NOVA IMS
INFORMATION MANAGEMENT SCHOOL

Doctoral Program in
Information Management

A Very Long and Impressive Thesis Title

by

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A Submission to the Thesis Monitoring Committee (Commisão de Acompanhamento de Tese) presented to the Universidade Nova de Lisboa - Nova IMS in fulfillment of the thesis requirements for the degree of PhD in Information Management. (You can change this based on if its a CAT or Final Document)

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Statement of Integrity

I hereby declare having conducted this academic work with integrity. I confirm that I have not used plagiarism or any form of undue use of information or falsification of results along the process leading to its elaboration. I further declare that I have fully acknowledged the Rules of Conduct and Code of Honor from the NOVA Information Management School.

Dedication

Dedication. This is a personal section where you can dedicate your thesis to someone special.

Acknowledgements

Acknowledgements are personal and should reflect your own voice.

Quote

You cannot teach a man anything;
you can only help him discover it in himself.

Galileo, 1632

Abstract

This document is the Nova IMS DGI-only thesis template with a simplified structure.

Keywords: PhD thesis, Nova IMS, DGI, LaTeX template

Sustainable Development Goals (SDG):

Resumo

Este documento e um modelo de tese focado apenas no doutoramento DGI da Nova IMS.

Glossary

computer An electronic device that receives and processes information.

Acronyms

DGI Doutoramento em Gestao de Informacao.

NOVA IMS NOVA Information Management School.

IPCC Intergovernmental Panel on Climate Change.

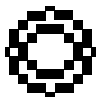
Symbols

μ Mu.

π The numerical value of pi.

r Radius of a circle.

Contents



List of Figures

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1

Template Documentation

This chapter is the complete documentation for the NOVA IMS LaTeX Thesis Template. It explains how every configuration file works, what each option does, and how to adapt the template for your own thesis. Read this chapter carefully before you start writing. Once you are comfortable, you can delete or archive it and replace it with your own Introduction.

1.1 Overview

The template is a simplified fork of the NOVAthesis project, redesigned for NOVA IMS doctoral and master programmes. The key design goals are:

- **Flat structure.** All your writing lives under four top-level directories: `chapters/`, `figures/`, `bibliography/`, and `config/`. There are no deeply nested subdirectories.
- **Single entry-point.** You compile `main.tex`. You should never need to touch it.
- **Separation of concerns.** Metadata, structure, style, and content are each controlled by a different file.
- **One-to-one with the Word template.** Cover pages, fonts, margins, heading styles, list-of-figures/tables, and back-matter layout all match the official NOVA IMS Word document.

1.2 Directory Structure

`main.tex` Compile entry-point. Loads the style, all config files, and calls the loader macros defined in `config/files.tex`. *Do not edit this file.*

`Makefile` Runs the full compilation chain (`latexmk` + `biber`) and auto-generates `config/bibliography-sources.tex` from every `.bib` file found in `bibliography/`.

`config/cover.tex` Thesis metadata: title, author, supervisors, degree, submission date. *This is the first file you should edit.* See Section 1.3.

`config/files.tex` Controls which chapters, appendices, and annexes are compiled, and in what order. See Section 1.4.

`config/bibliography.tex` Selects the bibliography style (`apa`, `numeric`, or `authoryear`). See Section 1.5.

`config/bibliography-sources.tex` Auto-generated by `make`. Lists all `\addbibresource` calls. *Do not edit by hand.*

`config/packages.tex` Add your own `\usepackage` calls and custom macros here. See Section 1.6.

`chapters/preface.tex` Front-matter sections: Statement of Integrity, Dedication, Acknowledgements, Quote, Abstract (EN + PT), Glossary, Acronyms, and Symbols. See Section 1.7.

`chapters/chapter*.tex` Your main thesis chapters, one file each.

`chapters/appendix*.tex` Appendix chapters. Numbered with Latin letters (A, B, . . .) and labelled "Appendix".

`chapters/annex*.tex` Annex chapters. Numbered with Roman numerals (I, II, . . .) and labelled "Annex".

`figures/` All figures used anywhere in the document. Reference them with a path relative to the project root, e.g. `\includegraphics{figures/myplot.pdf}`.

`bibliography/*.bib` Your BibTeX/BibLaTeX source files. Drop any number of `.bib` files here; the `Makefile` picks them all up automatically.

`style/novaims-dgi.sty` The consolidated style file. Controls cover rendering, heading formats, page layout, running headers, and annex/appendix numbering. *Only edit if you know what you are doing.*

1.3 Configuring Your Cover

Open `config/cover.tex`. Every metadata item is set with a `\renewcommand`. The following listing shows all available options and what they control.

`\coverlanguage` Language of the cover page text. Set to `en` (English) or `pt` (Portuguese). This also controls which cover PDF asset is used from `style/assets/covers/DGI/`.

`\thesistitle` Full title of your thesis, exactly as it should appear on the cover.

`\thesisauthor` Your full name, as it should appear on the cover and title page.

`\thesisdegree` The degree being awarded, e.g. `PhD in Information Management` or `Master in Data Science and Advanced Analytics`.

`\thesissubmissiondate` Month and year of submission, e.g. `January 2026`.

`\thesisschoolEN` English name of the school. Defaults to `NOVA Information Management School`.

