

OPEN_NEXT

Deliverable 1.2

Quality Assurance Framework



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OPEN_NEXT – Transforming collaborative product creation

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11	MAKER	MAK	DK
12	AGILE HEAP EV	FLB	DE
13	SONO MOTORS GMBH	SOM	DE
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D1.2 - Quality Assurance Framework

Review and approval status:

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List of abbreviations and terms

- BY Attribution
- CC Creative Commons
- KPI Key performance indicator
- SME Small and medium-sized enterprise
- P2P Peer-to-peer
- v1 Version 1
- WP Work Package

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1 Introduction of the Quality Assurance Framework v1

This document delivers a framework which aims to maximise effective, uniform, quality output and eliminate misalignment and possible failure to fulfil the committed obligations according to Annex 1 - Description of the action, Grant Agreement 869984 (part a and b). Through a set of appropriate quality assurance measures, the framework aims to improve the **quality of results**. It further supports **more effective collaboration** (internally and externally) and **enhanced citizens participation** (e.g. from makers, consumers, etc.) by facilitating accessibility and transparency of the research process.

The quality assurance framework consists of the following quality assurance measures:

- A manual on how to publicly manage issues for tasks in GitHub to facilitate seamless integration within and beyond the project OPEN_NEXT
- A process on how to define and track key performance indicators to manage tasks within work packages (WP) by means of quantifiable measures
- A document template for deliverables as a corporate design to standardize deliverables
- The definition of a review and approval process prior to submission of deliverables
- A form for review results that supports the review and approval process
- Continuous improvement of the framework

These quality assurance measures reflect best practices that the partners of the OPEN_NEXT project have established in previous research projects and extends them according to the ethics of the project’s object of research and thus owes to its **ambitious open science policy**. The framework is illustrated in the following figure:

