Exploring Project Management Tools based on the ITLingo PSL language

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Abstract

Project management is the application of knowledge, tools and techniques to plan the activities that are needed for the project managers to ensure that each project reaches the defined level of success. In order to do so, project management is divided in 5 group processes (initiating, planning, executing, controlling and closing) and covers 5 main areas (scope, time, cost, quality and risk).

In the project management area, products are expected to be delivered fast, with small increments between deliveries. In the current market, there are already countless pm tools that help serve this purpose, however most are still developed with a standalone approach, meaning it does not focus on being able to transfer between different tools, and miss key features, such as the Work Breakdown Structure and the Responsibility Assignment Matrix.

The ITLingo initiative aims to be different from the existing tools on the market, by building a language, the Project Specification Language, that should work as a middle ground tool to transfer plan specifications. Project Specification Language has been developed by other MSc Thesis students, and has, at the time of writing this dissertation, a very viable Excel Template (PSL Excel Template v.2018). This template focuses mostly on the planning processes of a project. The purpose of our work is to improve the template for usage in other processes, focusing mainly on execution and control. The new template is an extended version of the previous one, with an improved user interface and additional features that allow the users to divide the plan across the different project managemet areas, so that the specialized users in those areas can focus solely on their own work.

Keywords: Project Management, ITLingo, PSL, Excel Template, PM Tools

Resumo

Gestão de projetos é a aplicação de conhecimento, ferramentas e técnicas para planear as atividades necessárias, onde os gestores de projetos asseguraram-se que cada projeto cumpre os níveis de sucesso definidos para tal. Para isto dividide-se gestão de projetos em 5 grupos de processos: iniciação, planeamento, execução, monitorização e encerramento, e cobre 5 áreas principais: âmbito, tempo, custo, qualidade e risco.

Na área de gestão de projetos, os produtos deverão ser entregues de forma rápida, com pequenos incrementos entre entregas. No mercado atual existem inúmeras ferramentas de gp que servem para este propósito, no entanto a maioria são desenvolvidas adaptando um postura autónoma e com falta de funcionalidades chave, tais como a Estrutura Analítica do Projeto e a Matriz de Responsabilidades.

A iniciativa ITLingo tem como objetivo produzir uma ferramenta diferente das ferramentas existentes no mercado, ao produzir uma linguagem, Project Specification Language, que tenta adaptar uma postura de intermediário, permitindo assim a transferência de especificações. A Project Specification Language, que foi desenvolvida por outros alunos nas suas teses de mestrado, tem no momento de desenvolvimento desta tese, um template de Excel viável (PSL Excel Template v.2018). Este template foca-se sobretudo nos processos de planeamento de um projeto. O propósito do nosso trabalho é melhorar o uso do template para outros processos, nomeadamente na execução e monitorização. O novo template é uma versão extendida da anterior, com uma interface de utilizador melhorada e funções extra que permitem aos utilizadores dividir o plano de projeto pelas diferentes áreas de gestão de projetos, para que os utlizadores especializados nessas áreas possam focar-se sómente no seu próprio trabalho.

Palavras-Chave: Gestão de Projetos, ITLingo, PSL, Excel Template, Ferramentas de GP

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List of Acronyms

PM – Project Management

PMBOK – Project Management Body of Knowledge

PSL – Project Studio Lingo

DSL – Domain-Specific Language

RSL – Requirements Specification Language

VBA – Visual Basic for Applications

WBS – Work Breakdown Structure

RAM – Responsibility Assignment Matrix

WiP – Work in Progress

1. Introduction

A project is a temporary and unique endeavour for organizations to achieve a particular aim [1], temporary because it has a clear beginning and end, even if the resulting product may be permanent, and also unique since the service or product that results from a project is always different from any other. Projects are often undertaken due to requests from stakeholders. This endeavour involves many limited resources, such as people, time and money.

This is where Project management (PM) comes in: the need to plan, monitor and control these resources. According to the Project Management Body of Knowledge (PMBOK), PM is the application of knowledge, skills, tools, and techniques to project activities to meet project requirements [1].