`\thesisschoolPT` Portuguese name of the school.

`\thesisuniversity` University name. Defaults to `NOVA University Lisbon`.

`\thesissupervisors` Primary supervisor(s). Use `\\` to separate lines and `\textit{}` for the affiliation in italics. Example:

```
\renewcommand{\thesissupervisors}{%
  João Silva\\
  \textit{Associate Professor, NOVA IMS}
}
```

`\thesiscosupervisors` Co-supervisor(s), using the same format. Leave the body empty (i.e., `{}`) if there is no co-supervisor; the field will be suppressed automatically.

`\printbackcovertrue` / `\printbackcoverfalse` Controls whether the back cover page is printed. Set to `\printbackcoverfalse` for digital-only submission.

1.4 Managing Chapters, Appendices, and Annexes

`config/files.tex` is the structural switchboard of your thesis. It defines several boolean flags and loader macros.

1.4.1 Boolean flags

`\perchapterbibliographytrue/false` When `true`, each chapter prints its own *References* section at its end. When `false`, a single consolidated bibliography is printed at the end of the document.

`\printlistoffigurestrue/false` Enables or disables the List of Figures in the front matter.

`\printlistoftablestrue/false` Enables or disables the List of Tables in the front matter.

`\printappendicestrue/false` Enables or disables the entire appendix back-matter block.

`\printannexestrue/false` Enables or disables the entire annex back-matter block.

1.4.2 Adding a chapter

Open `config/files.tex` and add a line inside the `\loadchapters` macro:

```
\newcommand{\loadchapters}{%
  \chapterwithrefs{chapters/chapter1}
  \chapterwithrefs{chapters/chapter2}
  \chapterwithrefs{chapters/chapter3}   % <-- new chapter
}
```

The helper `\chapterwithrefs{}` inputs the file and, when per-chapter bibliographies are enabled, prints the local References section automatically.

1.4.3 Adding an appendix

Add a line inside `\loadappendices`. Also make sure `\printappendicestrue` is set:

```
\newcommand{\loadappendices}{%
  \ifprintappendices
    \imsstartappendices
    \chapterwithrefs{chapters/appendix1}
    \chapterwithrefs{chapters/appendix2}
    \chapterwithrefs{chapters/appendix3}   % <-- new appendix
  \fi
}
```

1.4.4 Adding an annex

Add a line inside `\loadannexes` and set `\printannexestrue`:

```
\newcommand{\loadannexes}{%
  \ifprintannexes
    \imsstartannexes
    \chapterwithrefs{chapters/annex1}
    \chapterwithrefs{chapters/annex2}    % <-- new annex
  \fi
}
```

Important: The `\imsstartappendices` and `\imsstartannexes` calls must appear *once*, before the first appendix/annex file respectively. They reset the chapter counter and switch the chapter prefix to "Appendix" / "Annex".

1.5 Configuring the Bibliography

Open `config/bibliography.tex`. Three `\usepackage{biblatex}` blocks are provided; exactly one must be uncommented at a time.

APA (default) Author-date format per the APA 7th edition. Citations look like (Silva, 2024) or Silva (2024). Use `\parencite{}` for parenthetical and `\textcite{}` for narrative citations. Note that the line `\AtBeginDocument{\let\cite\par` in `bibliography.tex` makes `\cite` behave like `\parencite` globally.

Numeric Citations are numbered in order of appearance: [1], [2], ... Bibliography is sorted by citation order.

Author-year Similar to APA but without full APA formatting rules (less strict journal/book field formatting).

To add a new `.bib` file, simply place it in `bibliography/` and re-run `make`. The `Makefile` regenerates `config/bibliography-sources.tex` automatically.

1.6 Adding Custom Packages and Macros

Put all your extra `\usepackage` calls and custom command definitions in `config/packages.tex`. This file is loaded after the style and before the document body, so your definitions are available everywhere. Never load packages in individual chapter files.

```
% config/packages.tex - example
\usepackage{tikz}
\usetikzlibrary{arrows,positioning}

\newcommand{\R}{\mathbb{R}}   % shorthand for real numbers
\newcommand{\E}{\mathbb{E}}   % shorthand for expectation
```

1.7 Writing the Front Matter

All front-matter content lives in `chapters/preface.tex`. Each section is introduced with `\prefacesection{`*name*`}`.

1.7.1 SDG icons

The template prints UN Sustainable Development Goal icons on the abstract page. Control which icons appear with:

```
\setsdglanguage{en}        % en or pt
\setsdgs{3, 11, 13}        % comma-separated list of goal numbers (1-17)
```

1.7.2 Abstract and Resumo

The English abstract uses `\prefacesection{Abstract}` followed by your abstract text and a `\keywords{}` command:

```
\prefacesection{Abstract}
Your abstract text here.
\keywords{keyword one, keyword two, keyword three}
```

The Portuguese abstract follows immediately with `\prefacesection{Resumo}`.