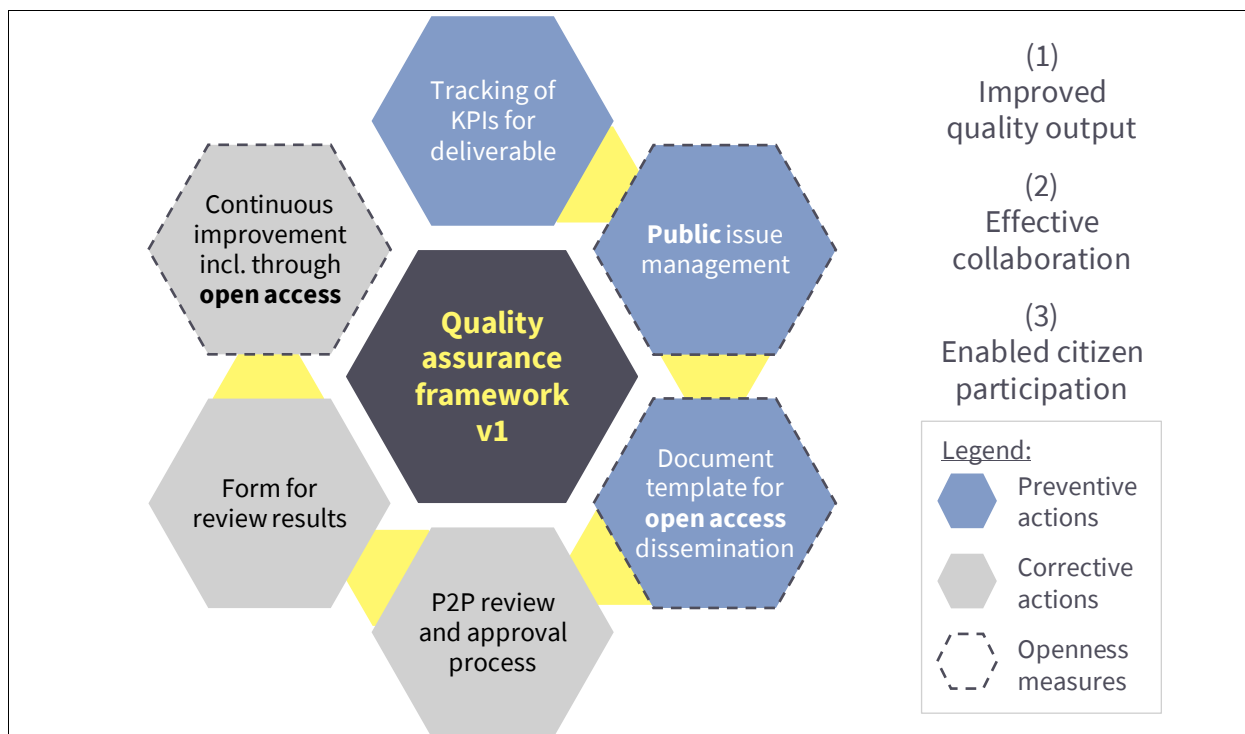


Figure 1: Quality assurance framework based on quality assurance and openness measures

As per the figure, the framework distinguishes **preventive actions** of quality assurance (marked in blue) which avoid non-conformances before they occur; and **corrective actions** of **quality**

assurance (marked in grey) which trigger appropriate rectifications in case of potential risks of deliverables to not fulfil the committed obligations before they are submitted. Some of these measures are also **openness measures**. The introduction of these openness measures in the research project OPEN_NEXT present a stretch towards opening the research process in addition to the *Rules on Open Access to Scientific Publications* and *Open Access to Research Data* in Horizon 2020¹ which refer merely to the research output.

The approach of the quality assurance framework v1 is to first test and calibrate the introduction of combined quality assurance and openness measures in the research project OPEN_NEXT. The adoption of these measures by all partners is highly encouraged in order to support the goals of the framework. The framework is a **living document** which will be further updated based on periodic feedback. In order to reflect that the framework will be expanded and adapted as per future supporting needs, it is labelled as version 1 (v1).

2 Quality Assurance Measures

The framework will support the research of the transdisciplinary consortium which is made of six research partners, seven practice partners, and six small and medium-sized enterprise (SME) partners. This section describes the quality assurance measures of the framework.

2.1 Defining and tracking of key performance indicators

The Description of the Action (part B), Annex 1, Grant Agreement 869984 (p. 7) breaks down the main objective of the project OPEN_NEXT into specific objectives and sub-objectives. This hierarchy of objectives will be further extended in the project OPEN_NEXT through the tracking of key performance indicators (KPIs) in order to manage tasks by means of quantifiable measures. The aim of this measure is to define every deliverable according to **at least two** KPIs with specified targets.

Within one month of commencement of tasks, KPIs should be proposed for each deliverable by the task leader and accepted by the WP leader. KPIs should be “SMART”, which means that KPIs fulfil the following requirements:

- They reflect a specific objective
- They are measurable
- They can be assigned to an owner who can influence them
- They can be realistically achieved
- They can be achieved by the time of submission

A change in KPIs goes hand in hand with goal-oriented action. For each KPI, a target will be agreed between the task leader and the WP leader. For example, targets of KPIs for this deliverable could be defined (retrospectively) as follows:

- Six quality assurance measures (goal: Improved quality output)
- Three preventive actions (goal: improved quality output)

¹ See European Commission Directorate-General for Research & Innovation, H2020 Programme, Guidelines to the Rules on Open Access to Scientific Publications and Open Access to Research Data in Horizon 2020, version 3.2, 21.03.2017, URL: https://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-pilot-guide_en.pdf. Last accessed on 23.02.2020.

- Three openness measures (goals: effective collaboration; enabled citizen participation)

The KPIs may refer to the above-mentioned sub-objectives of the project OPEN_NEXT or alternatively refer to additional sub-objectives. They should be documented by the task leader in the spreadsheet “Key performance indicator log” which is available to the partners under the following file location: `OPEN_NEXT\04_Deliverables`.

2.2 Public issue management

Issue management will be used in OPEN_NEXT to improve the information flow about ongoing tasks and support better alignment of works within the project and with outside partners. This will empower resources to get involved or provide useful inputs / information on tasks of whose content they would otherwise not be aware. Although it is not the primary objective to use the issue management for monitoring purposes, the projects tab also gives a good overview of the overall progress of tasks as illustrated in the screenshot of the following project:

