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RESEARCH CENTRE ON TRANSPORT POLICY

TRASPOL didactical notes

TRANSPORT DISSERTATION HANDBOOK

VERSION 1.0 (2017)

Transport Dissertation Handbook
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Contents

1 OBJECTIVES

The thesis / dissertation is the occasion for students to develop and apply research skills, examine in depth topics encountered during their studies and bridge the gap between a pure theoretical approach and a real world application.

In particular, it is possible to undertake three kind of dissertation /thesis

- Project work report
- Non-research (literature report).
- Design project report

The skills to be developed include (in brackets those relevant for more complex theses only):

- Literature review
- Focus on key issues
- (Original / empirical methodology development)
- (Data analysis)
- Results and policy implication

A **Project work report** requires data analysis and some form of calculations using excel or equivalent programs. The core of the work is mainly analytical and the analysis/production of data and elaborations is the core. Data analysis may be simple or complex depending on the project, the dataset and software available (and yes… the confidence of student in using the software as well!).
The various degree of complexity of calculation will not affect the timing and deadlines after the kick-off meeting.

Non-research dissertations (literature report) will not include any or very limited production of data or mathematical analysis, but it is focused on an in depth review of literature of a chosen topic. This does not mean that there is no quantitative focus in the thesis, but that the student is not developing or producing data or analyses, but refers to third-party ones found in literature.

Finally, it is advisable that a student may undertake a **design project report** only whether a real case and related data are available. The design report project may be a portion or a particular of a real ongoing project.
Fictitious cases are not accepted. Cases in foreign countries will be discussed and, in general, it is necessary that data is clearly available since the beginning, as the tutor has usually no direct knowledge on the case. Design projects may include the design or redesign of transport services, the design of new infrastructure, a land use-transport integrated design. In general, it is not accepted here as a thesis the further deepening of the project works developed during the Infrastructure Design workshop (Pucci + Beria).

2 DEADLINES

Step 0: Topic and Kick-off

Dissertation and Thesis topics must be agreed between the student and Professor Beria. The topic may change and adapt during the work, but the research question must be clear since the beginning to both student and tutor. Kick-off meeting will focus on that. If available, we will give students literature and available materials, but this is not the case for all topics.

Step 1: Interim report and workflow

Once the kick-off meeting is over, the student must start working on the thesis and produce an Interim report in a period of 2-4 weeks, consisting in a document and/or in a Powerpoint presentation.
The Interim Report must include a work plan, consistent with the following deadlines:

Step	Deadlines	Notes
[0] Kick-off		
[1] Interim report	2-4 weeks from kick-off	
√ Approval of the Interim		
[2] Literature review, methodology, preliminary results or hypothesis		
[3] Draft	20 working days before Draft's approval	The Draft's completeness must be such that the Tutor can assess the feasibility to meet the deadline of [4]
√ Approval of the Draft		
[4] Final draft	10 working days before step [5]	The Final Draft must be complete in all parts. Only editing, cross references, full bibliographical refs. can be finalised later.
[5] Submission of the Thesis	**As published in Polimi website**	
√ Approval of the Thesis		
[6] Presentation preparation	3 working days before [7]	
[7] Discussion	**As published in Polimi website**	

It is possible for the student to revise the deadlines and the work plan, but deadlines [3] and [4] must be always respected, not to be delayed to the next session.

Steps 3 and 4: Drafts

The Draft is a complete text – although not finalised – that contains all methodological aspects and most of results. The Draft will be rejected – and the student will pass to the next session – if the remaining time to meet the deadline of the Final Draft is judged as not sufficient to cope with all requested changes and corrections. In particular, if the methodology is not yet clear, data not elaborated and text far from completeness, and time to Final Draft is limited (1-2 weeks), the Draft will be rejected.

The Final Draft is a document with characteristics of completeness and the further modifications are expected to be only formal.

In practice, the Draft can – in principle – require major revisions, if time is sufficient, while Final Draft will be acceptable only if minor revisions and Minor integrations are still needed.

Step 5: Submission

The student is expected to upload a Final Draft (or a Final version) in the system to be admitted to the session. The upload is a necessary but not sufficient condition, as the submission is subject to approval from the Tutor. The submission to the online repository is subject to Polimi deadlines, usually visible via School website http://www.auic.polimi.it/ or www.polimi.it.

