
The path to net-zero through multi-modal and collaborative logistics

A Data Management Plan created using DMPonline.be

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Template: FWO DMP (Flemish Standard DMP)

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Project abstract:

Climate change and a shortage of truck drivers urge a paradigm shift in truck-dominated supply chains. To alleviate the pressure on truck transport, one can bundle shipments with other companies, or shift more freight to alternative transport modes, such as train or inland waterways. In this research, we will develop ordering policies to facilitate freight bundling and a modal shift to reduce the truck intensity of supply chains. To achieve this goal, three research objectives are stipulated: (1) develop ordering policies for freight bundling using one transport mode; (2) develop ordering policies for freight bundling using two transport modes; and (3) use deep reinforcement learning to improve ordering policies for freight bundling using two transport modes. With this research, we contribute to the state-of-the-art by combining the multi-modal and collaborative literature, and by providing decision-making support for multi-modal, collaborative supply chains.

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FWO DMP (Flemish Standard DMP)

1. Research Data Summary

List and describe all datasets or research materials that you plan to generate/collect or reuse during your research project. For each dataset or data type (observational, experimental etc.), provide a short name & description (sufficient for yourself to know what data it is about), indicate whether the data are newly generated/collected or reused, digital or physical, also indicate the type of the data (the kind of content), its technical format (file extension), and an estimate of the upper limit of the volume of the data.

				Only for digital data	Only for digital data	Only for digital data	Only for physical data
Dataset Name	Description	New or reused	Digital or Physical	Digital Data Type	Digital Data format	Digital data volume (MB/GB/TB)	Physical volume
		<i>Please choose from the following options:</i> <ul style="list-style-type: none"> • Generate new data • Reuse existing data 	<i>Please choose from the following options:</i> <ul style="list-style-type: none"> • Digital • Physical 	<i>Please choose from the following options:</i> <ul style="list-style-type: none"> • Observational • Experimental • Compiled/aggregated data • Simulation data • Software • Other • NA 	<i>Please choose from the following options:</i> <ul style="list-style-type: none"> • .por, • .xml, • .tab, • .csv, .pdf, • .txt, .rtf, • .dwg, • .gml, ... • NA 	<i>Please choose from the following options:</i> <ul style="list-style-type: none"> • <100MB • <1GB • <100GB • <1TB • <5TB • <10TB • <50TB • >50TB • NA 	
Code	Code written to generate results (e.g., new algorithms, simulation engines,...)	New	Digital	Software	Python files (.py)	Around 2MB per chapter, so comfortably <100MB in total	
Numerical results	Numerical results sprouting from simulations and other analyses.	New	Digital	Observational	Stored in text files (.txt) and Excel files (.xlsx)	Around 1GB per chapter, so an estimated 5GB will be needed to store data regarding numerical results.	
Manuscripts	Written text to describe methods, results, and conclusions	New	Digital	Other	Stored online (Overleaf) of which a PDF file is downloaded sporadically.	Around 2GB of text files per chapter, so an estimated 10GB will be needed.	

If you reuse existing data, please specify the source, preferably by using a persistent identifier (e.g. DOI, Handle, URL etc.) per dataset or data type:

n/a

Are there any ethical issues concerning the creation and/or use of the data (e.g. experiments on humans or animals, dual

use)? Describe these issues in the comment section. Please refer to specific datasets or data types when appropriate.

- No

Will you process personal data? If so, briefly describe the kind of personal data you will use in the comment section. Please refer to specific datasets or data types when appropriate.

- No

Does your work have potential for commercial valorization (e.g. tech transfer, for example spin-offs, commercial exploitation, ...)? If so, please comment per dataset or data type where appropriate.

- No

Do existing 3rd party agreements restrict exploitation or dissemination of the data you (re)use (e.g. Material/Data transfer agreements/ research collaboration agreements)? If so, please explain in the comment section to what data they relate and what restrictions are in place.

- No

Are there any other legal issues, such as intellectual property rights and ownership, to be managed related to the data you (re)use? If so, please explain in the comment section to what data they relate and which restrictions will be asserted.

- No

2. Documentation and Metadata

Clearly describe what approach will be followed to capture the accompanying information necessary to keep data understandable and usable, for yourself and others, now and in the future (e.g., in terms of documentation levels and types required, procedures used, Electronic Lab Notebooks, README.txt files, Codebook.tsv etc. where this information is recorded).