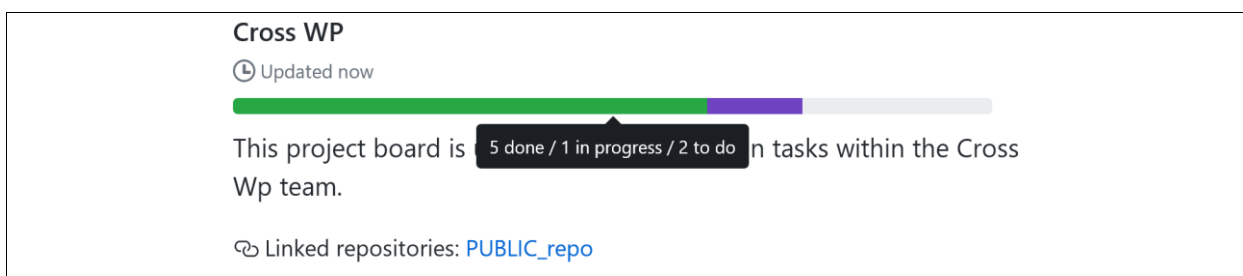


Figure 2: Overview on task progress

Public issue management is implemented on the organisational GitHub account “OPEN-NEXT” which can be accessed by anyone under <https://github.com/OPEN-NEXT>. Task participants can be invited to WP teams by the WP leaders. Under the project tab, task leaders can create tasks as “projects” with the following default settings: basic Kanban boards, public visibility, and linking to the associated WP repository. The resulting issue management structure for OPEN_NEXT in GitHub is illustrated in the following figure:

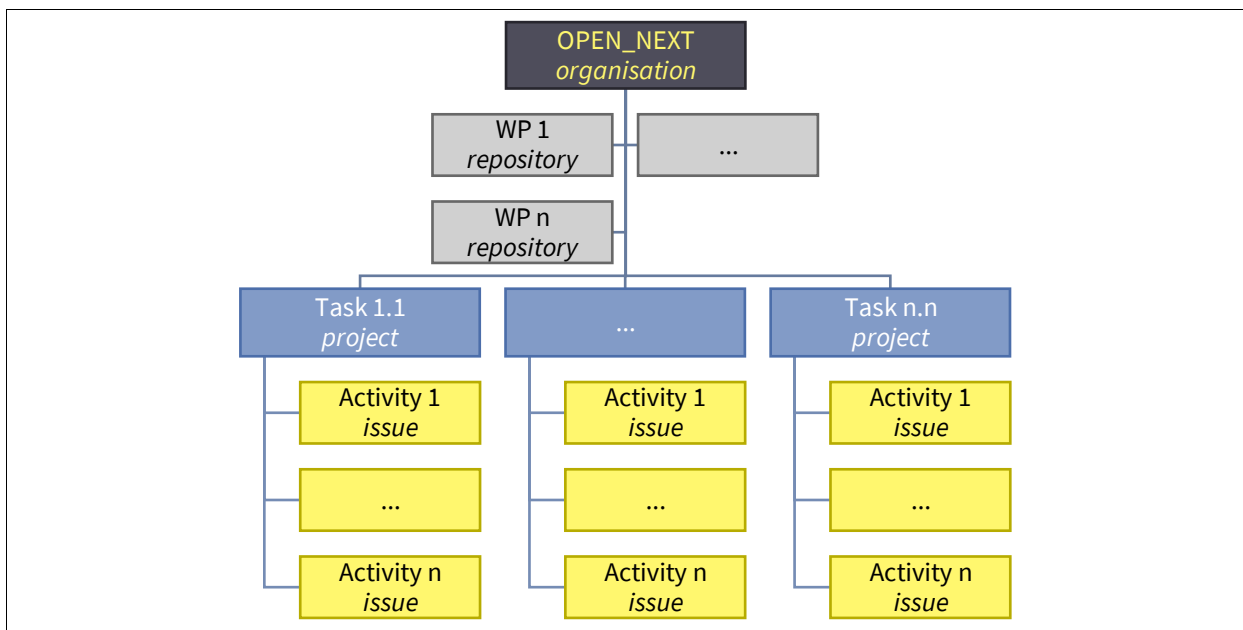


Figure 3: Issue management structure for OPEN_NEXT in GitHub

The WP leaders and the task leaders of currently ongoing tasks have agreed to make projects publicly visible so that anyone can see the activities/issues of ongoing tasks in the project. Once a task has been created as “project”, task participants can create issues for activities that they are working on or plan to work on in the future. To add an issue, task participants first have to add a note (“+” sign on columns) and then turn the note into an issue. They are then also able to assign the issue to themselves and other task participants. Issues should be defined as follows:

- Add note and convert the note into an issue via ellipsis on right-hand side of note → set title and if needed description
- Assign issue to at least one person (→ person may need to be invited first)
- Move to correct column of the Kanban board (“To do”, “In progress”, “Done”)
- Use description field of issues for adding #updates, #objectives, #results, #requirements, etc.