Step 6: Presentation

The time between the submission (ruled by Polimi) and discussion, can be typically used to prepare and discuss the presentation. The presentation must not – in principle – include contents different from the Final Draft or further elaborations, but simply present and summarise the work and its results.

3 CONTENTS AND WORKFLOW

3.1 INTERIM REPORT

The interim report is a 1000-6000 words document or a Powerpoint presentation where is briefly explained:

i. **Background of the thesis and preliminary literature review**: *what is the general topic/context of the work? Which is the state of the art from which the thesis starts? To which previous studies the thesis belongs?*
ii. **Motivation for the study**: *why are you working on this topic? Why is it relevant for the reader? Which are the relationships with your study programme?*
iii. **Objectives**: *what are you expecting to obtain from the thesis? Which will be the outcomes? Which documents will be produced (book, tables, projects, presentation,…)?*
iv. **Proposed methodology**: *how do plan to work? Which approaches are you applying?*
v. **Datasets**: *which information you already have or you need to obtain? When these data are needed and expected to become available?*
vi. **Dissertation structure**: *which is the structure of the work and of the document (not necessarily the same)?*
vii. **Workflow and Gantt Chart**: *how are you organising the work in phases? What is the expected timing of each phase? Are there milestones to be considered, i.e. things that must happen before the workflow goes on? → see paragraph 3.2*

An example of interim report is attached. Some important issues that you must bear in mind:

- The main goal of the interim report is to clarify the objectives of the research and to organise the work and its time frame
- The literature review is a process that goes on along the entire thesis work, but it is important to start from an initial comprehensive work which clarifies what literature has already said about the issue, which are the main lacks of the literature, which methods are available and can be applied in the thesis.
- Background and preliminary literature review may be combined together: the dissertation should fade out from the context and land "naturally" at the literature review as a tool to address the questions raised in the previous paragraph. The student should focus on the papers that will help him to choose an appropriate methodology.
- It is important to back the thesis (except the literature based ones) with empirical analyses. Empirical works require that you preliminarily identify the dataset needed (incl. surveys, if needed), and verify if they are actually available and how? What happens if the expected data do not come on time or result not available at all?
- Methodology can be developed later, but as soon as you identify the main issues related to the methodology or data chosen, the better it is
- Consider that the workflow you follow is not necessarily matching with the thesis book structure. The workflow is how **you** undertake the study, the thesis is how you present it to the reader. Typically, the work you do will be broader than the things you are going to show and write in the book: something will be redundant, useless, misleading, or simply already known and not worth to be presented. Also, for clarity's sake, some parts that you did later can be anticipated or the opposite. For example, the literature review done at the beginning could be spent later in the book if the case study description and the problem setting (which came later in your work) are discussed at the very beginning of the presentation.

3.2 ORGANISING THE WORKFLOW

A proper organization of the workflow is essential to make your dissertation experience fruitful and enjoyable. If you draw a realistic plan, you will be in control of your essay. It is very likely, thus, that you will end up with satisfactory results without too much stress.

First of all, you must identify the tasks that you are going to perform, writing a "to-do-list". Each task must be neither too much specific nor too broad. It may contain subtasks, such as in the example:

- *Task 1 - Literature review. Sub-tasks: topic 1, topic 2… notes review, chapter writing;*
- *Task 2 - Literature chapter – Sub tasks: chapter 3,4,5 ...*
- *Task 3 - Methodology chapter writing;*
- *Task 4 - Results - Sub-taks: calculations, review against literature results*
- *…*

Secondly, you should assign a reasonable time that you expect to spend in order to perform them. Consider the number of subtasks, the different complexities and assess the possible risks of time overrun. How likely are they? Are there critical tasks?

Furthermore, very often tasks are chained. Identifying properly the dependency between the various activities is crucial (i.e. Results calculation can be performed only when the methodology is well established).

