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Title of the Report

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Acknowledgements

Abstract

Glossary

Abbreviation	Description
EPS	European Project Semester
ISEP	Instituto Superior de Engenharia do Porto
USB	Universal Serial Bus

1. Introduction

1.1 Presentation

Present here the team

1.2 Motivation

Describe here your motivation for choosing this project

1.3 Problem

Provide here the problem you are tacking

1.4 Objectives

Detail here the objectives of this project

1.5 Requirements

Specify here the identified and mandatory requirements the solution has to fulfil

1.6 Tests

Specify here the functional, performance and usability tests to be performed with the prototype

1.7 Report Structure

Chapter	Description
1	…
2	…
3	…
4	…
5	…
6	…
7	…
8	…

2. Background and Related Work

This chapter provides the reader with the relevant technical-scientific background as well as existing related products and research, also known as the state of the art, in the field(s) of the project.

2.1 Introduction

Provide here an overview of the contents (structure) of this chapter.

2.2 Concepts

Provide here all relevant concepts related to the topic(s) of the project

2.3 Products

Search, select and describe related commercial solutions

2.4 Projects

Search, select and describe related research projects

2.5 Comparative Analysis

Compare selected products and projects considering the requirements of your own solution

2.6 Summary

Provide here the conclusions of this chapter and make the bridge to the next chapter.

Based on this study of the state of the art, the team decided to adopt the following <specify here the architecture, technique(s), material(s), component(s)> because <specify here the technical/scientific reasons>.

3. Project Management

Provide here an overview of the contents (structure) of this chapter. Explain the project management approach your group followed and justify why you think it is a good approach.

3.1 Scope

Document the boundaries of your project. Document the product scope (the extent of what your project will produce) and the project Scope (summary of the work needed to produce it). Make sure you clearly define what is part of the project and what is outside of its scope, justifying as needed.

3.2 Time

Explain how you managed the schedule of your project. Document the key milestones of your project, mapping key phases to reference deadlines.

3.3 Cost

Describe your project budget and its key components. Explain how your budget was managed throughout the project. Document the planned vs. effective costs of your project.

3.4 Quality

Document quality metrics that will apply to your project deliverables, associated thresholds and how they should be reviewed.

3.5 People & Stakeholder Management

Enumerate all people relevant to your project, including the project team and key stakeholders.

Document their roles and responsibilities. Document your stakeholder management plan and strategy.

3.6 Communications

Document how your team will manage communications, describing communication channels, meetings, etc.

3.7 Risk

Identify key risks (product and project level), evaluate them and define how they should be handled (responses) and monitored. Perform quantitative and qualitative risk analysis and use the results to define the appropriate risk responses.

3.8 Procurement

Document your procurement management strategy including make vs buy decisions, materials/services to be acquired, sources, costs, timings, etc.

3.9 Project Plan

Document the project schedule, and the key project phases, using a Gantt Chart. Highlight the key project phases and milestones.

Describe how your plan was mapped to multiple iterative sprints.

Document how the sprint backlog was planned and managed for each of the sprints you have created in Planner.

Describe how prioritization was done.

Document how the estimation process was implemented, and any underlying challenges.

Provide a summary of the sprints that were executed, along with sprint goals.

3.10 Sprint Outcomes

Include the outcomes of all sprint reviews (what was the sprint backlog, completion status, planned capacity vs. achieved velocity).

3.11 Sprint Evaluations

Include the summary of all the sprint retrospectives, including any actions implemented as part of the team’s continuous improvement strategy.

3.12 Summary

Provide here the conclusions of this chapter and make the bridge to the next chapter.

4. Marketing Plan

4.1 Introduction

Provide here an overview of the contents (structure) of this chapter.

4.2 Business Idea Formulation

4.3 Business Model

4.4 Market Analysis

4.5 SWOT Analysis

4.6 Strategy

4.6.1 Strategic Objectives

4.6.2 Segmentation and Targeting

4.6.3 Positioning

4.6.4 Marketing-Mix

4.6.5 Brand

4.7 Marketing Programmmes

4.7.1 Programmes

4.7.2 Budget

4.7.3 Control

4.8 Summary

Provide here the conclusions of this chapter and make the bridge to the next chapter.

Based on this market/economic analysis, the team decided to create <specify the type of product> intended for <specify the market niche> because <specify here the relevant market-related reasons>. Consequently, the team decided to design a solution with the following <specify here the features added for market reasons>.

5. Eco-efficiency Measures for Sustainability

Sustainability is a widely used concept that is applied by companies, organizations and politicians in various contexts. This chapter deals with specific measures to minimize the environmental footprint. An overview of the most important aspects of sustainable development and eco-efficiency. The eco-efficiency measures for sustainability provide a foundation for understanding our environmental responsibility and resource efficiency.

5.1 Introduction

Throughout history, geo-resources have served as crucial elements in providing all kinds of raw materials. However, excessive consumption has inflicted significant damage on the ecosystems, resulting in pollution and resource depletion. Sustainable engineering presents itself as a solution to this pressing issue, aiming to reconcile the demands of environmental preservation with economic growth. Sustainable engineering plays a fundamental role in these processes as it is rooted in the three pillars of sustainable: environment, society, and the economy. In simple terms, sustainability means to satisfy existing needs, without eliminating the needs of future generations. This correlates also with the 17 sustainable development goals (SDGs) from the United Nations. By adapting to nature, rather than trying to control it, more sustainable practices and products can be created.