The following project can be found as an example <https://github.com/orgs/OPEN-NEXT/projects/1>. Public issue management has been rolled out across all WPs of OPEN_NEXT in the first two months of 2020.

2.3 Document template for open access publication of deliverable

For consistent presentation of deliverables, an MS Word template is available to the partners under the following file location: `OPEN_NEXT\04_Deliverables\Document template`. This deliverable report is based on the template as well and can be used for further reference including the terms of using a Creative Commons Attribution (CC-BY) 4.0 International licence (see footer). For instructions on how to use the document template, please consult the Appendix of this deliverable report. Deliverables should be self-contained manuscripts. The document template ensures that the following information is included in the deliverable:

- Cover Page (incl. acknowledgement)
- General information OPEN_NEXT (incl. disclaimer)
- Versioning history and abstract
- Directories
- Reference list (if needed)
- Appendix / appendixes (if needed)
- Free and open source license which grants open access

2.4 Peer-to-peer review and approval process of deliverables

The following peer-to-peer (P2P) review and approval process has been defined for future deliverables within OPEN_NEXT according to **time remaining until due date** (please note that business days may vary within the different EU member states, as well as within individual federated states).

One month before the due date, the task leader should give prior notice of an upcoming review to the project coordinator TUB (referred to as “coordinator” in this section) and the WP leader. The prior notice should confirm the timely submission of deliverable as planned and that the appointments of reviewers have been accepted (at least one reviewer should be from another WP). The task leader should initiate the selection of reviewers early (e.g. two weeks in advance) and appoint reviewers in consultation with the coordinator and in agreement with the reviewers. In case of unforeseen circumstances, a backup reviewer from another WP should also be appointed. In order to ensure even distribution of reviewing obligations, accepted appointments of reviewers should be

recorded by the task leader in the spreadsheet “Internal reviewing log” which is available to all partners under the following file location: `OPEN_NEXT\04_Deliverables`.

Ten business days before the due date, the task leader should submit the complete deliverable to the reviewers for internal review with the coordinator and the WP leader in copy. The submission should also include the prefilled form for review results and author’s comments which is available for all partners under the following file location: `OPEN_NEXT\04_Deliverables\Review results\Template` (to be introduced in the following sub-section). Reviewers should give immediate notice in case the backup reviewer needs to stand in for them.

Seven business days before the due date, the reviewers should submit the internal review to the task leader with the coordinator and the WP leader in copy. The reviewers should structure their comments and evaluations as per the prefilled form for review results provided to them by the task leader (see last paragraph). The reviewers may also insert specific comments on minor issues in the deliverable document. However, these do not require responses from the task leader and all main issues should be addressed in the form for review results. The WP leader and the coordinator can insert additional comments in the form for review results within an additional 24 hours.

Two business days before the due date, the task leader should submit the finalised deliverable (publish-ready) internally to the coordinator and the WP leader by using the mailing subject “[OPENNEXT] Request for approval and submission of deliverable”. The submission should also attach the author’s responses to the reviewers’ comments as per the form for review results (see penultimate paragraph).

Within 24 hours response time final approval will be given by the WP leader and the coordinator who also reserve a veto right. In case of approval, the coordinator will submit the deliverable.

The veto right will only be made use of in case of unsatisfactory responses whereby critical issues have not been addressed by the author (e.g. milestone do not allow the next phase of the work to begin, serious formal / content-related deficiencies in the manuscript, etc.). The coordinator will then inform the Project Officer (PO) of last-minute delay including estimated time of delay and provide a statement with reasons directly to the task leader with the WP leader in copy.