At this point, you can start working on your "Gantt Chart". A simple Gantt chart is a bar chart that helps you to schedule your project. It advisable that you draw the chart at task level and then (for your own sake) at sub-task level.
Most importantly, you should identify the milestones ◆ and include them in the schedule. Milestones are all those steps that must be complete before proceeding to the next one. For example:

- *"obtain the dataset from ISTAT" is necessary to proceed with the task "Calculations".*
- *"approval of the draft" is a milestone before to proceed with "submission".*

Task	Start	End	February				March				April			
			W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4
Methodology	01/02/17	20/02/17												
Data collection	15/02/17	24/03/17												
Calculations	30/03/17	01/05/17												
…														

The milestone ◆ is necessary to start with the task "calculations" and thus must come earlier. The 3 weeks of the example can be used as a security buffer: if the data does not come on time, the workflow will not be delayed. But if the data are expected on March-week3 and this does not happen, "calculations" will delay accordingly!

You can plan also breaks in the Gantt (e.g. the last exam session), but it is important that all timing is coherent with the deadlines!

3.3 DISSERTATION REPORT – FUNDAMENTAL CONTENTS

THE RESEARCH CONTEXT	What is the subject and the essential discipline? Why is it an important subject? Why are we studying it? What do you hope to achieve?
AIMS AND OBJECTIVES	State clearly aims & objectives of the dissertation. Describe and explain the structure of the dissertation, giving to the reader the idea of the logical flow of contents.
RESEARCH BACKGROUND	Make a complete but meaningful literature review. What has already been done? How? By whom? Are there context differences?
METHODOLOGY	Methodology explanation. How are we going to apply the methodology? What we expect to obtain from the treatment?
DATASET	Data description. Where they come from? Nature and source
RESULTS	Turn the handle and proceed with an analysis of basic results. Just EXPLAIN, DO NOT COMMENT.
FINDINGS	HERE COMMENT AND INTERPRET THE RESULTS OF THE ANALYSIS.
CONCLUSIONS	What have you found? Is that the expected result? What is the meaning? Refer to the literature review and compare. Evidence shortcomings and opportunities for further studies.
BIBLIOGRAPHY	

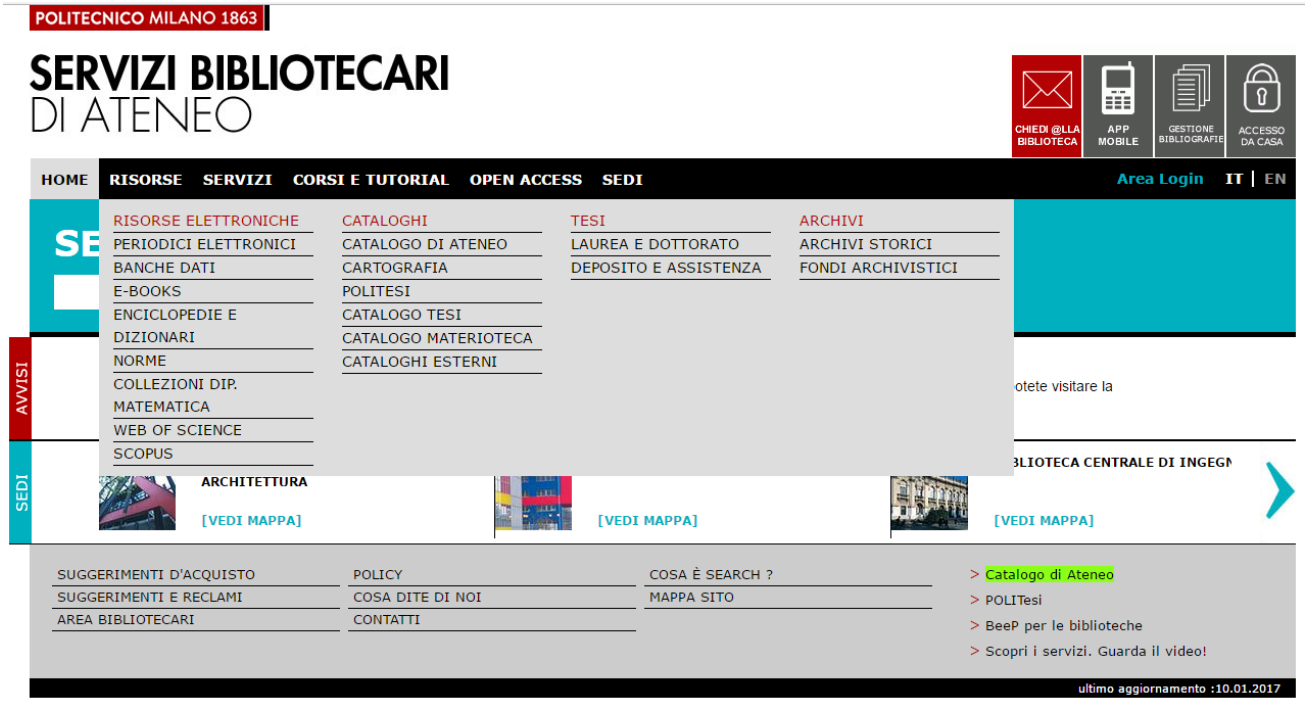
(adapted from: University of Leeds)

