

This is a provisional translation of the supervision agreement (Betreuungsvereinbarung) by TUM School of Management. Until an official translation is provided by TUM, this document can be used instead of the German original, too.

## **Supervision agreement** within the framework of a doctorate at the Technical University Munich *Graduate Center of Management*

### **1. Preamble**

The Technical University of Munich (TUM) attaches particular importance to the qualification, support and promotion of its young scientists. The role of the supervisors as well as a good and active relationship between supervisors and doctoral candidates are important factors for a successful doctorate. In this sense, each supervisor and each doctoral candidate agree on the framework conditions of the individual doctoral project and the supervisory relationship in the supervision agreement. The agreement on content between the supervisor and the doctoral candidate, which is documented in this supervision agreement, is intended to serve as a basis for a trusting, constructive and transparent cooperation at the highest scientific level, to make the process of the doctoral phase as predictable as possible and to contribute to the successful completion of the doctorate within a reasonable period of time.

The supervision agreement is based on the currently valid versions of the TUM [Regulations for the Award of Doctoral Degrees](#), the [TUM Graduate School Statutory Regulations](#) and [the regulations of the Graduate Center of Management](#).

This agreement is based on the current planning horizon. It can and should be **updated at any time** regarding further development of the scientific questions of the doctorate as well as the individual qualification elements and milestones in agreement between the supervisor and the doctoral candidate in the sense of an active document.

This supervision agreement regulates the supervision relationship between the doctoral candidate and the supervisor regarding the doctorate. It does not regulate any aspects of staff or employment law arising from any employment relationship between the persons concluding the supervision agreement and does not establish any enforceable legal positions.

## 2. Parties involved

This supervision agreement is arranged between:

\_\_\_\_\_ [doctoral candidate]  
and

\_\_\_\_\_ [supervisor]<sup>1</sup>  
and if necessary<sup>2</sup>

\_\_\_\_\_ [second supervisor]

Mentor<sup>3</sup> of the doctoral project is: \_\_\_\_\_

Additional mentors, if applicable: \_\_\_\_\_

## 3. Membership application and intended doctoral degree

With this supervision agreement, the doctoral candidate applies for membership in the Graduate Center of Management and thus in the TUM Graduate School (TUM-GS).

The aim of the doctorate is the award of the doctoral degree \_\_\_\_\_ <doctoral degree>  
at the degree-awarding institution \_\_\_\_\_.

## 4. Content and schedule of the doctorate

The doctoral candidate prepares a thesis on the following **doctoral topic**:

|  |
|--|
|  |
|  |
|  |

The working basis for the doctoral project is an exposé (research proposal) including work plan and time schedule.

An **exposé** from \_\_\_\_\_ (date) is to be uploaded in DocGS.

An **exposé** is not yet available at the time of registration on the doctoral list but will be prepared **within 6 months** after the supervision agreement comes into force and will be uploaded in DocGS after consultation with the supervisor. For the preparation of an exposé see [Information Sheet Research Proposal](#).

<sup>1</sup> In the event of a change of the supervisor, a new supervision agreement must be concluded.

<sup>2</sup> For doctorates in cooperation with universities of applied sciences as well as with international partner universities, the second supervisor must be included by the cooperating institution and listed in the supervision agreement.

<sup>3</sup> At least one mentor must be appointed for each doctoral project. Mentors can offer specialist but also interdisciplinary advice or can be involved for personal development. Mentors can be all persons who have proven their ability to carry out independent scientific work, usually through a doctorate. If possible, they should be independent persons who do not belong to the chair or professorship of the supervisor. When changing mentors, the mentoring agreement must be presented to the new mentors and, in accordance with Attachment 1, confirmation of the Graduate Center's acknowledgement of the mentoring agreement must be submitted.