The P2P review and approval process is illustrated in the following figure:

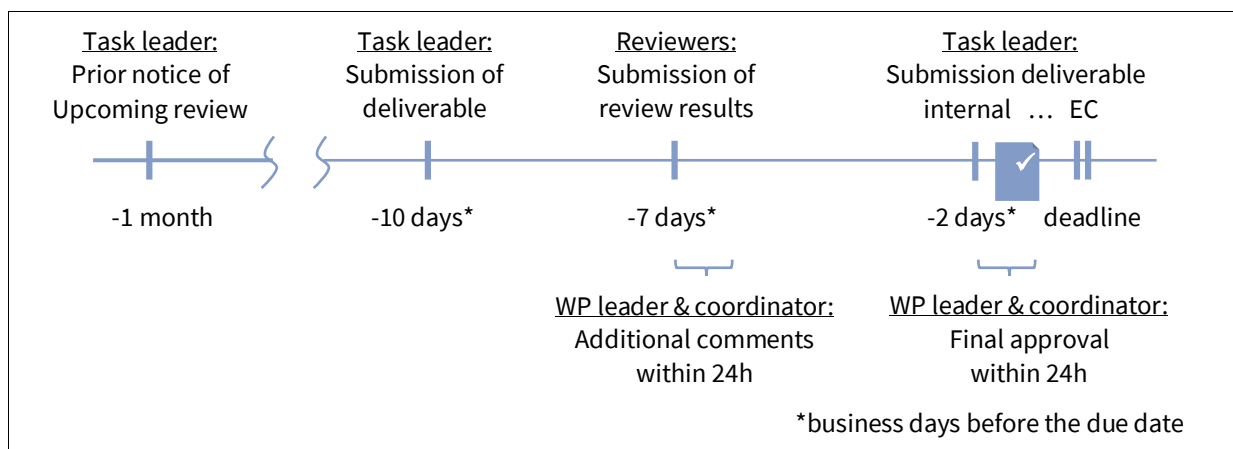


Figure 4: Peer-to-peer review and approval process of deliverables

2.5 Form for review results

A form for review results is available for all partners under the following file location: `OPEN_NEXT\04_Deliverables\Review results\Template`. The form is structured according to the following three parts:

- I General information
 - Deliverable name and description according to the Description of the Action (part A), Annex 1, Grant Agreement 869984
 - Task description according to the Description of the Action (part A), Annex 1, Grant Agreement 869984
 - KPIs (see sub-section 2.1)
- II Comments and responses
 - General comments for author
 - (Presentation, formatting, readability, gender issues, etc.)
 - Criterion “content” - Rating and comments for author
 - (Completeness of state of the art, application, methodology)
 - Criterion “structure” - Rating and comments for author
 - (Consistency of approach and argumentation)
 - Criterion “relevance” - Rating and comments for author
 - (Ambitiousness, innovativeness, and significance of findings/results)
- III Evaluation of the deliverable
 - Rating of the above-listed three criteria from 1 to 5 (with 5 being the highest)

As part of the review and approval process, the task leader will send the prefilled form to the reviewers. The task leader is encouraged to share the final review results including responses under the following file location: `OPEN_NEXT\04_Deliverables\Review results`.

2.6 Continuous improvement of the framework including through open access

Periodic internal reviews of the framework in the project OPEN_NEXT will allow for the gathering of lessons learned and thus continuous improvement. The publishing of the quality assurance framework as open access report is also hoped to support its adaption in other research projects and elicit feedback in return. Lessons learned will be used to adapt and extend the measures towards the above-mentioned goals (see section 1).

At the core of the framework lies the integration of quality assurance and openness measures. As mentioned above, the framework consists of preventive actions and corrective actions for quality assurance, to half of which openness measures have been applied. In order to illustrate how the quality assurance and openness measures are integrated, the following table shows how they reinforce each other:

Table 1: Integration of quality assurance and openness measures

Direction of integration ↗	KPIs	Public issue management*	OA Document template*	Review process	Form for review results	Continuous improvement*
KPIs	 	 	 	 	✓	
Public issue management*	 	 	 	✓	 	
OA Document template*	 	 	 	✓	 	
Review process	 	 	✓	 	 	
Form for review results	 	 	 	✓	 	
Continuous Improvement*	✓	✓	✓	✓	✓	

*openness measure

The direction of integration is indicated by the arrow in the top left table field. For example, a field for the KPIs is included in the form for review results. This table will be used henceforward to analyse how to further integrate quality assurance and openness measures.