Projects are composed of processes, which are series of actions bringing about a result [1], and in PM these processes are divided into five groups namely: Initiating, planning, executing, controlling and closing.

1.1. Motivation

Out of the 5 process groups described in PMBOK [1], Planning is one of the most crucial, since a well-defined plan, that provides the best possible alternative courses of action, will undoubtedly minimize costs and reduce risks impact. As such the PM team responsible for the project creates a plan to make sure that each process is accomplished successfully.

Project managers define such project plans with the help of PM tools, such as Azure DevOps, Microsoft Project, JIRA, Asana and Smartsheet.

To enter the market and assist teams with defining a good project plan, Project Specification Language (PSL) was developed within the ITLingo scope [2].

Currently PSL is being supported by an Excel template, that has the planning processes as its main focus, and it does a good job in covering the area's needs; however, it can still be improved in the other areas that are lacking functionality, such has execution, control and closing processes. With this work we intend to extend the Excel template's reach to these areas, especially concerning execution and control processes, by adding features that focus on the analysis of the project's current situation and sharing information in real time between team members and clients.

1.2. Context

ITLingo [3] is a research initiative focused on developing middle ground languages to transfer specifications between different software applications, based on domain-specific languages namely: PSL (Project Specification Language), RSL (Requirements Specification Language) [30] and ASL (Application Specification Language). To support these languages ITLingo-Studio was developed. ITLingo-Studio is an editor that allows to make verifications of ITLingo languages specifications, as well as import and export specifications from and to different tools and formats.

In this project we work within the PSL scope. Currently ITLingo-Studio only supports importing and exporting with Microsoft Word and Excel. A PSL Excel Template has been developed by other MSc thesis students, and it was built around the PSL language, so it covers all aspects of it. The first version was PSL Excel Template v.2017 [4], and it included one section for each concept of the PSL language, a sheet example, Scope.Requirements, is shown on Figure 1-1.

	A	B	C	D	E
1	Back to Index				
2					
3	ProjectP Project Plan				
4	**Scope :: System Requirements**				
5					
6	**Id (*)**	**Name (*)**	**Type (*)**	**Status**	**Description**
7	Req_1	System Requirement 1	Main	On Design	System Requirement 1
8	Req_2	System Requirement 2	Main	Not Plan	System Requirement 1
9	Req_3	System Requirement 3	Main	Plan	System Requirement 1
10					
11					
12					
13					

Figure 1-1 - Scope.Requirements sheet in the PSL Excel Template v.2017

The next version, “PSL Excel Template v.2018”, expanded the range of the template while adding macros to automate tasks and update information. On Figure 1-2 it is displayed the same sheet as the one above, but for the 2018 version and it shows the buttons that hold the macros mentioned.