The doctorate begins on \_\_\_\_\_ and is to be completed within \_\_\_\_\_ years. The work plan should be discussed with the supervisor and adapted to developments at regular intervals. Regular discussions on the progress of the doctorate are agreed upon at intervals of \_\_\_\_\_ months or alternatively \_\_\_\_\_ weeks.

## 5. Elements of the doctoral project

5.1. After successful formal examination of the application for acceptance on the doctoral list, the doctoral candidate becomes a preliminary member of the TUM-GS. After successful substantive examination of the application, the doctoral candidate becomes a full member of the TUM-GS. A membership of at least two years as well as the participation in the qualification program of the TUM-GS are a prerequisite for the opening of the doctoral procedure according to § 8 of the TUM Regulations for the Award of Doctoral Degrees.

5.2. This supervision agreement specifies the intended individual qualification program for the doctoral candidate. It serves as an orientation and can be adapted at any time but must meet the requirements of the qualification program required in § 16 TUM-GS Statutory Regulations and the Regulations of the Graduate Center.

5.3. The following **compulsory** qualification elements (cf. Graduate Center Regulations §13) are agreed upon:

- a. Participation in a TUM-GS **kick-off seminar** within the first six months.
- b. The integration into the **academic environment of the TUM** is ensured by
  - Attendance time at TUM or at the following partner institution<sup>4</sup>: \_\_\_\_\_
  - Teaching at TUM (e.g. lectures, tutorials, supervision of internships/project studies/theses)
  - The substantive collaboration in the following research group at TUM: \_\_\_\_\_

If the involvement is through teaching or participation in a research group, the following specific activities are planned:

| Activity | Duration |
|----------|----------|
|          |          |
|          |          |
|          |          |
|          |          |

- c. **Subject-specific courses** (seminars, special lectures, summer/winter schools, etc.) from the Graduate Center of Management's qualification program, amounting to a total of at least 10 semester hours (SWS), which may be distributed over the entire doctorate. Recognition of external courses that do not differ significantly from those of the Graduate Center of Management with regard to the level of competence is possible upon application to the Graduate Center (cf. §13 of the Regulations of the Graduate Center). Planned courses are:

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<sup>4</sup> Partner institutions are public, academic research institutions recognized by the Graduate Center.

| Course | Course type | SWS/ECTS |
|--------|-------------|----------|
|        |             |          |
|        |             |          |
|        |             |          |
|        |             |          |
|        |             |          |

In addition to the subject-specific events according to sentences 1 and 2:

Active participation in the doctoral colloquium of the professorship, the chair, or the field of competence. This includes at least one presentation of the own research project per year. Participation in a doctoral colloquium does not count as a subject-specific course according to sentences 1 and 2 of this point.

- d. At the latest two years after the entry into force of this agreement, the doctoral candidate and the supervisor will hold a **feedback meeting** on the doctorate in accordance with § 16 Para. 8 of the TUM-GS Statutory Regulations, in which the progress of the doctoral project and the qualification program will be discussed as well as the further process of the doctoral project. The results of the discussion will be documented in writing (see attachment 4) and this supervision agreement will be updated accordingly.
- e. The doctoral candidate presents his/her research results for **discussion in the international scientific community**, evidenced by at least one accepted international publication or conference paper that is subject to a peer review process. Planned is/are:

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- f. University public seminar presentation that may be substituted for a presentation at an academic conference.

5.4. In addition, participation in the following **optional qualification elements** is planned:

- a. **Interdisciplinary courses** from the range of courses offered by TUM-GS or other continuing education institutions. The TUM-GS recommends participation in at least three courses. Planned are:

| Course | Course type | SWS/ECTS |
|--------|-------------|----------|
|        |             |          |
|        |             |          |
|        |             |          |
|        |             |          |

- b. **International integration of** the doctoral project (e.g. stay abroad, conference visit or integration of international guests into the doctoral project). The TUM-GS recommends an international research stay of at least four weeks and supports this financially within the scope of its available funds. Planned is:

| Type of planned stay abroad | Visited/ inviting institution | Country | Duration in days |
|-----------------------------|-------------------------------|---------|------------------|
|                             |                               |         |                  |
|                             |                               |         |                  |
|                             |                               |         |                  |

5.5. The central element of the doctoral procedure is **writing the dissertation**. According to §7 (2) of the TUM Regulations for the Award of Doctoral Degrees, it must demonstrate the applicant's ability to conduct independent scientific work and to present its results clearly, and it must make its own, new, and continuing scientific contribution.