3 Discussion and Outlook

The released version 1 of this quality assurance framework reflects the preliminary consensus of an integrated set of quality assurance and openness measures in the transdisciplinary research project OPEN_NEXT. Applying these measures for upcoming deliverables will be subject to feedback and improvement. Successful adoption of the framework also depends on the acceptance of selected groupware solutions like GitHub.

Additional openness measures to extend the framework could for example include public sharing of agreed KPIs, public sharing of review results, and open calls for external reviews. Integration of additional quality assurance measures could for example include the introduction of design reviews, requirements discovery, or validation of tasks according to previously defined requirements.

Looking forward, iterative development of the framework could follow the objective of establishing a template for **open quality action plans** for **publicly funded research projects** which integrate measures according to acknowledged **standards** of **openness** and **quality assurance**. This standardization effort would be hoped to have a great potential to enhance research **convergence** and **competitiveness** and also to build more **trust** and **inclusiveness** in publicly funded European research projects.



Appendix – Instructions for Open Access Document Template

These instructions are intended to guide the partners of the OPEN_NEXT Project when preparing their deliverables. It is partly derived from the “Instructions for Authors” of the International Design Conference 2020².

A1 Fill ins

In the template some passages are coloured grey. They are intended to be replaced by the actual required content. Please note that the colour should be changed to black. All other formatting such as font or font size should be kept.

A1.1 First page

Please fill in the first page with number and title of the deliverable.

A1.2 Third page

First of all, please fill in the number and the title of the deliverable in the header. On page 3 of the template you will then find four tables that you are asked to fill in. In this appendix the tables are already filled in with examples to show you what is expected exactly. Deliverable file names should include the deliverable number, the deliverable name, the date, and the versioning number as follows: <DX.X>_<Name of Deliverable>_<YYYYMMDD>_<vX.X>

A2 Formatting requirements

For formatting your deliverable, please use the predefined designs.

A2.1 Headings

All the headings should be written in sentence case (cap on the first word only). First level headings should be in “O!N_Heading1” style, second level headings should be in “O!N_Heading2” style and third level headings should be in “O!N_Heading3” style. These three predefined heading styles are automatically numbered. Please do not use heading levels four or lower.

Unnumbered headings that should be listed in the table of contents (e.g. references and appendix headings) should be generated in “O!N_Heading1” style and numbering manually deleted. Unnumbered headings that should not be listed in the table of contents (e.g. table of contents and list of contents abbreviations and terms) should be generated in “O!N_Unnumbered_heading” style. Headings may not end in full stop.

A2.2 Directories

Directories serve for clarity. The requirements for the directories are specified in this subsection.

A2.2.1 Table of contents

The “Table of contents” heading should be in “O!N_Unnumbered_heading” style. Please let the table of contents insert automatically and use the given formatting.

² See URL: https://www.designconference.org/download/design2020/DESIGN2020_Instructions_for_authors.docx. Last accessed on 23.02.2020.

A2.2.2 List of abbreviations and terms

The “List of abbreviations and terms” heading should be in “O!N_Unnumbered_heading” style. The abbreviations already listed above can be used as an example. They are to be formatted in the “O!N_Abbreviations_and_terms” style and descriptions are to be separated by using the “shift” key once. When adding further abbreviations, please note that an alphabetical order must be maintained.

A2.2.3 List of figures

The “List of figures” heading should be in “O!N_Unnumbered_heading” style. The list of figures provides an overview of all figures contained in the work. Please use the automatic generation of the list of figures and use the same formatting as in this paper.

A2.2.4 List of tables

The “List of tables” heading should be in “O!N_Unnumbered_heading” style. Please use the automatic generation of the list of tables and use the same formatting as in this paper. The tables on page three should not be included in the list of tables.

A2.3 Order of headings

Please keep to the following order of headings. Headings must not be used if there is no need for them. For example, if there are no tables, there should be no table list.

- Table of contents
- List of abbreviations and terms
- List of figures
- List of tables
- Text (chapters usually start with text and not directly with sub-heading)
- Acknowledgement
- References
- Appendix/Appendices

A2.4 Main text

Main text should be in “O!N_Standard” style. Please do not use blank lines between paragraphs of main text. To emphasize passages in the text, the three styles “O!N_Italic”, “O!N_Bold” and “O!N_Italic_and_bold” can be used.