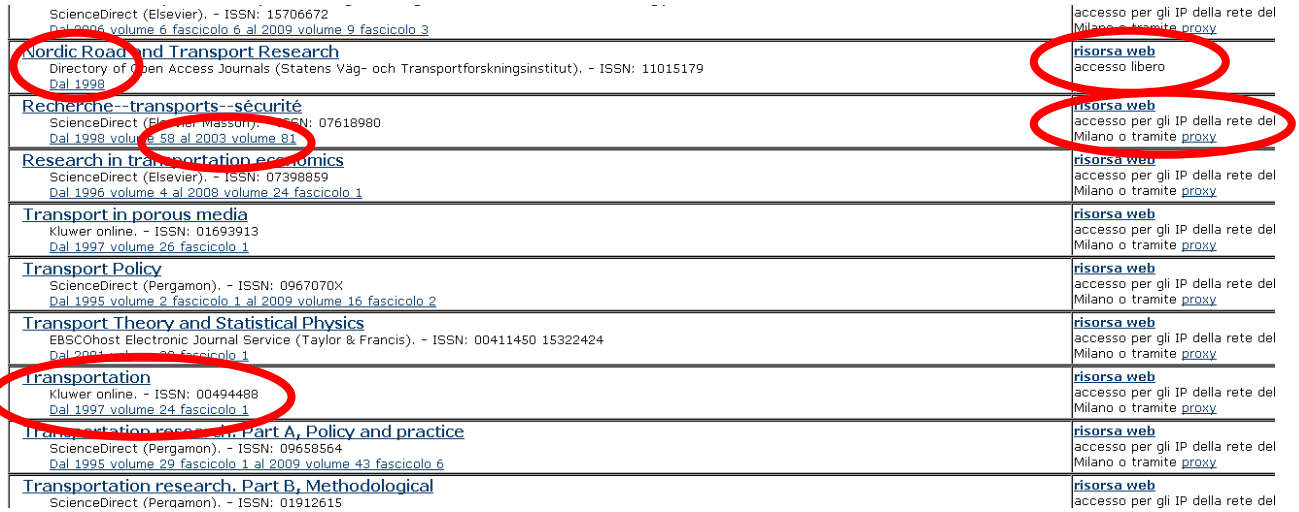
4 THE SOURCES OF THE THESIS

4.1 WHERE AND HOW TO SEARCH FOR LITERATURE

Since the massive use of web, we can enjoy of a wide range of tools to find the literature we need for our research. Some of the sources are OpenSource and can be freely downloaded and quoted. Most of scientific literature is not OpenSource and you can have it only by purchasing it or being subscribed to a journal. Once you have a paper, you can freely quote it (ok, you also need to read it…).

Politecnico di Milano is subscribed to many journals and owns numerous books, both in paper and digital format. Our library website www.biblio.polimi.it lists all available sources, in particular under "RISORSE ELETTRONICHE" section.





For example, the journal "Nordic Road and Transport Research" is freely available for everybody since 1998. The "Recherche--transports—sécurité" journal is available only from Politecnico computers, freely, but until

2003. After that the journal ended publications or the subscription of Politecnico expired. Journals like "Transportation" are continuously available since a certain issue until present.

If we need an article included in this list and in these time ranges, we will obtain it for free automatically. Otherwise, the downloading tool will ask us to pay for the download. For example, we have subscribed access to the "Journal of Transport Geography" since 1995. We will see the issues and the papers before 1995 in red or in white (see figure) because unsubscribed, while since 1995 a green flag shows us the free download.