## 6. Roles and duties within the framework of the supervision

As part of a trusting supervisory relationship between supervisor and doctoral candidate, both sides agree to fair cooperation during the doctoral project.

### 6.1 Doctoral candidates and supervisors commit to

- actively and conscientiously live the supervisory relationship and jointly create a working environment characterized by trust, mutual respect, esteem and appreciation, and open communication; they strive for a timely and efficient doctoral process,
- support the TUM-GS in its work,
- provide the annual feedback on the status of the doctoral project according to § 5 of the TUM-GS Statutory Regulations and
- exchange views on the topic, the problems, and the structure of the doctoral project, also with regard to the realistic implementation within the targeted period of time.

### 6.2 Supervisors commit to

- actively promote the professional and interdisciplinary education and training of doctoral candidates and to advise them in this regard, promote the quality of the doctoral project through consultation and discussion, including feedback on questions and manuscripts as well as monitoring the completion of the dissertation within an appropriate period of time. At intervals of \_\_\_\_\_ months or \_\_\_\_\_ weeks, detailed documented discussions on the progress of the doctorate are arranged.
- provide the necessary support, tailored to the individual needs of the doctoral candidates, for the achievement of the doctoral goal and for the early scientific independence of the doctoral candidates,
- enable and support the participation in scientific conferences in Germany as well as abroad according to the financial possibilities of the professorship as well as through time flexibility, as well as the completion of stays abroad, if desired by the doctoral candidates and
- advise the doctoral candidates regarding further career planning, if they so wish, and to continue to support the doctoral project even if the candidate leaves TUM, e.g. by providing continued supervision within the framework provided by the doctoral regulations or by providing support in case of a change of supervision.

### 6.3 Doctoral candidates commit to

- strive for a successful completion of the doctoral project through goal-oriented and independent scientific work according to the time and work plan,
- independently fulfill the compulsory elements of the doctoral project according to point 4 and point 5 of this agreement,
- maintain regular contact with the supervisor and facilitate and utilize the aforementioned supervising opportunities,
- report precisely and regularly to the supervisor on the status of the scientific work and the completion of the qualification elements,
- inform themselves about requirements and regulations relevant for the doctoral process and
- seek immediate discussion with the supervisor in case of conflict in order to resolve it promptly.

## 7. Work equipment

The supervisor and the doctoral candidate have agreed on the working materials required to carry out the research work (e.g. laboratory access, measurement technology, consumables, etc.). The doctoral candidate has been informed about possible limiting conditions. The following is agreed on in this regard:

|                 |
|-----------------|
| (if applicable) |
|                 |

## 8. Good scientific practice

All parties involved undertake to comply with the principles and guidelines laid down in the **statutes of TU Munich for safeguarding good scientific practice and for dealing with scientific misconduct** (see [www.tum.de](http://www.tum.de)). The acknowledgement of these statutes is confirmed with the signature below. The doctoral candidate is aware that, in accordance with § 7 para. 7 of the TUM Regulations for the Award of Doctoral Degrees, his/her own work that has already served examination purposes may not be submitted as a doctoral thesis/dissertation or as part of a doctoral thesis/dissertation.

## 9. Reconciliation of family and scientific activity

The compatibility of family and scientific activity is particularly supported by TUM. To this end, the following agreements are made (if applicable):

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|  |
|  |

## 10. Fair play in the workplace

The parties involved undertake to comply with the TUM "Fair Play in the Workplace" agreement and to jointly and actively create a working environment characterized by trust, mutual respect, esteem and appreciation as well as open communication. Acknowledgement of this agreement is confirmed with a separate signature (see Attachment 3 and the [agreement on fair play in the workplace](#)).