1.7.3 Glossary, Acronyms, and Symbols

These use the standard `description` environment inside a `\prefacesection`:

```
\prefacesection{Acronyms}
\begin{description}
  \item[NLP]  Natural Language Processing
  \item[ML]   Machine Learning
\end{description}
```

1.8 Using the Chapter Front Matter

For article-style chapters (e.g., papers submitted for publication), the template provides a `chapterfrontmatter` environment that prints a chapter-level abstract and keywords immediately after the chapter heading:

```
\chapter{My Chapter Title} \label{chap:mychapter}

\begin{chapterfrontmatter}
  \begin{abstract}
    \small \noindent Chapter-level abstract text here.
  \end{abstract}
  \begin{keyword}
    \small
    keyword one \sep keyword two \sep keyword three
  \end{keyword}
\end{chapterfrontmatter}

\section{Introduction}
...
```

For standard thesis chapters (not article-style), omit the `chapterfrontmatter` block and start directly with `\section{}`.

1.9 Compiling the Document

1.9.1 With make (recommended)

```
make
```

This single command:

1. Scans `bibliography/*.bib` and writes `config/bibliography-sources.tex`.
2. Runs `latexmk` with `-pdf` and `-shell-escape`.
3. Calls `biber` for bibliography processing.
4. Repeats passes until the output is stable.

The final output is `main.pdf`.

1.9.2 Manual compilation

If `make` is not available, run:

```
latexmk -shell-escape -file-line-error -pdf main
```

Or step by step:

```
pdflatex -shell-escape main
biber main
pdflatex -shell-escape main
pdflatex -shell-escape main
```

1.9.3 Overleaf

1. Download the repository as a ZIP.
2. Upload the ZIP to Overleaf.
3. Set `main.tex` as the root document (*Menu → Main document*).
4. Set the compiler to `pdfLaTeX` and the bibliography tool to `Biber`.
5. Compile.

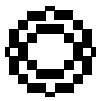
A paid Overleaf account may be required due to the 20-second compilation limit on the free plan.

1.10 Adding a New Programme (for contributors)

Currently, only the DGI cover assets are included. Adding support for another NOVA IMS programme requires three steps:

1. Create the cover PDFs (EN and PT) following the brand guidelines and place them in `style/assets/covers/PROGRAMME_CODE/DGI-EN/` and `style/assets/cover`
2. Add a new cover-rendering block in `style/novaims-dgi.sty`, conditional on the programme code.
3. Update `config/cover.tex` to expose the new programme option via a `\renewcommand`.

Pull requests are very welcome.



2

Writing in LaTeX: A Practical Guide

This chapter is a hands-on guide to the LaTeX constructs you will use most when writing your thesis. Rather than showing only code snippets, each section demonstrates the feature *live* so you can see the rendered output directly in this document alongside the source that produced it. The figures, tables, and citations in this chapter all use real assets from this template repository, so the document compiles out-of-the-box.

2.1 Document Structure

Chapters are divided with the standard sectioning hierarchy. The template numbers them automatically:

```
\section{My Section}           % e.g. 2.1
\subsection{My Subsection}     % e.g. 2.1.1
\subsubsection{My Sub-sub}     % e.g. 2.1.1.1
\paragraph{Inline heading}     % not numbered
```

Never skip levels, and avoid more than three levels of nesting in a thesis.

2.2 Labels and Cross-References

Attach a `\label{}` to any numbered object — chapter, section, figure, table, equation — and refer to it anywhere with `\ref{}`. Numbers update automatically.

2.2.1 Labelling conventions

Use a consistent prefix to keep labels scannable:

chap: Chapters — `\label{chap:introduction}`

sec: Sections — `\label{sec:methodology}`

fig: Figures — `\label{fig:accmap}`

tab: Tables — `\label{tab:summary}`

eq: Equations — `\label{eq:poisson}`

app: Appendix secs — `\label{app:workflow}`

ann: Annex secs — `\label{ann:commands}`

2.2.2 Making a reference

Always put a tilde (~) between the word and `\ref` — it is a non-breaking space that prevents "Figure" from ending up alone at the end of a line:

```
See Section~\ref{sec:methodology} for details.
Figure~\ref{fig:accmap} shows the spatial distribution.
Full results are in Appendix~\ref{app:workflow}.
Raw data are in Annex~\ref{ann:commands}.
Equation~\eqref{eq:poisson} defines the model.   % use \eqref for equations
See page~\pageref{fig:accmap} for the map.
```

Live example — this sentence refers back to the subsection just above: Section 2.2.1 listed the labelling prefixes, and Figure 2.1 on page 12 shows the accident map introduced in Section 2.3.

2.3 Figures

Place all image files in `figures/`. Use a path relative to the project root in `\includegraphics`.

2.3.1 A single figure

The source below produced Figure 2.1:

```
\begin{figure}[htbp]
  \centering
  \includegraphics[width=0.85\textwidth]{figures/sevAccMap24LAB.png}
  \caption{Spatial distribution of severe accident reports across mainland
```

```
            Portugal, 2024.  Darker municipalities had higher daily counts.}
  \label{fig:accmap}
\end{figure}
```