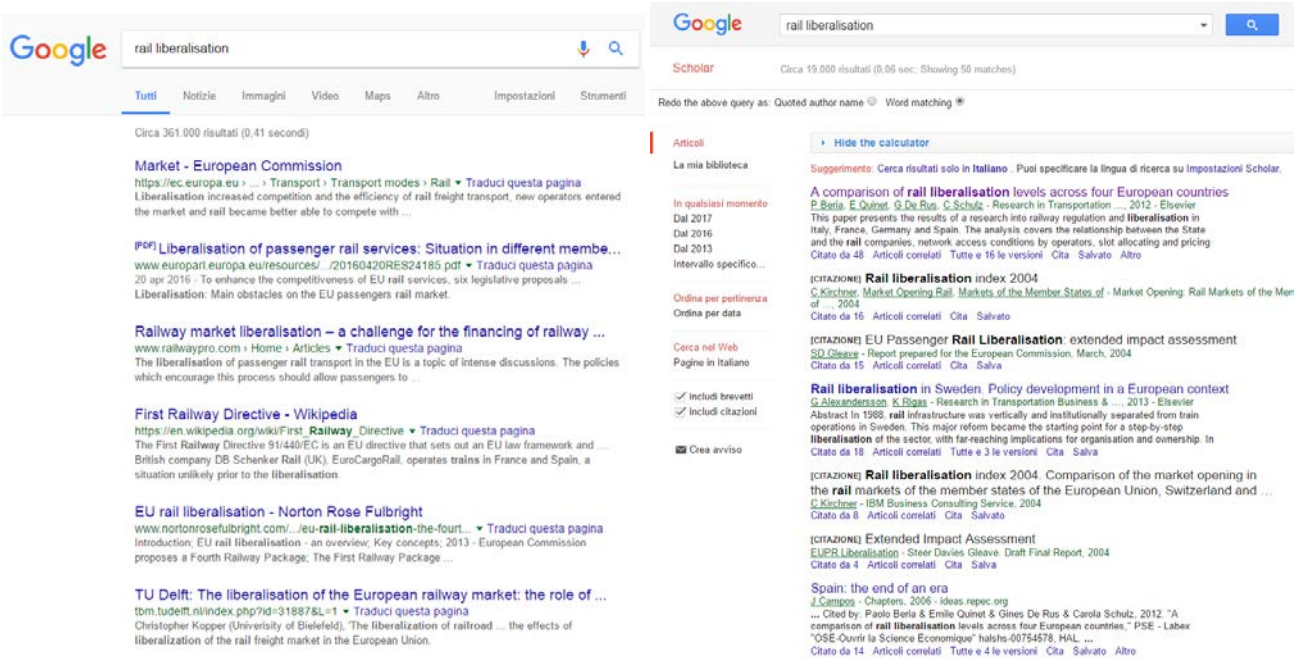
To obtain the papers you can use the library catalog, i.e. the OPACs, "**Catalogo di Ateneo**" or use external search engines. Here a list of the ones I currently use:

www.google.com
scholar.google.com

the basic Google search engine includes also scientific literature, but it is advisable not to use it because it presents many more results which will not be relevant for a scientific work.

Google has a specific open research tool for scientific literature, that can be an excellent starting point for broad range researches, called Google Scholar.

Google Scholar finds both academic literature (journals, book, etc.) and "grey literature", namely reports, conference papers and working papers. The two pictures show the different results obtained in Google and Google Scholar:



www.scopus.com

Scopus is an indexing tool that can be used also as a search engine. Differently from google, it includes only a set of indexed journals, which normally include all the relevant and internationally reputed publications, and articles are always peer reviewed and complete (i.e. no preliminary researches is published). For this reason it is advisable to used Scopus, being aware that it excludes journals that did not adhere to the platform and all grey literature including working papers and conference papers.

www.doaj.com

Is a repository of OpenAccess journals only. All of these are free, and some of these journals are not in Scopus. Consequently, Scopus and Doaj can be used in parallel.

http://ideas.repec.org/

Is a **repository**, i.e. collections of published and unpublished papers, reports, working papers, and other stuff, usually submitted by authors or found by the managers of the repositories in the web. The documents found here are usually not peer reviewed, i.e. are submitted by the authors and no one controlled for the quality of them. Typically, repositories are used by authors to give evidence and circulate not-finished works or conference papers or ongoing researches which later on should be published.
Consequently, these papers must be used only if a final published version is not yet available.