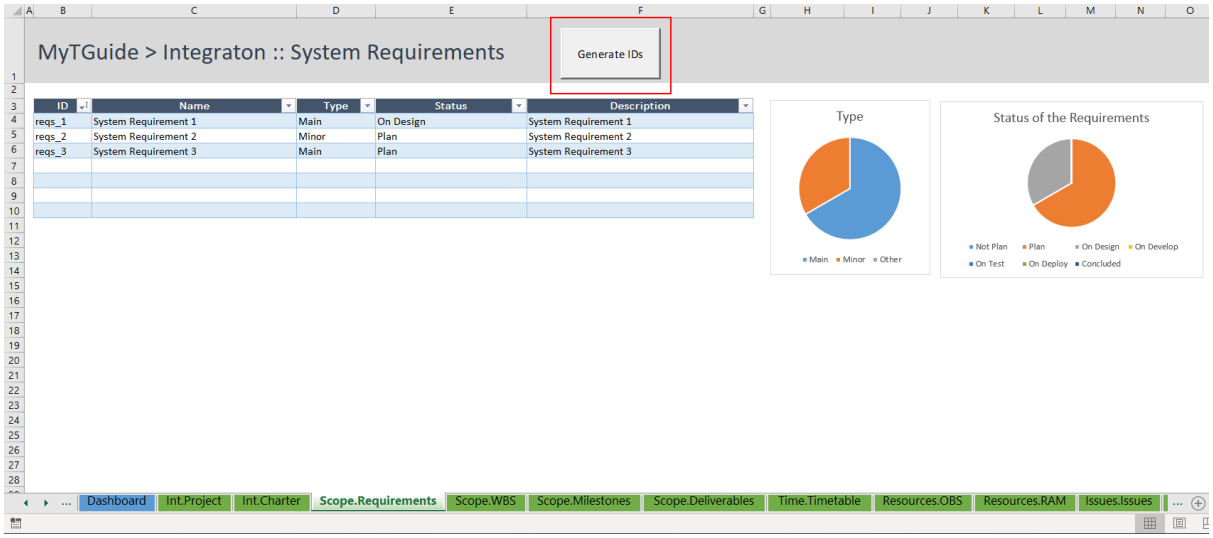


Figure 1-2 - Scope.Requirements sheet in the PSL Excel v.2018, with the button that holds the macro highlighted in red

We plan to enhance this template by building on top of the current one, improving user experience and the functionality included in the macros, and we shall name it “PSL Excel Template v.2019”.

1.3. Proposal

The current version of the template, “PSL Excel Template v.2018”, is already a viable tool to be used for project plan specifications. However, the template is not optimized for user experience, especially for new users, seeing as the focus of the previous developers has been to increase functionality, so it still isn’t sharp enough to be competitive in today’s market of tools used for the same purpose.

To understand how we can improve it, we will be looking into existing Excel templates, and other popular PM tools, to identify the strong aspects that help them strive in the market, and what weaknesses are often overlooked.

So, we propose to develop PSL Excel Template v.2019 on top of the old version, by making improvements to the tool, in order to improve the user experience, as well as adding a number of functionalities, such as a Custom Ribbon and a macro to generate a report onto Word, and consequently increasing the tool’s competitiveness in the market, based on an analysis of the most popular excel templates and PM tools in the market, which is described in chapter 3.

1.4. Work Schedule

This dissertation research and development occurred between October 2018 and October 2019.

We based our work in the Action Research Methodology [6], which is a cyclical approach divided in 5 phases: idenstify the problem, research a solution, develop and implement a solution, reflect on the results and learn from the outcome.

We divided the work in four phases which are described briefly below.

The first phase involved mainly researching and studying. We studied Project Management, Software tools that we would use to accomplish our work and other existing PM tools. This phase lasted from October 2018 to December 2018, and it ended with a presentation of the research (identify the problem).

The second phase occurred between January 2019 and March 2019, and it comprised of studying excel and VBA code, followed up by the PSL Excel Template v.2018 exploration in order to understand what to focus on (research a solution).

The third phase was the longest, from April 2019 to July 2019, and it was the analysis and implementation of the changes on the new template (develop and implement a solution).

The fourth and final phase lasted from August 2019 to October 2019, and it involved evaluating the new template by simulating its use for two projects and afterwards this thesis writing (reflect on the results, learn from the outcome).

1.5. Structure

After this brief introduction the dissertation is organized in the following manner:

Chapter 2 provides the background information needed to understand and perform the task ahead, starting with an introduction to the area of study, then the technologies used to accomplish the work done and an introduction to the context of our work;

Chapter 3 presents the related work by giving an introduction to the key concepts of our context, analysing existing PM Excel templates, as well as the current version of the PSL Excel Template and software PM tools that are currently available on the market, while comparing them in order to understand how can we improve PSL Excel Template;

Chapter 4 describes the implementation of the features in the PSL Excel Template;

Chapter 5 describes the evaluation process, including our findings;

Chapter 6 is a conclusion of this paper, what was accomplished with our work and propositions for the future of the template.