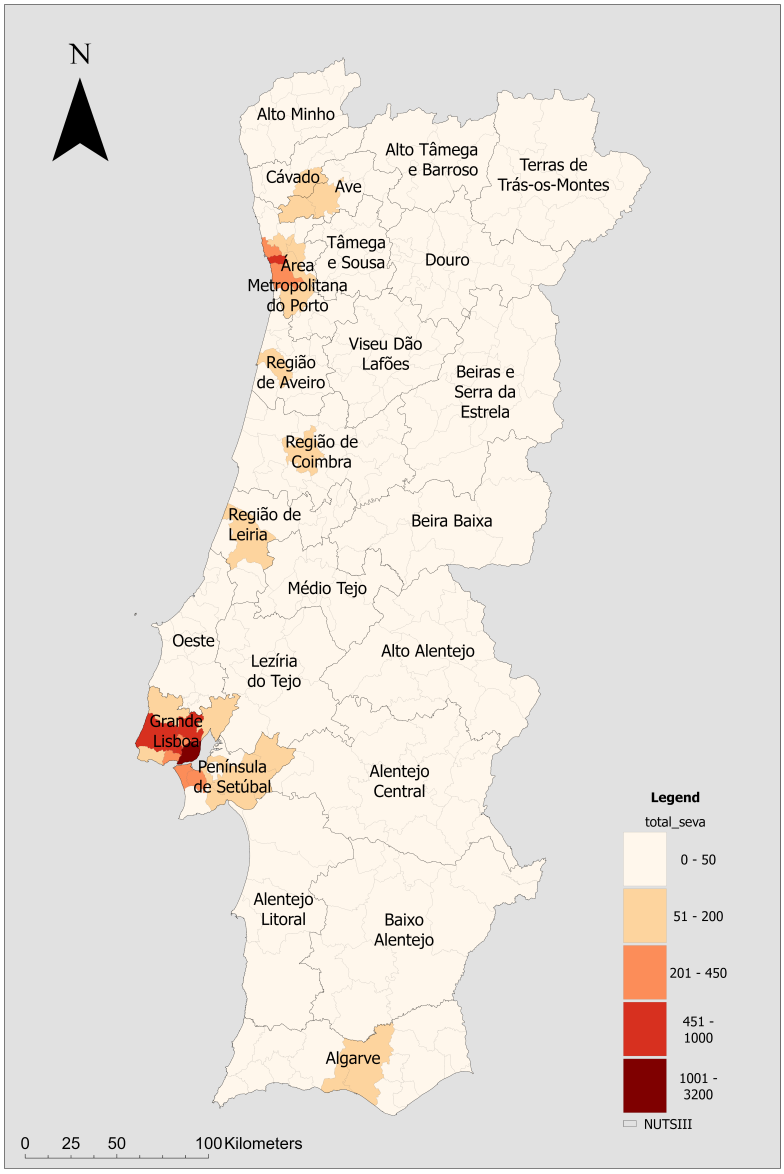


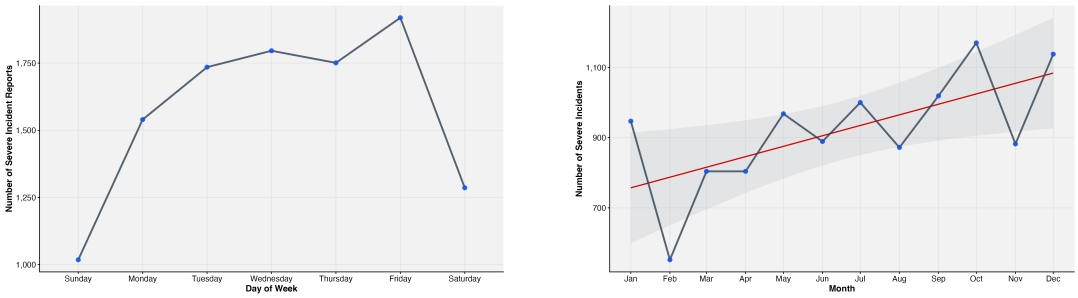
Figure 2.1: Spatial distribution of severe accident reports across mainland Portugal, 2024. Darker municipalities had higher daily counts.

Prefer `.pdf/.eps` for vector graphics and `.png` for raster images. The specifier `[htbp]` tells LaTeX to try: here, top, bottom, float page. Avoid hardcoding `[H]` unless essential.

2.3.2 Side-by-side figures

Use the `subcaption` package (already loaded). Figure 2.2, using two files already in `figures/`:

```
\begin{figure}[htbp]
  \centering
  \begin{subfigure}{0.48\textwidth}
    \centering
    \includegraphics[width=\textwidth]{figures/sir_day_of_week.png}
    \caption{Reports by day of week.}
    \label{fig:dayofweek}
  \end{subfigure}
  \hfill
  \begin{subfigure}{0.48\textwidth}
    \centering
    \includegraphics[width=\textwidth]{figures/sir_by_month.png}
    \caption{Reports by month.}
    \label{fig:bymonth}
  \end{subfigure}
  \caption{Temporal patterns in severe accident reports, Portugal 2024.}
  \label{fig:twoplots}
\end{figure}
```



(a) Reports by day of week.

(b) Reports by month.

Figure 2.2: Temporal patterns in severe accident reports, Portugal 2024. Panel (a) shows the weekly cycle; panel (b) shows seasonal variation.

Refer to individual panels as Figure 2.2a and Figure 2.2b, or to the pair as Figure 2.2.

2.4 Tables

Use `booktabs` (already loaded): no vertical lines; horizontal rules only via `\toprule`, `\midrule`, `\bottomrule`. Captions go *above* tables. Table 2.1 was produced by the code that follows:

Table 2.1: Descriptive statistics — main variables, mainland Portugal 2024.