## **11. Regulations for cases of conflict**

In order to clarify disputed issues and cases of conflict, discussions will be held between the parties involved immediately. If the conflicts of at least one person appear to be no longer resolvable, each party can turn to the elected doctoral candidate representatives, the Graduate Center, the head of the respective doctoral institution, the office or management of the TUM-GS or the ombudspersons of the TUM in the respective order.

## **12. Individual agreements**

Individual agreements between the supervisor and the doctoral candidate can be added to the supervision agreement as an appendix (see attachment 2).

## **13. Privacy**

The signing parties are hereby informed that their personal data will be stored and processed by TUM for organizational and statistical purposes as well as for controlling and quality management in accordance with the DSGVO. The legal basis for this is Art. 6 Para. 1 lit. b DSGVO. Data will not be passed on to third parties, except in anonymized form to the Bavarian State Office for Statistics for statistical purposes there and only for such purposes. The legal basis for this is Art. 6 para. 1 lit. c DSGVO.

Under the legal conditions, the right to information, as well as to correction or deletion or to restriction of processing or the right to object processing, as well as the right to data portability holds. There right of appeal to the Bavarian State Commissioner for Data Protection also holds.

Contact for questions: TUM Graduate School, [contact@gs.tum.de](mailto:contact@gs.tum.de) or the Data Protection Officer at TUM.

|                                  |  |
|----------------------------------|--|
| _____ , the _____                | _____ , the _____                        |
| _____                            | _____                                    |
| Doctoral candidate               | Supervisor                               |
| _____ , the _____                | _____ , the _____                        |
| _____                            | _____                                    |
| If applicable, second supervisor | Mentor                                   |
| _____ , the _____                | _____ , the _____                        |
| _____                            | _____                                    |
| If applicable, second mentor     | Managing Director of the Graduate Center |

### Copies

The supervision agreement, signed by all parties, should be uploaded in DocGS when applying for registration in the doctoral list. Subsequently copies should be received by:

- |                       |                    |
|-----------------------|--------------------|
| 1. Supervisor         | 3. Mentor          |
| 2. Doctoral candidate | 4. Graduate Center |

### Attachments

Attachment 1: Confirmation of knowledge of the supervision agreement by subsequently enrolled or new mentors

Attachment 2: Individual agreements

Attachment 3: Agreement Fair Play at the Workplace

Attachment 4: Interview guidelines for feedback interviews



**Attachment 1:**  
**Confirmation of knowledge of the supervision agreement by new mentors\***

Name of the mentor:

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Acknowledgement of the supervision agreement dated \_\_\_\_\_ (date of supervisor's signature) between \_\_\_\_\_ (the doctoral candidate) and \_\_\_\_\_ (the supervisor) is confirmed.

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Place, date, signature of mentor

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\*At least one mentor must be appointed for each doctoral project. Mentors can offer specialist but also interdisciplinary advice or be called upon for personal development. Mentors can be all persons who have proven their ability to carry out independent scientific work, usually through a doctorate. If possible, they should be independent persons who do not belong to the chair or professorship of the supervisor.

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**Attachment 3:  
Agreement fair play at the workplace**

Notice is hereby taken of the [service agreement "Fair Play in the Workplace"](#) as well as the commitment to comply with them confirmed.

