reviewed, often in the form of a table or a series of tables. Several ‘templates’ for such a presentation can be found. One common template for structuring the inputs to the review is to have as columns: author(s), descriptive characteristics such as the year of publication, geographical area, and sample size, but not the results of the review. The rows below are the papers/sources to be reviewed. For example, Hunt, Kriger, and Miller (2005) reviewing land-use transport frameworks used six columns to describe the software developed, the lead researcher, the history of the particular approach, the data platform, the commercial availability, and the support for the software. Six different models were selected, and they are then explicitly compared and commented on under each of the headings outlined above. Another template could be where the rows are *a priori* clusters of papers, for example, by world region or methodology. If a table is very long, it can be included as an appendix (see, for example, Salomon & Singer, 2014, where the authors review a range of travel measures over four time points).

In the case of papers with an empirical or methodological focus, the results of the review can also be presented in a table form, especially if the number of sources is relatively large, more than ten being a rough indication. This again can be structured with the papers/sources as rows. The columns provide the main content of the papers, and these are clearly linked to the aims of the review. For example, Nicolaisen and Driscoll (2014) use this approach to structure their ex post analysis of travel demand in a series of tables that systematically compare the results of the different studies by a consistent set of metrics.

The objective in using different formats and summary tables is to synthesise large amounts of information in a clear and concise way that makes it easy for the reader to both understand and to make comparisons between the broader approaches being reviewed. It is much easier to summarise with the use of tables, graphics, and other illustrative material, and it should also make the narrative easier to follow for the reader.

There are more options to structure the review paper than by source. It is also an option to have ‘results’ or content-related clustering as the guiding principle. For

example, if the papers review methods, it can also be that the first column presents key methods, and for each method then a description or typology is given, and next a column presents the sources that apply the method. Goodwin et al. (2004) in an LRP on price and income elasticities structure some of the content of their paper by distinguishing between the short- and the long-term elasticities. In case there are too many sources to be included in the LRP (see above), the author can decide to only present example papers, but explanation would be required.

Tables are not the only means to present substantial amounts of information, and in many cases, the use of text does the job just as well. Whether in table form or through other presentation devices, there are many options to structure the results section, depending on the aim of the paper. Examples would include the research area, the research period, the empirical focus, method(s), results, theories, etc. And in some cases figures can clearly present findings.

One observation is that authors of LRPs sometimes overlook the ‘obvious results’ that are often, but not necessarily, descriptive and characterise the body of literature in general terms. Examples of ‘obvious results’ might include the omission of studies published before a certain date originating from the USA, or that all studies found significant impacts of variable A on variable B, or that 80% of the studies were carried out after 2005, or that recent papers apply other methodologies. What might seem obvious to some needs to be explained, as it might be less obvious to others. A general tip is to present those obvious results in an early stage in the results section. A key element in the selection of papers is the audience for the LRP and their level of prior knowledge on the topic, as this determines the decision as to whether to include or exclude particular comments and results. This issue is difficult to give advice on, as the purpose of the LRP is to appeal to a wide readership that includes both experts in the subject area (for updating) and newcomers to the subject area (for more general background). The final decision here must reside with the author(s).

## 6. Final Remarks: Journal Choice, Abstract, Rejections of LRPs

Before writing any journal paper it is important to think about the journal of first choice for submission. Several transport journals do not (or only in very exceptional cases) accept LRPs, and examples here would be *Transportation Research Parts A and B*, *Transport Reviews* and *Transportation Research Part E: Logistics and Transportation Review* explicitly have ‘review’ in the journal title. Journals like the *Journal of Transport Geography* and *Urban Studies* also accept LRPs. Before choosing the journal of first choice it is wise to read recent examples of LRPs published in that journal, to get an impression of the tradition for LRPs. Some journals impose a maximum number of words for any paper and this limit needs to be checked, and all journals give authors guidance on the scope and expectations. Word limits for any paper often create problems, as authors have difficulties in keeping to externally imposed constraints, and an LRP is no exception. We have the impression it is even more difficult to stay within the word limit in case of an LRP, as there is always more to tell. Referees are also fond of asking for more material in an LRP, but are not so keen on suggesting what parts of a review paper should be shortened or omitted.

In most cases it is helpful that the abstract of an LRP not only describes the paper but also includes the main conclusions and added value. We realise that

different journals have different guidelines for the length of an abstract. In case of relatively long abstracts it could also include the background/introduction of the topic, its research questions, and its methodologies. This paper is intended to help aspiring writers of reviews to think about how writing an LRP can best be approached, and its purpose has been to highlight both the positives and the negatives in an open and informative way. The main reasons for rejection are not difficult to summarise. The key element is whether the paper is really a review or more of an overview, and here the key element is the added value. It should be written in an authoritative and constructively critical narrative. Another reason for rejection is that its aims are not met. The paper should clearly state its objectives in the introduction, and the conclusion should return to these objectives to assess whether they have been achieved. A third reason for rejection is that the paper has not been fully developed, as it is really an early draft. This means that the structure is weak, the evidence is partial, and there is no real content or thought in the LRP. In turn, this may result in a paper that is poorly constructed and has been submitted for external refereeing prematurely. The rejection levels are increasing for all major academic journals, and transport journals have rejection rates of between 50% and 90%. However, we see no reason why it should a priori be more difficult to get an LRP accepted in a high-quality transport journal than getting a conventional research paper accepted.

In summary, the LRP should primarily be a review paper that covers a wide range of literature from an authoritative and critical perspective, and that it comes to a set of conclusions that are supported by the evidence cited and adds value to the debate. Ideally, the paper should also be readable, interesting, and even exciting to read. Because of the high added value for readers, our intention is that this paper inspires potential authors to write an LRP that follows the *Transport Reviews* golden rule: a good review “takes a comprehensive overview of a subject, bringing together the material and coming to some interesting conclusions” (<http://www.tandf.com/journals/printview/?issn=0144-1647&subcategory=GE250000&linktype=1>).

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