Code

Every code file will be supplied with annotations in the script. Additionally, for every project a .txt file will provide insights in the function of all the different code files.

Numerical results

Numerical results will be aggregated in a .xlsx file in which we will highlight how we got to these results. Further, in the location where the raw data is stored, a .txt file will additionally clarify the specific way in which the numerical results were generated.

Manuscripts

Sporadically, the manuscripts written in Overleaf will be downloaded and saved locally. The name of these files will consist of the date that the file was downloaded, to maintain good version control.

Will a metadata standard be used to make it easier to find and reuse the data? If so, please specify (where appropriate per dataset or data type) which metadata standard will be used. If not, please specify (where appropriate per dataset or data type) which metadata will be created to make the data easier to find and reuse.

- No

3. Data storage & back-up during the research project

Where will the data be stored?

All data will be stored in the cloud on the OneDrive of KU Leuven from Bram De Moor, which has a capacity of 2TB.

How will the data be backed up?

Every month, Bram De Moor will make a back-up by copying the data on a Seagate external hard drive with a capacity of 1TB. This hard drive will be stored in Bram's appartement.

Is there currently sufficient storage & backup capacity during the project? If yes, specify concisely. If no or insufficient storage or backup capacities are available, then explain how this will be taken care of.

- Yes

We are confident that we need no more capacity than 5GB per research chapter, which brings the total data capacity requirement to around 20-25GB for the entire project. As we have cloud capacity of 2TB and a back-up hard drive of 1TB, we definitely will have enough data storage capacity.

How will you ensure that the data are securely stored and not accessed or modified by unauthorized persons?

The data on the OneDrive of KU Leuven are password protected. The hard drive with back-up is safely kept in Bram's private accommodation.

What are the expected costs for data storage and backup during the research project? How will these costs be covered?

The expected expenditures for data storage are 0.

4. Data preservation after the end of the research project

Which data will be retained for at least five years (or longer, in agreement with other retention policies that are applicable) after the end of the project? In case some data cannot be preserved, clearly state the reasons for this (e.g. legal or contractual restrictions, storage/budget issues, institutional policies...).

All data will be preserved for 10 years.

Where will these data be archived (stored and curated for the long-term)?

The hard drive concerning all the data generated during the project will be stored by prof. dr. Robert Boute due to his long term commitment to the project. Additionally, all finished manuscripts will be stored and publicly available on SSRN, under the account of Bram De Moor. All finished code files will be stored and publicly available on GitHub, under the account of Bram De Moor.

What are the expected costs for data preservation during the expected retention period? How will these costs be covered?

0

5. Data sharing and reuse

Will the data (or part of the data) be made available for reuse after/during the project? In the comment section please explain per dataset or data type which data will be made available.

- Yes, in an Open Access repository
- Finished manuscripts will be made available via SSRN, under the account of Bram De Moor (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=4615970)
- Finished codefiles will be made available via GitHub, under the account of Bram De Moor (<https://github.com/bramdemoor-BE>)
- Detailed numerical results will be made publicly available upon request

If access is restricted, please specify who will be able to access the data and under what conditions.

n/a

Are there any factors that restrict or prevent the sharing of (some of) the data (e.g. as defined in an agreement with a 3rd party, legal restrictions)? Please explain in the comment section per dataset or data type where appropriate.

- No

Where will the data be made available? If already known, please provide a repository per dataset or data type.

- Finished manuscripts will be made available via SSRN, under the account of Bram De Moor (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=4615970)
- Finished codefiles will be made available via GitHub, under the account of Bram De Moor (<https://github.com/bramdemoor-BE>)

When will the data be made available?

Upon publication of research results.

Which data usage licenses are you going to provide? If none, please explain why.

None.

Do you intend to add a PID/DOI/accession number to your dataset(s)? If already available, you have the option to provide it in the comment section.

- No

What are the expected costs for data sharing? How will these costs be covered?

0

6. Responsibilities

Who will manage data documentation and metadata during the research project?

Bram De Moor

Who will manage data storage and backup during the research project?

Bram De Moor

Who will manage data preservation and sharing?

Bram De Moor + Robert Boute after the project

Who will update and implement this DMP?

Bram De Moor