Variable	Mean	Std. Dev.	Min	Max
Severe accidents (daily)	3.21	2.07	0	18
Temperature (°C)	17.4	6.3	−1.2	42.1
Precipitation (mm/h)	0.18	0.61	0	8.4
Hours above 30°C	1.4	2.1	0	11
Hours of heavy rain	0.3	0.8	0	6

```
\begin{table}[htbp]
  \centering
  \caption{Descriptive statistics.}
  \label{tab:summary}
  \begin{tabular}{lrrrr}
    \toprule
    Variable          & Mean & Std.\ Dev. & Min    & Max  \\
    \midrule
    Accidents (daily) & 3.21 & 2.07       & 0      & 18   \\
    Temperature (°C)  & 17.4 & 6.3        & $-1.2 & 42.1 \\
    Precipitation     & 0.18 & 0.61       & 0      & 8.4  \\
    \bottomrule
  \end{tabular}
\end{table}
```

For multi-column headers use `\multicolumn{n}{c}{text}`. For tables spanning multiple pages, load `longtable` in `config/packages.tex`.

2.5 Mathematical Equations

2.5.1 Inline mathematics

Wrap inline maths in dollar signs. `$\hat{y}_{it} = \mu_i + \varepsilon_{it}$` renders as $\hat{y}_{it} = \mu_i + \varepsilon_{it}$.

2.5.2 Numbered display equations

Use `equation` and always label equations you will refer to. The code below produced Equation (2.1):

```
\begin{equation}
  \mathbb{E}[y_{it} \mid \mathbf{x}_{it}]
    = \exp\!\left(\alpha_i + \beta_t
      + \mathbf{x}_{it}'\boldsymbol{\gamma}\right)
  \label{eq:poisson}
\end{equation}
```

$$\mathbb{E}[y_{it} \mid \mathbf{x}_{it}] = \exp\left(\alpha_i + \beta_t + \mathbf{x}_{it}'\gamma\right) \tag{2.1}$$

Use `\eqref{eq:poisson}` (not `\ref`) — it adds parentheses automatically so you get "Equation (2.1)".

2.5.3 Multi-line equations

`align` aligns multiple lines at the `&` column:

```
\begin{align}
  \text{RMSE} &= \sqrt{\frac{1}{n}\sum_{i=1}^{n}(\hat{y}_i - y_i)^2}
                 \label{eq:rmse} \\
  \text{MAE}  &= \frac{1}{n}\sum_{i=1}^{n}\lvert\hat{y}_i - y_i\rvert
                 \label{eq:mae}
\end{align}
```

$$\text{RMSE} = \sqrt{\frac{1}{n}\sum_{i=1}^{n}(\hat{y}_i - y_i)^2} \tag{2.2}$$

$$\text{MAE} = \frac{1}{n}\sum_{i=1}^{n}|\hat{y}_i - y_i| \tag{2.3}$$

Use `align*` to suppress all equation numbers.

2.6 Citations

The template uses `biblatex` with `biber` and APA by default. Drop any number of `.bib` files into `bibliography/` and re-run `make` — they are all picked up automatically.

2.6.1 Citation commands

`\cite{key}` Parenthetical citation — aliased to `\parencite` by this template.
Example source: `\cite{andreyWeatherChronicHazard2003}`
Rendered: (Andrey et al., 2003)

`\textcite{key}` Narrative citation where the author's name is part of the sentence. `\textcite{blackEffectsRainfallVehicle2017}`
Rendered: Black et al. (2017)

`\parencite[p. 45]{key}` With a page number post-note.
Rendered: (Basagaña et al., 2015, p. 45)

`\parencite{key1,key2}` Multiple sources in one bracket.
Rendered: (Andrey et al., 2003; Black et al., 2017)

`\citeauthor{key}` Author name only, no year: Basagaña et al.

`\citeyear{key}` Year only, no author: 2015

`\fullcite{key}` Full bibliography entry rendered inline in the text.

`\nocite{*}` Forces all entries in a `.bib` file into the bibliography, whether cited or not.

2.6.2 Live paragraph example

The paragraph below uses real bib keys from `bibliography/traffic_weather.bib` and renders exactly as it would in your own chapter:

The relationship between weather and road safety has been widely studied. Andrey et al. (2003) report that precipitation increased crashes by approximately 75% and injuries by 45% in mid-sized Canadian cities. Basagaña et al. (2015) document a J-shaped relationship between temperature and crash risk in Spain. More recent matched-pair analyses across multiple US states confirm that rainfall consistently raises collision risk (Black et al., 2017).

2.7 Footnotes

Insert a footnote inline with `\footnote{}`. The sentence ends, a superscript appears, and the note is set at the foot of the page.[1]

[1] This is a live example footnote produced by `\footnote{...}` immediately after the period.

Keep footnotes short. If a note exceeds two lines, move the content into the main text or an appendix.

2.8 URLs and Hyperlinks

`hyperref` is already loaded. Every `\ref`, `\cite`, and table-of-contents entry is automatically a clickable link in the PDF.

`\url{...}` Monospace clickable URL: https://www.novaims.unl.pt

`\href{url}{anchor text}` Hyperlink with custom visible text: NOVA IMS official website

DOI/URL in bibliography Add `doi = {10.xxxx/...}` or `url = {https://...}` to any BibTeX entry and `biblatex` renders and links it.