\_\_\_\_\_, the \_\_\_\_\_

\_\_\_\_\_, the \_\_\_\_\_

\_\_\_\_\_  
Doctoral candidate

\_\_\_\_\_  
Supervisor

\_\_\_\_\_, the \_\_\_\_\_

\_\_\_\_\_  
If applicable, second supervisor

**Acknowledgement**

\_\_\_\_\_, the \_\_\_\_\_

\_\_\_\_\_, the \_\_\_\_\_

\_\_\_\_\_  
Mentor

\_\_\_\_\_  
If applicable, second mentor

**Attachment 4:  
Interview guidelines: Feedback interview**

Doctoral candidate: \_\_\_\_\_  
 Supervisor: \_\_\_\_\_  
 If applicable, second supervisor: \_\_\_\_\_  
 Date: \_\_\_\_\_

Since the start of the doctorate, the following progress has been made:

**1. Participation in subject-specific courses**

Completion of the following course program is recommended during the first two years.

| Course participation 1st year: | Course participation 2nd year: |
|--------------------------------|--------------------------------|
|                                |                                |
|                                |                                |
|                                |                                |
|                                |                                |

**2. Review of the relevant literature**

The review of relevant literature has been done (please elaborate):

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**3. Integration into the academic environment of the TUM**

Inclusion is ensured by the following measures:

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**4. Participation in doctoral colloquium of the professorship, the chair or the competence field**

Participation in the following doctoral colloquia has been made or discussed and recommended:

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**5. Participation in interdisciplinary seminars**

Participation in the following courses from the range of courses offered by TUM, the Graduate School or other continuing education institutions has been made or has been discussed and recommended:

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**6. International integration of the doctoral project**

The following measures (e.g. stay abroad, conference visit or involvement of international guests in the doctoral project) were carried out or discussed:

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**7. Identification of and participation in appropriate conferences**

List conferences and dates, if applicable:

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**8. Independent research work**

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**9. Development of first results**

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**10. Development and finalization of a first working paper**

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**11. Submission of working papers to conferences**

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**12. Completion of the dissertation**

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**13. Other**

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\_\_\_\_\_, the \_\_\_\_\_

\_\_\_\_\_, the \_\_\_\_\_

\_\_\_\_\_  
Doctoral candidate

\_\_\_\_\_  
Supervisor

\_\_\_\_\_, the \_\_\_\_\_

\_\_\_\_\_  
If applicable, second supervisor

**Acknowledgement**

\_\_\_\_\_, the \_\_\_\_\_

\_\_\_\_\_, the \_\_\_\_\_

\_\_\_\_\_  
Mentor

\_\_\_\_\_  
If applicable, second mentor

## Data Management Form for Doctoral Candidates

In order to safeguard an adequate management and storage of research data, and as required by the university, TUM School of Management has formulated a Data Management Form (DMF) for its doctoral candidates.

The aim of the DMF is to **increase the transparency of the data collection and analysis process**. The documentation will make it easier for the doctoral candidate, but also other researchers or reviewers to find and understand the data, prepare the data for future use (e.g., data publication, verification purposes) and to comply with institutional, funder and journal requirements.

Furthermore, **third-party funding bodies and journals are increasingly demanding the publication of data** in the interests of quality assurance.

The DMF provides guidance to help researchers carefully plan the handling of research data and to comply with the [FAIR principles](#) (data should be findable, accessible, interoperable, reusable).

A central step in the whole process consists of filling out the DMF below. The form should be stored on the server of the supervising professorship during the ongoing dissertation project. Please note that DMFs are living documents that can still be updated and concretized in the course of the project. **The form should be submitted with the completed dissertation.**

All doctoral candidates are asked to register (and preferably publish) the data underlying their dissertation projects in [mediaTUM](#) as default option.

You may also use other online repositories. The location of storage must be named in the DMF.

There is no cost involved if you upload data in mediaTUM (through TUM Library Support).

In case of questions related to mediaTUM please contact: [researchdata@tum.de](mailto:researchdata@tum.de)

For further assistance on individual aspects, you may also contact the [TUM Research Data Hub](#).

### 1. To whom does the policy apply?

The DMF applies to all doctoral candidates of TUM School of Management. A DMF has to be filled out for every research project.