2. Background

This chapter gives a description of the theoretical and technological concepts that support our work, as well as a brief introduction of the context of the PSL language and describe the tools that were used to perform the task.

2.1. Project Management

Project management is the application of knowledge, skills, tools, and techniques to project activities to meet project requirements [1]. In order to achieve this, five groups of processes and nine knowledge areas are defined in PMBOK. The process groups are initiating, planning, executing, controlling/monitoring and closing. The knowledge areas are integration, scope, time, cost, quality, human resources, communication, risk and procurement.

A project starts with the stakeholders, who are individuals or organizations actively involved in the project, defining the projects requirements. For the project management team to reach success they have to identify the stakeholders and meet their requirements.

In this area the words iteration and iterative come up a lot, since most of the processes within project management are iterative in its nature. These processes are considered iterative because to achieve a solution there is a sequence of tasks that are repeated until the desired result is met. These sequences are usually divided into segment[known as project phases, which collectively form the project life cycle [1]. Each phase is characterized by the completion of one or more milestones or deliverables. To cope with its iterative nature, the Agile approach was introduced.

2.2. Agile Methodologies

Agile project management is an iterative approach, which means the project is completed in small iterations, allowing for continuous delivery and incorporating customer feedback with each iteration [7]. The most popular agile development methods are Scrum and Kanban. Agile methodology is a contrast to the traditional Waterfall model, which is a linear approach, as opposed to an iterative one.

Scrum is a framework for Agile project management that uses fixed-length iterations, which are called Sprints [8]. In a Scrum team there are three key roles: Scrum Master, Product Owner and Development Team. The Scrum Master is the one responsible for helping everyone understand Scrum theory, both inside the team, as well as outside, if they are relevant to the project. The Product Owner is responsible for maximizing the value of the product that results

from the work of the Development Team and is also responsible for the Product Backlog. This Product Backlog is a list of things that need to be done within the project. There is also the Sprint Backlog which is a list of tasks identified by the team that need to be completed in each sprint.

Kanban is also a framework for Agile project management that matches the work to the team's capacity, commonly referred to as Work in Progress (WiP) Limit [9]. Kanban focuses on getting things done fast, by measuring the lead time [9], which is the average time to complete one item. It usually has no backlog, but instead the work items are represented in a Kanban board separated in three or more columns, the most common example is composed by three columns: To Do, Doing and Done. The WiP limit, is usually defined at the start of the project.

2.3. PSL Language

Within the ITLingo research initiative, there were defined a few Domain-specific languages (DSLs).

DSLs are languages focused on a particular problem domain [10], a couple of popular examples are SQL and HTML, as opposed to General Purpose Languages (GPLs), that are applicable to a much broader variety of problems, such as Java. DSLs are valuable because it can be much easier to specify information with them, hence it has a couple of advantages over GPLs such as increased productivity for the programmers and improved communication with domain experts [10].

As of October 2019, in the ITLingo scope there are the following DSLs [29]:

- RSL (Requirements Specification Language) is the language that focuses on the requirements specification and tests [11];
- PSL (Project Specification Language) the language focused on project specification plans.
- ASL (Application Specification Language) which is a textual language that allows to define software applications in a rigorously and technological-independent way.

The PSL language is both a descriptive way of defining a project plan and a method to prevent inconsistencies within it. Since it is a DSL it was built to be simple to use and easily learnt by the target audience, which should be engineers familiar with programming [5].

To edit these languages ITLingo-Studio was developed [4]. ITLingo-Studio, shown in Figure 2-1, is a ready to use tool, built on top of the Eclipse Integrated Development Environment (IDE). In the PSL scope, the tools purpose is to verify the project specification, and to allow the user to export the project plan to other formats, such as Microsoft Excel.