You want to use `href` for most purposes, since if the URL breaks across lines, the link will still work, whereas `url` can break but only at certain characters.

2.9 Lists

All three list environments are shown live below.

Bullet list (`itemize`):

- Crowdsourced incident data (Waze)
- Gridded reanalysis weather data (ERA5-Land)
- Official accident statistics (ANSR)

Numbered list (`enumerate`):

1. Download the repository as a ZIP.
2. Upload to Overleaf or clone locally.
3. Edit `config/cover.tex` with your metadata.
4. Run `make` to compile.

Definition list (`description`):

ERA5-Land ECMWF hourly gridded reanalysis product at 9 km resolution.

ANSR Autoridade Nacional de Segurança Rodoviária — the Portuguese road safety authority.

GLM Generalised Linear Model.

2.10 Keeping the Source Readable

- Write **one sentence per line**. Error messages and Git diffs reference line numbers — shorter lines make both much easier to read.
- Use `%` comments to annotate complex tables and equations.
- Never commit generated files (`*.aux`, `*.bbl`, `main.pdf`) — the `.gitignore` already excludes them.
- When in doubt about a package, run `texdoc` *`packagename`* in a terminal for the official documentation.
- For a version-control workflow, see Appendix A.4.

References

Andrey, J., Mills, B., Leahy, M., & Suggett, J. (2003). Weather as a Chronic Hazard for Road Transportation in Canadian Cities. *Natural Hazards*, *28*(2), 319–343. https://doi.org/10.1023/A:1022934225431 (cit. on p. 16).

Basagaña, X., Escalera-Antezana, J. P., Dadvand, P., Llatje, Ò., Barrera-Gómez, J., Cunillera, J., Medina-Ramón, M., & Pérez, K. (2015). High Ambient Temperatures and Risk of Motor Vehicle Crashes in Catalonia, Spain (2000–2011): A Time-Series Analysis. *Environmental Health Perspectives*. https://doi.org/10.1289/ehp.1409223 (cit. on p. 16).

Black, A. W., Villarini, G., & Mote, T. L. (2017). Effects of Rainfall on Vehicle Crashes in Six U.S. States. *Weather, Climate, and Society*, *9*(1), 53–70. https://doi.org/10.1175/WCAS-D-16-0035.1 (cit. on p. 16).

Annexes

I

Useful LaTeX Command Reference

This annex is a compact command reference for formatting constructs that appear frequently in theses but are not covered in Chapter 2.

I.1 Text Formatting

`\textbf{text}` **Bold text.**

`\textit{text}` *Italic text.*

`\texttt{text}` `Monospace / typewriter text.` Use for code, file names, and commands.

`\emph{text}` *Contextual emphasis.* Italic in normal context; roman inside an already-italic environment. Prefer this over `\textit` for emphasis.

`\underline{text}` Underlined text. Use sparingly.

`\small`, `\footnotesize`, `\large`, `\Large` Relative font-size switches. These are declarations (not commands with arguments), so wrap them in a group: `{\small small text}`.

`\textsc{text}` Small capitals.

`\textsuperscript{n}` Superscript: 1^{st}, 2^{nd}.

`\textsubscript{n}` Subscript in text mode.

I.2 Spacing and Breaks

~ Non-breaking space. Always use between a word and a `\ref` or number: `Figure~\ref{fig:x}`, `Table~1`.

\, Thin space. Useful in maths and units: `$3\,\mathrm{km}$`.

\quad, \qquad Wide horizontal spaces (1 em and 2 em respectively).

**\newline or ** Force a line break within a paragraph. Avoid in normal prose.

\newpage Force a page break. Avoid until the final formatting pass.

\noindent Suppress paragraph indentation on the following paragraph.

\vspace{1cm} Insert vertical space. Use with care; prefer structural commands.

I.3 Special Characters

Some characters have special meaning in LaTeX and must be escaped:

Character	Command
%	`\%`
$	`\$`
&	`\&`
#	`\#`
_	`\_`
{	`\{`
}	`\}`
~	`\textasciitilde`
^	`\textasciicircum`
\	`\textbackslash`

I.4 Dashes and Quotation Marks

Hyphen (-) Word-hyphenation, compound adjectives: *well-known*, *data-driven*.

En-dash (--) Ranges: pages 12–15, years 2020–2026.

Em-dash (---) Interruption or parenthetical aside—like this one—in running text.

Opening double quotes (``) Typed with two backticks: “quoted text”.

Closing double quotes ('') Typed with two apostrophes.

Never use the keyboard " character for quotes in LaTeX.

I.5 Floats and Placement

h Place *here* (approximately).

t Place at the *top* of a page.

b Place at the *bottom* of a page.

p Place on a dedicated float *page*.

! Override LaTeX's internal quality thresholds.

The specifier `[htbp]` is the recommended default. If LaTeX still cannot place a float satisfactorily, use `\FloatBarrier` (from the `placeins` package) to force all pending floats to be placed before continuing.