### 2. Responsibility for data management and storage (general) /ownership

- The doctoral candidates are responsible for management and submission of the research data. They are also responsible for the submission of the DMF once their dissertation project is finished.
- See TUM's '[Guide to legal aspects of research data management](#)' (p. 10f.).
- Doctoral students can reuse the data of others, provided that the terms of use allow it.

### 3. Which data have to be stored?

- All data that is used in doctoral theses.
- Before long term storage, data will be anonymized (as far as possible). This means that any indicator allowing identifying individuals will be lastingly removed, also from the raw data.
- Personal data should not be stored. There should however still be a way to trace the data and/or a valid reason should be given in the DMF why these data were not stored.
- If external rules exist with regard to the storage of data (for example when doctoral candidates are not the author of the data), these rules should be followed, but it should be described in the DMF where and how data can be found and/or who took responsibility for data archiving.

#### 4. What type of data have to be stored?

- The rule of thumb is that the stored data, together with the information that is stored along with it, should allow researchers who are/were not involved in the research to understand the data, its context, and the conditions for using the data. The goal is to set up the documentation such that a knowledgeable third person could rerun the reported analyses using the provided datasets and replicate the results. A careful documentation also comprises additional materials such as surveys, experiments, videos, information cards etc.
- To be able to understand the data, its context, and the conditions for using the data, and to rerun the analyses, the following **core files** are necessary:
  - i. A filled-out DMF
  - ii. Metadata
    1. Files that describe the project, such as proposals, descriptions of work, etc.
    2. Materials used in the collection of the data (questionnaires, stimulus material, screen shots, research protocols, etc.)
    3. Files that describe how data was cleaned and processed (e.g., syntax files, intermediate files while coding data)
    4. Electronic copy of ethical clearance (if applicable)
  - iii. Raw data: Raw (unprocessed) data in digital form (datasets, audio/video recordings, original transcripts, screenshots, etc.)
  - iv. Intermediate data and syntax
  - v. Final data and syntax
    1. Final data files as used in analyses for publication
    2. Files that describe which analyses were run for publication (e.g., syntax files)
- The code of conduct for scientific practice requires that raw data in physical form (e.g. pen and paper surveys etc.) should be retained for ten years after the publication. If possible, this data should be digitized.

#### 5. When and where is data stored?

- A DMF, the raw data, and all core files (see above) have to be submitted for storage right before the submission of the final version of the doctoral thesis (at the latest).
- During a running project, processed data, syntax files, etc. can be maintained on the medium of the doctoral candidate's choice (preferably mediaTUM or other LRZ storage solutions). Please do not store data in unsafe directories, like Dropbox or Google Drive. Doctoral candidates themselves are responsible for back-ups (e.g., see LRZ Backup Services).
- Final central storage of the data (see 4.) should be accomplished right before the submission of the final version of the doctoral thesis.

*Please also refer to the explanatory appendix at the end of this document.*



## Data Management Form for Doctoral Candidates

The doctoral candidate:

and supervisor:

have mutually agreed to conduct research data management using the attached form:

Yes

No

If no, please specify the reasons:

.....

Doctoral candidate

.....

Supervisor

### 1. Organizational context

|                              |  |
|------------------------------|--|
| <b>Doctoral Candidate</b>    |  |
| <b>Professorship</b>         |  |
| <b>Supervisor</b>            |  |
| <b>Start Date of Project</b> |  |
| <b>File name of this DMF</b> |  |

### 2. Description of thesis project

|                 |  |
|-----------------|--|
| <b>Title</b>    |  |
| <b>Abstract</b> |  |

### 3. Data management roles

|   |  |
|---|--|
| Who is <b>collecting</b> the data?  |  |
| Who is <b>analysing</b> the data?   |  |
| <b>Other</b><br>(Is there a person in the research group/professorship with a specific responsibility for data management?) |  |
| What is the role of your <b>supervisor</b> ?  |  |