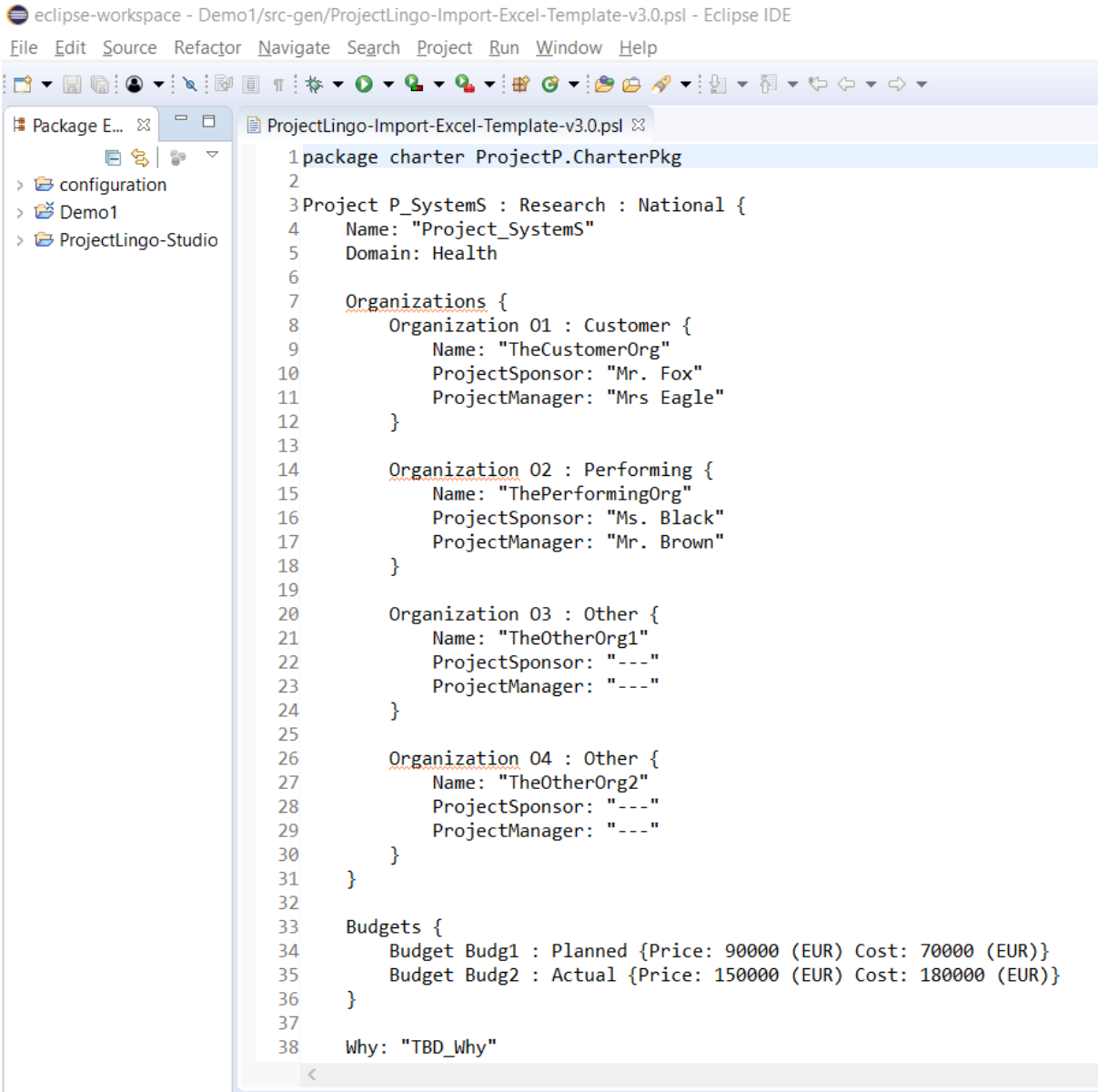


Figure 2-1 - ITLingo-Studio environment, with the PSL code for the Charter package

There are a total of eight packages for each PSL specification, which can access each other, but only one of each package can be defined for a single specification. The eight packages are: Charter, Scope, Time, Human Resources, Communication, Cost, Risk and Quality [5].

