# Adaptive Architecture: The Robotic Orchestration of a Healthy Workplace

*A Data Management Plan created using DMPonline.be*

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**Template:** KU Leuven BOF-IOF

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**Project abstract:**

Workplace attendance is struggling since before the pandemic as many employees suffer from the generic and busy environment in which they were supposed to work. The currently dominant “flexible” office made up of moveable furniture is unable to host these post-pandemic expectations because the presence and activities of workers is too unpredictable for office facility teams to constantly adapt for. As self-driving vacuums and mowers already demonstrate, it is yet becoming increasingly feasible and affordable to integrate miniaturised mobile robotic technology in everyday office furniture that could actively adapt its layout configuration. This project therefore investigates how the currently prevalent ‘flexible’ workplace can be shifted towards an “adaptive” workplace: a workplace that increases the occupational health and wellbeing of workers by proactively changing its spatial configuration via mobile robots. It is based on the premise that a semi-autonomous spatial configuration will be able to nudge new ways of social interaction and communication between workers as they are more actively invited to utilise the architectural affordances that are optimal for the actual context of that particular workplace, for that particular moment. This scientific objective can only be overcome by solving three multidisciplinary challenges, as we need to determine how workplace context can be captured and predicted; how a more healthy and engaging workplace configuration can be modelled; and how such an ideal configuration can be robotically actuated.

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## 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.**

| Dataset name / ID | Description | New or reuse | Digital or Physical data | Data Type | File format | Data volume | Physical volume |
|---|---|---|---|---|---|---|---|
| | | *Indicate:* ***N****(ew data) or* ***E****(xisting data)* | Indicate: **D**(igital) or **P**(hysical) | Indicate: **A**udiovisual **I**mages **S**ound **N**umerical **T**extual **M**odel **SO**ftware Other (specify) | | Indicate: <1GB <100GB <1TB <5TB >5TB NA | |
| sensing data | digital log | N | D | N | .csv; .xls | <1GB | |
| video data | camera recordings of the experiments | N | D | A | .mp4 | <100GB | |
| questionnaire data | Likert scales of participants experience | N | D | N | .csv; .xls | <1GB | |
| interview audio data | recordings of participants answer to semi-structured interview | N | D | A | .mp3; .m4a | <1GB | |
| interview transcription data | transcribed from interview audio data | N | D | T | .txt; .doc | <1GB | |
| thematic coding data | themes generated from coding interview transcript | N | D | T;M | .xls; .csv | <1GB | |
| Python code | robotic software developed by the researchers | N | D | SO | .py; | <1GB; | |
| reports | presentation and discussion of results | N | D | T;I | .doc; .pdf | <1 GB | |

**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)? If so, refer to specific datasets or data types when appropriate and provide the relevant ethical approval number.**

- No

**Will you process personal data? If so, please refer to specific datasets or data types when appropriate and provide the KU Leuven or UZ Leuven privacy register number (G or S number).**

- Yes (Provide PRET G-number or EC S-number below)

PRET G-number: G-2021-4480-R2(MAR)

- Identification information (e.g. names, (email) addresses)
- Personal details (e.g. age, gender)
- Audio and video recordings

**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

Python code and robotic software developed by the researchers:
The robotic control technology could become integrated in future office furniture. The computational adaptation algorithms could become part of smart building management services.

**Do existing 3rd party agreements restrict exploitation or dissemination of the data you (re)use (e.g. Material or 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

## 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).**

Experimental and quantitative data will be maintained in MS Excel files. Qualitative data will be maintained in MS Word files on the secured KU Leuven OneDrive server.
A short description will be added for each (group of) files listed.
We will collect raw data through audio recordings, and process and maintain their transcription via MS Word and Excel files.

**Will a metadata standard be used to make it easier to find and reuse the data?**
**If so, please specify which metadata standard will be used.**

**If not, please specify which metadata will be created to make the data easier to find and reuse.**

- Yes

RDR KU Leuven

## Data Storage & Back-up during the Research Project

**Where will the data be stored?**

- OneDrive (KU Leuven)
- Shared network drive (J-drive)

Low-volume data (such as, analytical and process data, experimental data, reports, video recordings, etc.) and academic disseminations are stored in OneDrive.
During development, robotic software is stored on Shared network drive (J-drive) of the principle researchers.

**How will the data be backed up?**

- Standard back-up provided by KU Leuven ICTS for my storage solution

**Is there currently sufficient storage & backup capacity during the project?**

**If no or insufficient storage or backup capacities are available, explain how this will be taken care of.**

- Yes

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

OneDrive, J-drive: the folders will only be shared through the OneDrive profiles of the relevant investigators within the research.

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

The default OneDrive costs are covered by the Department of Architecture. If additional costs are inquired because we surpass standard storage limits, the PI will cover the cost from the project budget.

## Data Preservation after the end of the Research Project

**Which data will be retained for 10 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 according to KU Leuven RDM policy
- Certain data cannot be kept for 10 years (explain below)

Parts of the digital logs, observational audio and/or video recordings that are irrelevant to the research activities and its dissemination will be deleted in a shorter term than 10 years to save storage space and maintain privacy. All data that forms part of the disseminated research findings and enable its reproducibility / verification will be kept for 10 years.

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

- KU Leuven RDR

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

These costs overlap with the OneDrive licensing already in place.

## Data Sharing and Reuse

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

- Yes, as restricted data (upon approval, or institutional access only)
- Yes, as open data

Part of the collected data relevant for scientific dissemination will be made available as open data via the appendix of such publications.

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

Only investigators in our research group will have access to raw data.

**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 per dataset or data type where appropriate.**

- Yes, other

Personal data from the participants will be managed accordingly to their individual input in the informed consent forms. However, such data will always be anonymised before sharing.

**Where will the data be made available?**

**If already known, please provide a repository per dataset or data type.**

- KU Leuven RDR (Research Data Repository)

**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.**

- GNU GPL-3.0 (code)
- CC-BY 4.0 (data)

Also: to be specified later.

**Do you intend to add a persistent identifier (PID) to your dataset(s), e.g. a DOI or accession number? If already available, please provide it here.**

- No

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

N/A

## Responsibilities

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

PhD researchers (Ozan Balci & Stien Poncelet)
Postdoctoral researcher (Alex Binh Vinh Duc Nguyen)
Supervisors (Andrew Vande Moere, Herman Bruyninckx & Lode Godderis)

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

All researchers

**Who will manage data preservation and sharing?**

Andrew Vande Moere & Lode Godderis

**Who will update and implement this DMP?**

Andrew Vande Moere, Herman Bruyninckx & Lode Godderis