4.2 How to write a bibliography

The words "bibliography" and "bibliographical references" refer to two different things and must not be confused.
With "bibliography" we intend a list of literature sources that can be considered as the whole body of knowledge on a topic or on an author. For example, in many commentaries or biographies of famous authors, we find at the end the list of their whole production and of the main commentaries on them. This is a bibliography.
For this reason, we do seldom use the word "bibliography" in a thesis or in a paper, unless we are completely sure that we know and we reviewed the whole literature, i.e. we are the main living experts on a topic…
The term "bibliographical references" refers to the literature we quoted in the text and is thus must be present at the end of any scientific text. It is necessary that any document used in the main text is quoted at the end of it, to be consulted and verified by your readers. So, in general, we will usually use the term "bibliographical references" and **we list all bibliographical references used at the end of the paper/thesis**.

Managing the bibliographical references is the same time boring and difficult, but necessary and useful. It is boring to correctly list all the documents quoted and it is advisable to do it during the writing and not at the end to be a bit lighter. It is also difficult because it is easy to make mistakes and because references should be written according to some rules.
The rules vary according to the journal, to the scientific sector and to the type of publication. The following rules refer to the planning and economic sector (often in engineering another standard is used).

Journal

Kanafani, A. and Abas, M.S. (1987) Local air service and economic impact of small airports. *Journal of Transportation Engineering*, 113, 42-55.

Books

Button, K.J. (1982) *Transport Economics*. Heineman, London.

Article in book:

Nash, C.A. (1988) Integration of public transport: an economic assessment.*Bus Deregulation and Privatization: An International Perspective* eds J.S. Dodgson and N.P. Topham, pp. 17-46. Wiley, New York.

Proceedings

Grant, R.A. (1989) Building and testing a casual model and information technology's impact. *Proceedings of the Tenth International Conference on Information Systems*, Boston, MA, pp. 173-184.

Thesis

Cardell, N.S. (1989) Extensions of multinational logit model and the ranked logit model. Ph.D. Thesis, Harvard University, USA.

Report

American Trucking Association (1987) *Motor Carrier Annual Report*. Alexandria, VA. Report American Trucking Association (1987) Motor Carrier Annual Report. Alexandria, VA.

We explain only the "journal article" format, as the others are similar and can be understood simply reading at them.

Every reference starts with the surnames of the authors, followed by the initial of the given name or names. For example Button, K.J. is for Professor Kenneth John Button. After the names, we find in brackets the publication year. Some journals do not use brackets but a full stop after the date. The year is followed by the title of the paper, in plain character. The name of the journal is instead in *italic*, followed by the number of the issue or the issue and the volume (for example "No. 52, Vol 12" instead of "52"). Finally, we indicate the initial and final page. The same information are usually available in the first page of the paper.

The other types of publications are slightly different, as one can verify reading the examples above. For example, we indicate the editor of a book and the city, for example "Heineman, London"; we do not give this detail for the editors of the journals.

An automatic reference can be obtained from https://scholar.google.com. When you find the correct document, click on "quote" ("cita" in the Italian version) and pick the APA standard. An alternative is using the service www.citeyoulike.org.

In the main text we must refer to them by simply using the surname/s of the author/s followed by the year of publication. If we need to quote two references of the same author published in the same year, we will use letters after the year to solve ambiguity. These three information allows identifying univocally each reference. Here the examples that clarify the concepts.

Kanafani, A. and Abas, M.S. (1987) Local air service and economic impact of small airports. *Journal of Transportation Engineering*, 113, 42-55.

Will be quoted in the main text in two ways, according to the sentence we write:
"…Kanafani and Abas (1987) demonstrated that…", or
"…the issue is already discussed in literature (Kanafani and Abas, 1987)…"

If we have two contributions by these two authors in 1987, we will write the bibliographical reference as:
Kanafani, A. and Abas, M.S. (1987a) Local air service and economic impact of small airports. *Journal of Transportation Engineering*, 113, 42-55.
Kanafani, A. and Abas, M.S. (1987b) A comment on local air service and economic impact of small airports. *Journal of Transportation Engineering*, 114, 3-8.