A2.5 Lists

Three list styles have been predefined in the template: bulleted list, numbered list and lettered list. It is suggested not to use more than three list levels.

A2.5.1 Bulleted lists

- Bulleted (unnumbered) lists should use bullets as shown here.
- Use the style “O!N_Bulleted_list” for bulleted lists
- First level
 - Second level
 - Third level

A2.5.2 Customized lists (example for lettered lists, numbered lists, etc.)

1. Numbered lists should start with an ordinal number as shown here.
2. You may use the style „O!N_Numbered_list“ for numbered lists with automatic numbering
3. First level
 - a. Second level
 - i. Third level

A2.6 Figures



Figure 1: Figure caption

Figures should be in line with text and centered on the page. There should be no text to the left or right of the figure. It is strongly recommended to insert the figures into the document from an external file using “Insert → Pictures from file” menu option. Inserted figures should be of the highest possible quality. Please move cursor in same line as figure and insert an outer border using “Home → Paragraph → Outside Borders” for each figure. The frame should be black and 3 pt. thick. Figures should be cited within the main text before their appearance in the paper. An example of inserting figures and figure captions can be seen below (Figure A1).

Figure captions should be labelled with “Figure” followed by the ordinal number of the figure and a colon. Figure captions must be placed in a central position below the figure in “O!N_Captions” style. Within a caption, use soft returns only (i.e. manual line breaks, “Shift-Enter”). Figure captions may not end in a full stop.

A2.7 Tables

Table captions should be labelled with “Table” followed by the ordinal number of the table. Table captions must be placed above the table in “O!N_Captions” style and may not end in a full stop. Within a caption, use soft returns only (i.e. manual line breaks, “Shift-Enter”). Tables should be placed centrally on the page. The text in the table cells can be left-aligned, right-aligned or centred, but it is advisable to use a consistent formatting within a table. It is recommended that the tables do

not spread over multiple pages. For the marking of headers or header columns you can use the styles “O!N_Bold”, “O!N_Italic” or “O!N_Italic_and_bold”. Tables should be cited within the main text before their appearance in the paper. An example of using tables and table captions can be seen below (Table 1).

Table 1: Table caption

Table text	Table text	Table text
Table text	Table text	Table text

If a text paragraph follows the table, please leave one blank line between the table and the paragraph. Blank lines are not necessary in cases where the table is followed by a heading. In order to avoid that tables are broken between pages, please mark all lines except the last line before intended break/end of table and reformat lines under “Home → Paragraph → Line and page breaks → check box ‘Keep with next’”.

A2.8 Equations

Equations should be left aligned with 1.3 cm left indentation and contain an equation number at the right margin. Therefore, the quick table “O!N_Equation_table” should be used (“Insert→Quick tables”). The left column of the table should be filled with the formula. The right column already contains the numbering. Equations should be cited within the main text before their appearance in the paper. An example of using equations can be seen below (Equation 1)

$$a^2 + b^2 = c^2 \tag{1}$$

A2.9 Direct quotes

Reporting of the exact words of an author or speaker (direct quotes) must be placed inside quotation marks and formatted using the “O!N_Direct_quote” style. For example:

“You can’t make an omelette without breaking eggs.”

When used in-text, the direct quotes may stay in “O!N_Standard” paragraph styles and formatted using the “O!N_Italic” character style, for example: *“You can’t make an omelette without breaking eggs.”*

A2.10 Footnotes

If footnotes are placed³, the footnote text must be formatted using the “O!N_Footnote” style.

A3 Acknowledgement

The acknowledgement is already included in the cover page of the deliverable document template. However, the following text should always appear within published documents from the project OPEN_NEXT under the heading Acknowledgement before the references: “This work has been performed in the frame of the project OPEN_NEXT which is funded by the European Union’s Horizon 2020 research and innovation programme under grant agreement no. 869984.”

³ Use „References→Insert Footnote“ menu option to automatically place a footnote.

