Sustainable urban supply chains through horizontal collaboration and integrating the city perspective

A Data Management Plan created using DMPonline.be

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Project abstract:

Increasingly, cities aim at improving the sustainability and efficiency of their urban supply chains, by restricting the use of certain vehicles or improving collaboration among supply chain actors. Additionally, new technologies and trends are emerging, e.g., micro consolidation centers, sidewalk robots, autonomous vehicles, synchromodality, etc.

These trends generate a myriad of difficult intertwined strategic and operational decision problems. Currently, however, the optimization and simulation tools required to support decision-making in such a complex environment are (1) disjointed and scattered across the scientific literature, or (2) not mature enough to adequately handle emerging urban logistic trends. To bridge this gap in the literature, and to aid cities and supply chain actors in modelling and optimizing the supply chains, we propose to develop a comprehensive and complementary suite of urban logistics optimization algorithms for “the” city. These problems of optimizing urban supply chains are typically large-scale, multi-level and multi-objective. In order to appropriately model and solve these problems, significant advances in operations research techniques are required.

They will ultimately contribute to improving the understanding of the impact of new technologies, trends, and policies for all urban logistics stakeholders, and support their decisions towards a more sustainable city.

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Sustainable urban supply chains through horizontal collaboration and integrating the city perspective DPIA

DPIA

Have you performed a DPIA for the personal data processing activities for this project?

- Not applicable

Sustainable urban supply chains through horizontal collaboration and integrating the city perspective GDPR

GDPR

Have you registered personal data processing activities for this project?

- Not applicable

Sustainable urban supply chains through horizontal collaboration and integrating the city perspective Application DMP

Questionnaire

Describe the datatypes (surveys, sequences, manuscripts, objects …) the research will collect and/or generate and /or (re)use. (use up to 700 characters)

In WP 1, both synthetic benchmark instances as well as instances based on real data will be developed. Obviously, all these benchmark instances will be stored and made publicly available for other researchers.
The real data where some of these instances are based on will either be publicly available data or data managed by logistic service providers or public authorities. Since this is not our data, we will not manage it. It should be noted this real data is not required to reproduce our scientific results.
All publications resulting from the project will be made available according to the open-access publishing rules.
The research will not collect new data by means of surveys.

Specify in which way the following provisions are in place in order to preserve the data during and at least 5 years after the end of the research? Motivate your answer. (use up to 700 characters)

The responsible person is Pieter Vansteenwegen, the project supervisor.
As soon as research results are published, the data of the benchmark instances (which is limited in size) will be stored locally at the supervisor (with KU Leuven One Drive backup) and made available (for at least 10 years) through a KU Leuven website (similar to this website: https://www.mech.kuleuven.be/en/cib/op). Whenever appropriate and relevant, data will be put in the data management tool of KU Leuven, RDR, as well.
An increasing number of journals in our domain also allows to upload and manage data together with the related journal papers.

What's the reason why you wish to deviate from the principle of preservation of data and of the minimum preservation term of 5 years? (max. 700 characters)

NA

Are there issues concerning research data indicated in the ethics questionnaire of this application form? Which specific security measures do those data require? (use up to 700 characters)

With this kind of data (benchmark instances) there are no issues concerning privacy or ethics.

Which other issues related to the data management are relevant to mention? (use up to 700 characters)

NA

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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
		Please choose from the following options: • Generate new data • Reuse existing data	*Please choose from the following options:* • Digital • Physical	*Please choose from the following options:* • Observational • Experimental • Compiled/aggregated data • Simulation data • Software • Other • NA	*Please choose from the following options:* • .por, .xml, .tab, .csv,.pdf, .txt, .rtf, .dwg, .gml, … • NA	*Please choose from the following options:* • <100MB • <1GB • <100GB • <1TB • <5TB • <10TB • <50TB • >50TB • NA	
Benchmark instances	Instances generated for specific optimization problems, inspired by real data or based on confidential data (see next)	Generate new data	digital	Simulation data, aggregated data	.txt	<1GB	
Supply Chain Actor data	Anonymized data from supply chain actors about their operations (mostly confidential data)	Reuse existing data	digital	Observational, simulation data	.txt, .xlsx	<1GB	
City data	Anonymized data from cities (mostly confidential)	Reuse existing data	digital	Observational, simulation data	.txt, .xlsx	<1GB	

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:

The existing data we will reuse comes from the databases and management systems of the companies and cities that want to collaborate in the project. This data is typically confidential and cannot be shared. Therefore, we also generate benchmark instances inspired by this data.