I.6 Common Environments

verbatim Typesets text exactly as typed, in monospace. No LaTeX commands are interpreted. Use for code samples and command examples.

quote Indented single-paragraph quotation.

quotation Indented multi-paragraph quotation with first-line indentation.

center Centres content horizontally.

flushleft / flushright Left- or right-aligns content.

minipage Creates a boxed region of specified width. Useful for placing two blocks side by side without a figure environment.

Appendix

A

Configuration Quick Reference

This appendix provides a compact one-page summary of every configurable option in the template. Use it as a cheat-sheet once you have read Chapter 1.

A.1 Cover Metadata (`config/cover.tex`)

`\coverlanguage` `en` or `pt`. Controls cover language and selects the matching cover PDF asset.

`\thesistitle` Full thesis title.

`\thesisauthor` Author full name.

`\thesisdegree` Degree being awarded.

`\thesissubmissiondate` Month and year (e.g. `March 2026`).

`\thesisschoolEN` English school name.

`\thesisschoolPT` Portuguese school name.

`\thesisuniversity` University name.

`\thesissupervisors` Primary supervisor block. Use `\\` for line breaks and `\textit` for affiliation.

`\thesiscosupervisors` Co-supervisor block, same format. Leave body empty (`{}`) if not applicable.

`\printbackcovertrue` Enables the back cover. Replace with `\printbackcoverfalse` for digital-only.

A.2 Document Structure (config/files.tex)

\perchapterbibliographytrue/false Per-chapter vs. single end-of-document bibliography.

\printlistoffigurestrue/false Enables / disables the List of Figures.

\printlistoftablestrue/false Enables / disables the List of Tables.

\printappendicestrue/false Enables / disables the appendix block.

\printannexestrue/false Enables / disables the annex block.

\loadchapters Macro listing all main chapters via `\chapterwithrefs{path}`.

\loadappendices Macro listing appendix files. Must call `\imsstartappendices` once at the top.

\loadannexes Macro listing annex files. Must call `\imsstartannexes` once at the top.

A.3 Front Matter (chapters/preface.tex)

\setsdglanguage{en|pt} Language for SDG icon labels.

\setsdgs{1,3,11} Comma-separated list of SDG goal numbers to display (1–17).

\prefacesection{Name} Opens a new front-matter section. Available section names: Statement of Integrity, Dedication, Acknowledgements, Quote, Abstract, Resumo, Glossary, Acronyms, Symbols.

\keywords{kw1, kw2} Used inside the Abstract section to print the keyword line.

\printsustainablegoals Inserts the SDG icon grid. Call this at the end of the Abstract section.

A.4 Suggested Git Workflow

Version control is strongly recommended. A minimal workflow:

1. Initialise: `git init` (or clone this repository).

2. Work on a feature branch: `git checkout -b chapter3`.
3. Commit frequently with descriptive messages:

```
git add chapters/chapter3.tex figures/ch3-*.pdf
git commit -m "chapter3: add methodology section"
```

4. Merge when stable: `git checkout main && git merge chapter3`.
5. Never commit generated files (`*.aux`, `*.bbl`, `main.pdf`, etc.). The `.gitignore` already excludes the most common ones.

Before submission, tag the final version:

```
git tag -a v1.0 -m "Final submission"
git push origin v1.0
```

B

Bibliography and Citation Reference

This appendix provides a concise reference for bibliography management and citation commands in the template.

B.1 BibTeX Entry Types

The most common entry types and their required fields:

`@article` Journal article. Required: `author`, `title`, `journal`, `year/date`, `volume`, `pages`.

`@book` Book. Required: `author` or `editor`, `title`, `publisher`, `year/date`.

`@inbook` / `@incollection` Chapter in an edited book. Required: `author`, `title`, `booktitle`, `editor`, `publisher`, `year`, `pages`.

`@inproceedings` Conference paper. Required: `author`, `title`, `booktitle`, `year`.

`@phdthesis` / `@mastersthesis` Thesis. Required: `author`, `title`, `school`, `year`.

`@techreport` Technical report. Required: `author`, `title`, `institution`, `year`.

`@misc` Anything else (websites, datasets, software). Use `url`, `urldate`, and `note` fields.

`@online` Preferred over `@misc` for web references. Use `url` and `urldate`.

B.2 Example BibTeX Entries

```
@article{silva2024,
  author  = {Silva, João and Costa, Maria},
```

```
  title   = {Traffic accidents in Portugal},
  journal = {Transport Research},
  year    = {2024},
  volume  = {12},
  number  = {3},
  pages   = {45--67},
  doi     = {10.1000/xyz123}
}

@book{wooldridge2010,
  author    = {Wooldridge, Jeffrey M.},
  title     = {Econometric Analysis of Cross Section and Panel Data},
  publisher = {MIT Press},
  year      = {2010},
  edition   = {2nd}
}

@online{novaims2024,
  author  = {{NOVA IMS}},
  title   = {NOVA Information Management School},
  url     = {https://www.novaims.unl.pt},
  urldate = {2024-01-15}
}
```

B.3 Citation Command Reference

\cite{key} Alias for \parencite in this template. Produces (Author, Year) in APA.

\parencite{key} Explicit parenthetical citation: (Author, Year).

\textcite{key} Narrative: Author (Year).

\parencite[p. 5]{key} With post-note: (Author, Year, p. 5).

\parencite[see][p. 5]{key} With pre- and post-note: (see Author, Year, p. 5).