5.2 Environmental

The environmental influence of products is of high importance in many aspects such as by depleting natural resources or emitting greenhouse gases. Concerning the product, it is important to try to reduce negative influences on the environment. This is achieved by reducing, reusing and recycling raw materials; taking into consideration the energy consumption in all phases of the project, as well as by minimizing transport.

5.3 Economical

The economic aspect of sustainability relates to the efficient and cost-effective utilization of resources, aiming to minimize environmental impact while ensuring long-term economic viability. The goal is to strike a balance between environmental responsibility and financial success by devising products, processes, and business models that are both ecologically and economically advantageous. Thus, the sustainable economy focuses on the responsible management of economic, social, and environmental resources to support the well-being of current and future generations. The goal of

economic sustainability is to achieve economic growth without making the negative environmental trade-offs that traditionally occur. It also means that the price of the product matches the time the product fulfils its purpose.

5.4 Social

Social sustainability is about identifying and managing business impacts, both positive and negative, on people. It refers to the ability of a project or initiative to foster positive and inclusive social interactions while considering the long-term effects on society. The social aspect of sustainability deals with the community, education, equality, justice, social resources, health, well-being, quality education and quality of life. The product should meet those social aspects.

5.5 Life Cycle Analysis

One crucial task is to assess how each stage of the life cycle contributes to the overall environmental impact. This analysis is typically aimed at prioritizing enhancements in products or processes and comparing various products for internal purposes. Life Cycle Analysis (LCA) is a method for evaluating the environmental impact of a service or product throughout its life cycle, from design to end-of-life management. LCA or life cycle assessment is an essential tool to support sustainable development decision-making, as well as to assess the potential environmental impacts of a product, material, process or activity.

5.6 Summary

Provide here the conclusions of this chapter and introduce the next chapter.

Based on this sustainability analysis, the team chose <specify here the design, technique(s) material(s), component(s)> for the following <specify here the relevant sustainability-related reasons>. Consequently, the team decided to design a solution with the following <specify here the features added for sustainability reasons>.

6. Ethical and Deontological Concerns

6.1 Introduction

Provide here an overview of the contents (structure) of this chapter.

6.2 Engineering Ethics

6.3 Sales and Marketing Ethics

6.4 Environmental Ethics

6.5 Liability

6.6 Summary

Provide here the conclusions of this chapter and make the bridge to the next chapter.

Based on this ethical and deontological analysis, the team chose <specify here the design, technique(s) material(s), component(s)> for the following <specify here the relevant ethics-related reasons>. Consequently, the team decided to design a solution with the following <specify here the features added for ethical reasons>.

7. Project Development

7.1 Introduction

Provide here an overview of the contents (structure) of this chapter.

7.2 Ideation

7.3 Concept

7.4 Design

7.4.1 Structure

Add and explain thoroughly the: (*i*) initial structural drafts; (*ii*) material selection; (*iii*) detailed drawings; (*iv*) 3D model with load and stress analysis; (*v*) colour palette.

7.4.2 Smart System

Hardware

Include and explain in detail the: (*i*) black box diagram; (*ii*) hardware component selection (use tables to compare the different options for each component; (*iii*) detailed schematics; (*iv*) power budget.

Software

Describe in detail the: (*i*) use cases or user stories for the smart device and app; (*ii*) selection of

development platforms and software components (use tables to compare the different options); (*iii*) component diagram.

7.4.3 Packaging

Present and explain the: (*i*) initial packaging drafts; (*ii*) detailed drawings; (*iii*) 3D model with load and stress analysis, if applicable.

7.5 Prototype

Refer main changes in relation to the designed solution.

7.5.1 Structure

Detail and explain any changes made in relation to the designed solution, including structural downscaling, different materials, parts, etc.

7.5.2 Hardware

Detail and explain any change made in relation to the designed solution. In case there are changes regarding the hardware, present the detailed schematics of the prototype.

7.5.3 Software

Detail and explain any changes made in relation to the designed solution, including different software components, tools, platforms, etc.

The code developed for the prototype (smart device and apps) is described here using code flowcharts.

7.5.4 Tests & Results

Hardware tests

Perform the hardware tests specified in 1.6 Tests. These results are usually presented in the form of tables with two columns: Functionality and Test Result (Pass/Fail).

Software tests

Software tests comprise: (i) functional tests regarding the identified use cases / user stories; (ii) performance tests regarding exchanged data volume, load and runtime (these tests are usually

repeated 10 times to determine the average and standard deviation results); (iii) usability tests according to the System Usability Scale.

7.6 Summary

Provide here the conclusions of this chapter and make the bridge to the next chapter.

8. Conclusions

8.1 Achievements

Discuss here what was achieved (wrt the initial objectives) and what is missing (wrt the initial objectives) of the project.

8.2 Limitations

Identify here the limitations of the solution and prototype.

8.3 Future Development

Provide here your recommendations for future work.

Bibliography

Will be added automatically by citing, in the body of the report, entries specified in BibTeX format and stored in the https://www.eps.dee.isep.ipp.pt/doku.php?id=refnotes:bib file

PS - *If you have doubts on how to make citations, create captions, insert formulas, etc. visit this page with examples and select "Show pagesource" to see the source code.*

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Last update: **2026/07/07 18:15**