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.

- Yes

The research codes, models and algorithms might have the potential for commercial valorization. We work with open source licenses with the restriction that everyone who uses our data or tools/code must also make their tools/code or data available open source as well.
For commercial use or other use types that are excluded from the open-source license, the license needs to be negotiated with KUL/LRD.

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.

- Yes

The data provided by the companies or cities will probably be confidential and cannot be shared with other researchers without permission from the data owners. Still, specific (benchmark) instances might be made available for other researchers to verify our work and to build further on or improve our work.

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).

Re-used data will either refer to the original source or a relevant copy will be uploaded to the KU Leuven data management tool, which has required meta-data documentation fields. Relevant code (including README files) will be stored on one-drive and made available via websites (such as https://www.mech.kuleuven.be/en/cib/op) or in git-lab and will be documented according to documentation standards and the available time of the researcher to improve re-usability.

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.

- Yes

Whenever relevant and appropriate, RDR, the data management tool of KU Leuven will be used. It has such a standard. For code, standard practice concerning readability and documentation will be used.

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

Where will the data be stored?

The data will be stored on the research computer of the researcher, with a back up at the internal storage drives of the research group. Cloud services, such as KU Leuven OneDrive will be used as well. Gitlab is used for code.

How will the data be backed up?

The internal drive of the research group provided by the department is used as a backup, this drive has an auto backup. For code, gitlab works with version control. So if necesarry, a rollback to a previous version of the code can be made as well.

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

KUL OneDrive and Gitlab quota are sufficient for the entire project.

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

Security checks are in line with KU Leuven regulations (e.g. dual factor authentication for accessing all platforms where data is shared, such as gitlab, teams, onedrive,...).
Some platforms, such as gitlab, furthermore use leveled access. This makes it impossible for non-authorised to access these files.

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

No additional cost are expected

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...).

The benchmark instance data will be retained. KU Leuven research data management policy stipulates that all relevant data generated are retained for a period of minimally 10 years after the end of the project. This will be followed.
The GitLab repository of the group including all the developed codes stays intact irrespective of people finishing their research and moving on to other projects. All data related to publications will necessarily be retained along with other important unpublished data. The possibility of publication of open-source tools as formal publications with permanent public identifier is currently being examined for other packages in the

group and will become our standard for open-science publishing.

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

After the research is concluded, the data will be kept at RDR as well as the internal storage drive of the research group and the gitlab.

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

The stored data volume is assumed to be small enough to not incur additional costs.

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

The benchmark instance data will be made publicly available. Either through GitLab, RDR, or online (example here: https://www.mech.kuleuven.be/en/cib/op)

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

NA

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.

- Yes, Intellectual Property Rights

Data shared by the companies or cities cannot be made available publicly without their consent.

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

A github/gitlab repository will be used, but is not made yet.
Via RDR, no details are available yet.
My research group has sites which publishes and stores research data. Some examples:

- https://www.mech.kuleuven.be/en/cib/lp
- https://www.mech.kuleuven.be/en/cib/op

When will the data be made available?

Along with each publication, relevant code and data will be made public. Under the code of open science, all relevant data that can be shared will be shared, to increase verifiability and reproducibility of the methods and their conclusions.

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

Datasets will be published under GNU General Public License version 3 (https://www.gnu.org/licenses/gpl-3.0.en.html) which is an open source software license. It has the restriction that everyone who uses our data or tools must also make their tools or data available open source as well.
For commercial use or other use types that are excluded from the open-source license, license needs to be negotiated with KUL/LRD.

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.

- Yes

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

No additional costs are expected.

6. Responsibilities

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

Pieter Vansteenwegen - Kenneth Sörensen - An Caris and our researchers

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

Pieter Vansteenwegen - Kenneth Sörensen - An Caris and our researchers

Who will manage data preservation and sharing?

Pieter Vansteenwegen

Who will update and implement this DMP?

Pieter Vansteenwegen - Kenneth Sörensen - An Caris