\citeauthor{key} Author name only, no year.

\citeyear{key} Year only, no author.

\fullcite{key} Full bibliography entry inline in the text.

\nocite{key} Include in bibliography without an in-text citation.

\nocite{*} Include *all* entries in the `.bib` file in the bibliography, whether cited or not.

B.4 Switching Bibliography Style

Open `config/bibliography.tex`. Comment out the active block and uncomment the block for your desired style. Only one block may be active at a time.

1. **APA** (default): uncomment the first block, comment the other two.
2. **Numeric**: uncomment the second block, comment the other two.
3. **Author-year**: uncomment the third block, comment the other two.

After switching, do a full clean build:

```
make clean && make
```

or delete `main.aux`, `main.bbl`, and `main.bcf` manually before recompiling, otherwise `biber` may use stale data.

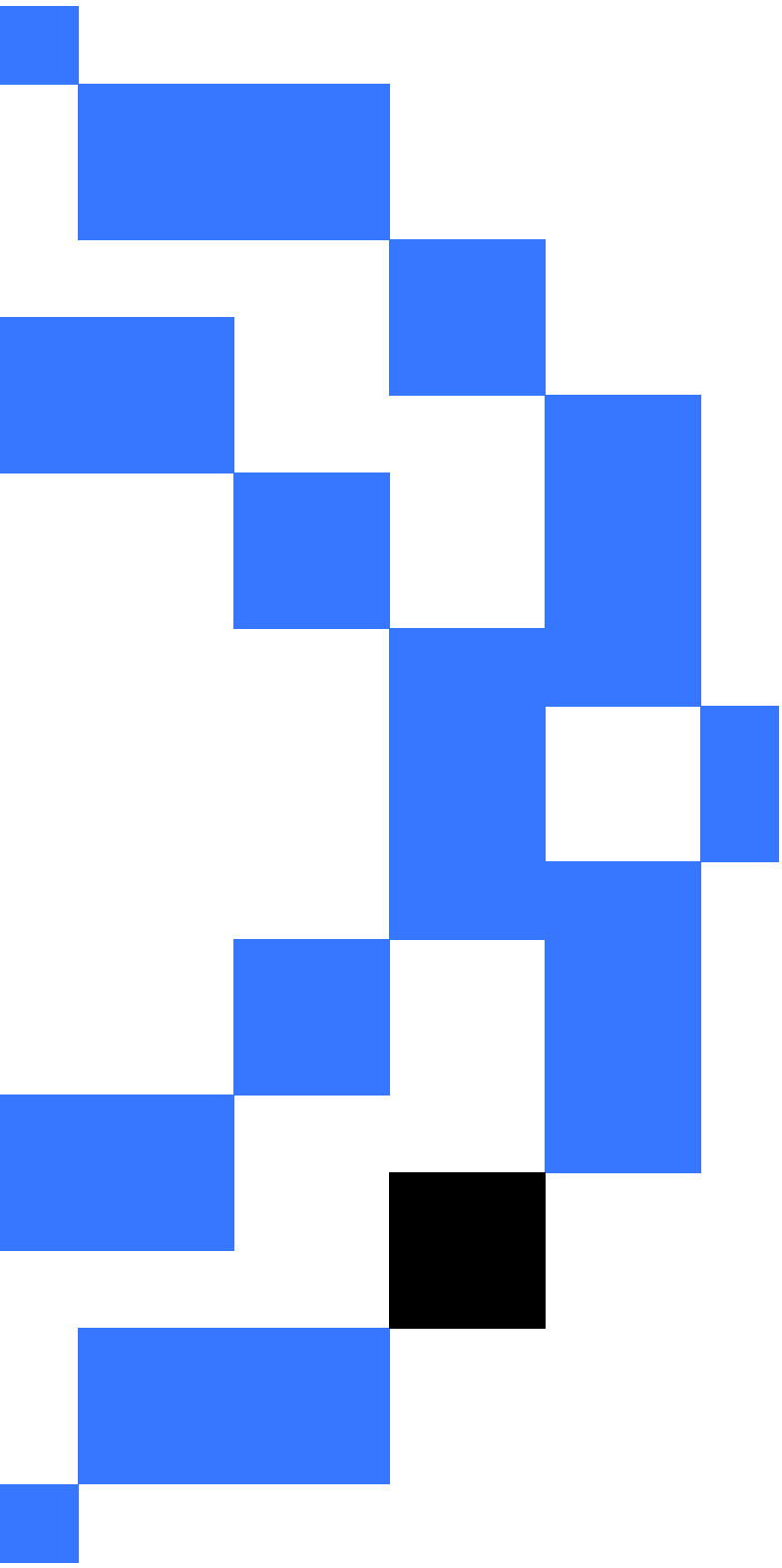
B.5 Per-chapter vs. Global Bibliography

The flag `\perchapterbibliographytrue` in `config/files.tex` controls this behaviour.

Per-chapter (default) Each chapter ends with its own *References* section listing only the sources cited in that chapter. Suitable for thesis-by-papers formats.

Global A single bibliography is printed at the end of the document, before the appendices. Set `\perchapterbibliographyfalse` to activate this. The `\printfinalbibliography` call in `main.tex` handles rendering it automatically.

Data with Purpose.



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