A4 References

The “References” heading should be generated in “O!N_Heading1” style and numbering manually deleted. Citations to published work throughout the paper should follow the **APA citation style**, as defined within these instructions. For the use of citation tools, the following styles may be useful to some extent:

- Citavi: APA American Psychological Association, (newest edition)
- Endnote: APA 6th
- Mendeley: APA

The main text should include references using the surname(s) of the author(s) and year. For in-text citations please follow: (Author, year of publication) / (Author1 and Author2, year of publication) / (Author1 et al., year of publication), or Author (year of publication) / Author1 and Author2 (year of publication) / Author1 et al. (year of publication). Use a semicolon (;) for separating multiple references inside brackets.

Each reference needs to include the **Digital Object Identifier (DOI)** if the publication has one. DOI can be found on the reference source website or in the CrossRef database (<http://www.crossref.org>).

Please ensure that every reference cited in the text is also included in the reference list (and vice versa). The list of references must be sorted in alphabetical order. Note that if the publication has more than six authors, only the first five are listed, followed by “et al.” after the fifth author’s name.

Please use the following guidelines when formatting the list of references:

- **Books:**

Author, A.A., Author, B.B., & Author, C.C. (Copyright Year). *Title of Book* (Edition). Place of publication: Publisher. DOI (if present)

Cruickshank, L. (2014). *Open design and innovation: facilitating creativity in everyone* (1st ed.). Farnham, Surrey: Gower. <https://doi.org/10.4324/9781315598932>

- **Book chapters:**

Author of chapter, A.A., Author of chapter, B.B., & Author of chapter C.C. (Copyright Year). Title of chapter. In: Editor, A.A., Editor, B.B. & Editor, C.C. (Eds.). *Title of book*. Place of publication. Publisher. pp. (insert page numbers). DOI (if present)

Bauwens, M., Kostakis, V., & Pazaitis, A. (2019). P2P and a New Ecosystem of Value Creation. In: *Peer to Peer: The Commons Manifesto*. London. University of Westminster Press. pp. 11-31.

- **Journals:**

Author, A.A., Author, B.B., & Author, C.C. (year of publication). “Title of Article”. *Title of Journal*, Vol. (insert volume number) (No.) (insert issue number), pp. (insert page numbers). DOI (if present)

Raasch, C., Herstatt, C., & Balka, K. (2009). On the open design of tangible goods. *R&d Management*, 39(4), pp. 382-393. <https://doi.org/10.1111/j.1467-9310.2009.00567.x>

- **Conference papers:**

Author, A.A., Author, B.B., & Author, C.C. (year of publication). Title of Paper. In: *Title of published proceeding (which may include place and date(s) held)*. Place of publication. Publisher. pp. (insert page numbers). DOI (if present)

Howard, T. J., Achiche, S., Özkil, A., & McAloone, T. C. (2012). Open design and crowdsourcing: maturity, methodology and business models. In: *DS 70: Proceedings of DESIGN 2012, the 12th International Design Conference, Dubrovnik, Croatia*. pp. 181-190.

- Reports:

Organisation/Author (year of publication). *Title of Report No.* (insert report number). Place of publication: Publisher.

Open Source Lab (2019). *The Open Source Paradigm in the Digital Transformation – Open Source Lab White Paper, March 2019*. Berlin: Open Source Lab Sustainable Mobility, German Research Center for Artificial Intelligence (DFKI).

- Thesis (PhD thesis, master thesis):

Author, A. (year of publication). *Title of Thesis [Designation]*. Awarding institution. Place of publication: Publisher. DOI (if present)

Heitmann, M. (2012). *Open Source Development and Company-community Collaboration: Impact Factors on the Process of Entering the Open Source Market [PhD Thesis]*. Technische Universität Berlin. Berlin: Kovac, Dr. Verlag.

- Standards:

Organisation short name/ Author (year of publication). *Standard title*. Place of publication: Organisation / Publisher.

ISO (2015). *ISO 9000:2015: Quality management systems - Fundamentals and vocabulary*. Geneva: International Organization for Standardization.

A5 Appendix/Appendices

Appendices (if any) should be in “O!N_Standard” style and start at a new page (use keys “ctrl” + “enter”). They should be placed after references. The title should be **labelled using letters** (e.g. Appendix A, Appendix B, Appendix C, etc.) and generated in “O!N_Heading1” style with numbering manually deleted. **If there is only one appendix, it is not labelled with a letter.** Within the text, appendices must be referenced in the same way, e.g. “Please consult Appendix A for the complete list of questions”.