And we will quote them as follows:
"…Kanafani and Abas (1987a) demonstrated that… and further clarified their position in a following paper (Kanafani and Abas, 1987b)".

5 APPENDIX: EXAMPLE OF INTERIM REPORT

1. Introduction

The Mohring effect identifies a sort of economy of scale by user side in public transport services: for scheduled, essentially urban, public transport, increasing the frequency of service will produce economies of scale for travellers, in terms of time savings.
Supposing to have an exogenous increase of travel demand in a particular area or route, operators would increase the service level and according to Mohring (1972), in case of welfare maximising operator, the social optimal bus service will be achieved. The relationship between service level (B* = optimal number of bus per hour), demand (Q= passengers per hours), unit cost to provide the service per hour (c) follows the so-called Mohring-square-root rule:

$$B^* = \left(\frac{30vQ}{c}\right)^{0.5}$$

If the demand Q doubles, the welfare maximising operator would run ≈40% more busses. Therefore the existing users would benefit of such increase in frequency, with lower waiting times. In addition the improved service level, through the reduction of *Generalised Cost* for bus services among other modes users, should produce an additional demand (second order demand).
Assuming the objective to boost the *modal shift* towards public transport, the Mohring effect has been set as argument to support a policy in favour of subsidies to public transport.

However, a different approach is needed in the case of the UK bus unregulated market: it requires dealing with preferences and choices of a profit-maximising operator, which behaviour is expected to be different from a welfare maximising case.

2. Motivation/background

The Mohring Effect is the background for the current reimbursement guidance of Concessionary Travel from the UK Department for Transport. In England, the Concessionary Travel has been introduced in 2006 for elderly people and disabled residents allowing free travel in off-peak time. In 2009/2010 concessionary passengers on local bus represented more than the 30% of local bus trips.

The principle for reimbursement to bus operators was "No better no worse off" than without the scheme. However the costs incurred by carrying extra passengers may be significantly different, depending on the way of the operators to supply the extra –demand.

Indeed they may choose to:
- Allow for higher load factor without running any additional service
- Run larger vehicles
- Run additional services

In third case only we might have evidence of the Mohring effect, which size is actually uncertain.
Abrantes and Last (2011) introduced a new methodology to calculate Mohring factor based on bus crowding within a new framework of profit-maximising operator, that might better represent the UK case. They argued that crowding is the main factor that may suggest bus operators to increase the service frequency. Therefore they examined the additional demand generated by Concessionary Travels to enquire into the size of Mohring Factor. In order to isolate the actual generated demand, they separated out:

- The actual generated concessionary travellers
- The concessionary travellers that would have travelled even in absence of the concessionary scheme
- The fare-paying travellers

The paper applying an alternative methodology for calculating the Mohring effect, through an empirical analysis on real data, demonstrated that the size of the implied Mohring factor was lower than 0.5 at PTE level as shown in the following table.

Table 1. Analysis of additional capacity requirements

Crowding Threshold	Area	Departures above crowding threshold	Departures above crowding threshold due to generated passengers	Generated concessionary passengers as proportion of total demand	Implied Mohring factor
100%	PTE1	3.0%	1.3%	13.1%	0.1
	PTE2	1.2%	0.6%	13.5%	0.04
	PTE3	3.3%	1.4%	15.5%	0.09
	Average	2.5%	1.1%	14%	0.08
85%	PTE1	4.8%	2.1%	13.1%	0.16
	PTE2	2.9%	1.3%	13.5%	0.1
	PTE3	7.6%	4.0%	15.5%	0.26
	Average	5.1%	2.5%	14%	0.17

Assumptions: Reimbursement Factor = 50%

Sample size: PTE1 = 4 855 bus departures; PTE2 = 25 000 bus departures; PTE3 = 25 000 bus departures.

3. Objectives

Leaving the PTE level, the main aim of this study is the investigation on what operators really do: do they really follow Mohring square root rule? Which is the size of Mohring factor?
According to the literature the Mohring factor=0.5 is challenged by a mix of commercial decision and operational/physical constraints that operators have to face.
For example:

- Indivisibilities: crew and vehicles
- Desire to maintain "round numbers" for service level
- Load factor constraints / passenger constraints (crowding)

It is important to mention the case of predatory behaviour when competition occurs between two or more operators on the same route. According to the square root rule, formally there is no change among factors included in the formula and the Mohring Factor still stands. Actually the time savings experienced by users might be reduced: in the case of frequent and non-scheduled services, more vehicles of competing companies might appear at the same time at the bus stop to drain the demand. However the dataset available at the moment (described later) does not show the opportunity to investigate such relevant question.