### 4. Expected types of research data, software choices for data processing, data size

| Data stage     | Type of research data | Software choice | Data size |
|----------------|-----------------------|-----------------|-----------|
| Raw data       |                       |                 |           |
| Processed data |                       |                 |           |
| Models/code    |                       |                 |           |
| Other?         |                       |                 |           |

### 5. Short-term storage solutions

Specify the data storage medium. In case of storing your data on your PC: please briefly describe how you organize backups.

| Data stage     | Storage medium                              | Backup procedures<br>(medium / how often?) |
|----------------|---|--|
| Raw data       | [Default answer: NAS-drive / LRZ solutions] |  |
| Processed data | [Default answer: NAS-drive / LRZ solutions] |  |
| Models/code    | [Default answer: NAS-drive / LRZ solutions] |  |
| Other?         | [Default answer: NAS-drive / LRZ solutions] |  |

## 6. Structure of data and information

Give a description of the file- and directory naming convention you intend to use.

[Default answer]:

Default DMF folder structure of TUM School of Management is:

- (1) Data Management Form
- (2) Metadata
  - (a) Project proposal, contracts, descriptions of work etc.
  - (b) Measurement instrument
  - (c) Materials stimuli etc.
  - (d) Preregistration
  - (e) Ethical clearance
- (3) Raw data (anonymised)
- (4) Final data and syntax
  - (a) Final datasets
  - (b) Final confidential data
  - (c) Syntax and program files giving reported results
- (5) Publication(s)

*optional:*

- (6) Conferences / Presentations / Slides

## 7. Documentation and metadata

Describe how you are going to document your data collection process, what the resulting data files comprise and how they will be processed further. Think about documenting the:

- i) **content** (what does your dataset contain?)
- ii) **context** (who, what, why, where and how will the data be collected and analysed?)
- iii) **process** (are there specific processes?)

### 8. Sharing, ownership and privacy

| Sharing, ownership and privacy  | (With) who(m), what and how? |
|---|------------------------------|
| <p><b>Ownership</b><br/>Any funders requirements to share your data, or to impose an embargo?<br/>Are there agreements on how the data will be used and shared within your group or with other parties involved in this research? (outside your group or outside TUM)</p> |                              |
| <p><b>Privacy</b><br/>Are there privacy or security issues, and if there are, how are you dealing with them?</p>  |                              |

### 9. Long-term storage

Which part of your research data is stored long-term?

| Data set |  |
|----------|--|
|          |  |

Which data archive do you intend to use for long-term storage?

*I intend to archive ... data in ...*

[Default answer]: I intend to **archive and publish** the raw data, final data and metadata in **mediaTUM**.

[Alternative answer]: I intend to archive and publish the raw data, final data and metadata at online repository XY.

[Alternative answer]: I intend to archive the raw data, final data and metadata at online repository XY (without publication).

[Alternative answer]: I intend to archive the raw data, final data and metadata in a local storage at my professorship (NAS-drive/LRZ solutions, without publication).

## Appendix with additional information

(shall be deleted after completion of your DMF)

### 1. Organizational context

A DMF should leave no doubt, as to which research(er) it belongs to.

### 2. Description of thesis project

Giving a short description of your research gives context to your DMF.

### 3. Data management roles

Identifying persons who are - *or can be* - of assistance in your daily data management practices, smoothens your data collection process. Maybe some people have special responsibilities regarding data management?

Having a closer look at data management roles places data collection in a broader perspective than your research project alone. Discussing both your roles as well as those of your supervisor and other colleagues prevents possible future issues concerning data ownership.

### 4. Type of research data

Identifying your possible research data before you actually start collecting those data, makes sure no research output is overlooked. You can choose from:

- *Raw data (i.e. data from experiments or observations (e.g. a lab note book))*
- *Derived / processed data*
- *Models (including data from simulations)*

If you use derived data, you should at least say how you handle the raw data. (If you haven't produced the data yourself, that may be of influence on what you are allowed to do with the data (data ownership)).