Given the issues aforementioned, the specific objective of this study is the investigation of how the operators react to an exogenous increase of demand represented by Concessionary Travels and which the implied Mohring Factor is.

In detail we try to find out how the size of the implied Mohring factor is influenced by:
- The operator size. According to Mohring theory, smaller operators are expected to show a lower bus crowding level and lower Mohring Factor, since the frequency is supposed to be lower and the second order demand absent. On the other hand, real world considerations may suggest that a small operator struggling to face a consistent demand may allow for higher load factor. We investigate how much operational constraints influence the size of Mohring Factor.
- The network density (the strength of the demand). Separating out big cities from small (e.g. Leeds VS Halifax) and cities from rural areas. How the same operator reacts in these different contexts?
Do different levels of demand lead to different Mohring factors?
- The peak-demand. Usually crowded departures are expected during peak time. Excluding off-peak time, which is the Mohring Factor size?

The last objective raises the question of backhauling that should be tackled along all the calculations. Usually the demand-flow is unidirectional, in-bound in the morning rush and outbound in the evening. Therefore we may expect to have a negative impact on the Mohring factor due to quasi-empty ascending/descending service on the same line. We propose to exclude the quasi-empty services (establishing a minimum threshold) since the operators are supposed to be more sensitive to the needs to not leave passenger behind in the peak direction than to the operational needs.

- On the margins of these calculations it should be possible, for each operator/city/peak-demand, to estimate the threshold above that the crowding is commercially unacceptable and that leads to additional service. Supposing to use, as in Abrantes and Last(2011) 85% and 100% thresholds to identify overcrowding, it should be possible to find a mean (or trimmed mean) within such range.

4. Methodology

The main operators' behaviour in West Yorkshire will be examined through a dataset of 25000 bus departures, for which a crowding survey has been rolled on in 2009/2010.

A step by step methodology was proposed by Abrantes and Last (2011):
"1. Calculate the load factor at the maximum load point for each of a sample of bus departures where complete on-board passenger surveys or boarding/alighting counts have taken place. In the case of passenger surveys it should be possible to obtain the number of concessionary passengers on board the bus at the maximum load point.
2. Plot a frequency distribution of bus mileage against load factor.
3. Calculate the proportion of bus departures for which the maximum load factor goes above a certain crowding threshold (which we refer to below as X%). Where data permits, calculate the proportion of departures where overloading is due to generated passengers (which we refer to below as Y%).
4. Calculate the proportion of generated concessionary passengers relative to total demand (which we refer to as G% below).
5. Estimate the local Mohring factor as the ratio between the estimated proportion of bus departures which are overloaded due to concessionary passengers and the proportion of generated passengers (Y/G)."

Such methodology will be applied, isolating in turn and calculating Mohring Factor:
- Operators
- Operators and cities
- Operators, cities and peak-times

For each (? or only for peak?) of those the data will be cleaned up by the empty services that are supposed to represent the backhauling problem.

5. References

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Savage I. and Small K.A. (2010), A Comment on 'Subsidisation of Urban Public Transport and the Mohring Effect', *Journal of Transport Economics and Policy*. 44(3)

Mohring, H. (1972). Optimization and scale economies in urban bus transportation. *The American Economic Review*, 591-604.

6. Dissertation Structure

1. Introduction
   1.1. Motivation
   1.2. Background

2. Literature Review
   - 2.1. The Mohring (1972) effect
   - 2.2. Current debate on Mohring effect at a glance.
   - 2.3. Abrantes and Last Approach (2011)
   - 2.4. Empirical work short review

3. Methodology and data
   - 3.1. Methodology
   - 3.2. Data

4. The Mohring Factor and the operator sizes
   - Big vs small: operational constraints

5. The network density
   - E.g. Leeds VS Halifax

6. The peak demand

7. Does the Mohring effect really exist?
   - 7.1. Basic results
   - 7.2. Limitations and possible refinements needed

8. Conclusions

Bibliography

Appendices

7. Workflow organisation