To give you an example of the diverse outputs of research data, read the following list:

- Documents (text, MS Word), spread sheets
- Scanned laboratory notebooks, field notebooks, diaries
- Online questionnaires, transcripts, or surveys
- Digital audio or video recordings
- Transcribed test responses
- Database contents
- Digital models, algorithms, or scripts
- Contents of an application (input, output, log files for analysis software, simulation software, or schemas)
- Documented methodologies and workflows
- Records of standard operating procedures and protocols

### 5. Software choices

What software will you use to create, analyse and visualize your data? Are these choices common practice in your field?

Software choices affect whether current and future users can actually view and use the data you have collected. For example, if you use proprietary software (software owned by the person or company that has developed it, and which may be required to read the associated file format), it may not be possible for people outside your field to do anything with your data except getting an error trying to read them. Also, some software may come with its own systems for folders and file names. Think software choices through with future users in mind.

## 6. Data size/growth

Give an estimate in (Mega – Giga – Tera) Bytes. Making an educated guess on the size of your research data output, indicates where you should store your data. If you will produce terabytes of data, for example, a simple hard drive will not suffice. In short, data size influences data storage solutions. Use mediaTUM as default option for storage.

## 7. Short-term storage

You need to decide how you will keep your data safe in the short term. Where will the data be stored physically and how will it be backed up? Do you follow the common practice in your research group, and if not, why not?

The table below may be of assistance in making an informed choice for short-term storage:

| Storage solutions   | Advantages  | Disadvantages  | Suitable for  |
|---|---|--|---|
| <b>PC &amp; laptop</b>  | Always available<br>Portable  | Drive may fail<br>Laptop may be stolen<br>Requires additional backup   | Temporary storage   |
| <b>Networked drives</b><br>e.g., LRZ storage solutions, mediaTUM, NAS-server          | Regularly backed up<br>Stored securely in a single place<br>Centralized storage makes it easier to maintain and back up | Costs (?)  | The master copy of your data<br>(if enough storage space is provided) |
| <b>External storage devices</b><br>e.g., USB flash drive, DVD/CD, external hard drive | Low cost<br>Portability   | Easily damaged or lost<br>Requires additional backup   | Temporary storage   |
| <b>Cloud services</b><br>Dropbox, SkyDrive, etc.                                      | Automatic synchronization between files online and folder on PC<br>Easy to use and access                               | It is not sure whether data security is taken care of<br>You don't have direct influence on how often backups take place and by whom | Data sharing  |

## 8. Documentation and metadata

Good documentation complies with the FAIR principles (data should be findable, accessible, interoperable, reusable). Information on how the research was performed may come in different forms: standardized protocols, manuals of equipment or software, field notes on paper, e-mails from colleagues etc.

Depending on the type of research, different solutions for data documentation may work. These questions are generally best discussed with you supervisor (and funders).

## 9. Sharing, ownership and privacy

It is important to have a sound understanding of what you are allowed to do with the data and how you will leave your data behind when the time comes to pursue your career at another organisation: What is going to happen to the data when your project is finished? Can you still publish about the data and use them for further research when you have left the university or research centre? With whom are you going to make these arrangements and how is the rest of the world going to know? These questions are generally best discussed with you supervisor (and funders).

For further information, see TUM's ['Guide to legal aspects of research data management'](#)

### **10. Long-term storage**

The code of conduct for scientific practice requires that you retain your data for ten years after you have published your article and make it available upon request for verification purposes. You may be able to fulfil such requests while you are in your present job, but to make data available for a longer period for re-use and verification, you should store it in a data archive with proper documentation and in a sustainable data format (e.g. mediaTUM).

Research data should always be retained for the short term. Additional long-term storage is at least recommended if:

1. data underlies publications
2. long-term storage and sharing is required by funders
3. there is a legal requirement
4. it is likely that others may want to re-use the data

If you choose long-term storage, is there a common practice/institution in your field? Or do you intend to use the services provided by TUM?