PSL was specified using Xtext [5], an open source framework for developing textual DSLs, and currently supports transformations with both Excel and Word, through the use of Apache POI library and a template for each application [5]. To test the transfers between PSL and Excel an Excel Template was developed, which is to be the target of our project.

2.4. Used Tools

This section briefly describes the software tools that were used in the context of our research.

2.4.1. Microsoft Excel

Microsoft Excel, used to build the base PSL Excel template, is a popular commercial spreadsheet application, that allows users to organize, format and calculate data, and is part of the Microsoft Office suite [12]. The most important features used in the template are graphing tools, pivot tables, formulas and the ability to create macros. VBA, introduced in section 2.4.2., is used to implement the macros, and to be able to make use of them in Microsoft Excel 2016, the user needs to change the Excel document to allow macros, changing the documents file format from .xlsx to .xlsm.

To better understand Microsoft Excel, an online course was taken, that taught the essentials of the software, including some VBA code, titled Microsoft Excel – Excel from Beginner to Advanced, created by Kyle Pew and distributed on Udemy [28].

2.4.2. Visual Basic for Applications

Visual Basic for Applications (VBA) is the internal programming language for Microsoft Office Applications, and is part of the Corporation legacy software [13]. VBA is not a standalone tool, it is a program used to manipulate the interface of the host application, such as Excel, Word or PowerPoint. It is event-driven, meaning it is used to trigger a chain of actions, or it can be triggered by an event that occurs in the host application, for example in Excel a worksheet activating can be a trigger.

These events are programmed through the building of macros, which by definition are sets of functions with instructions that perform a particular task.

Macros are used in PSL Excel Template to automate repetitive tasks that users want to perform. Part of our work was to make macros that would help users when defining project specifications.

2.4.3. Office RibbonX Editor

The Office RibbonX Editor is a free, open-source, standalone tool to edit Custom UIs of Office documents [14]. The tool is an extension of a Custom UI Editor for Microsoft Office [14].

This tool allows the user to open and edit the xml file associated with the Microsoft Office document, where the user can make the desired changes to the ribbon. The tool provides a

variety of features to help the users reach their objectives, such as providing a number of tutorials, so that the users can easily learn and understand the tool, and it also allows them to check if it their current XML document is valid or not.

This tool was used to develop the Custom Ribbon, which was one of the main features implemented in the PSL Excel Template.

2.4.4. SoftwareKey protection tools

SoftwareKey provides a solution to licensing management software, by supplying its clients with two tools for this purpose [15].

Instant Protection PLUS (IPP) provides the protection to the software the user wishes to protect, with the use of license keys, encrypted with industry-standard public-key cryptography. There are 2 versions available for this software, IPP3 and IPP5, however in the trial version, only IPP3 includes the software wizard, which is the user interface that allows the customer to build the encryption file.

Each computer has a fingerprint and this tool makes it a requirement to have a license key for every computer installation. It also allows the user to decide on what type of licensing they wish to provide their customer, either perpetual or fully customizable subscription-based licenses.

The license distribution of the software protected through this tool alone, needs to be managed by the customer. However, SoftwareKey does provide an alternative for this process with a second tool. If the customer wishes to automate the distribution, they can buy a SOLO server instance, which is a central licensing server that automates the exchange of licensing keys between the users of the software and its owner. This server provides different ways of accomplishing this license keys exchange, such as with direct online activation, indirect activation through nearby computers, mass distribution for company uses and even offline activation through an exchange of codes.

The company gives a 30-day free trial of the instant protection PLUS 3 component, but not the SOLO Server. SoftwareKey has 2 purchase options. If the customer wants to manually process each license activation, they can perpetually purchase Instant Protection PLUS 3 or 5 for $699. If the customer wants access to the automated license distribution they have 3 options, the cheaper INDIVIDUAL version allows up to 25 activations per month and 1 user, costing $49 per month, the second version, TEAM costs $99 per month, the difference being allowing up to 75 activations and 3 users can access the server. The BUSSINESS version costs $799 per month and allows up to 250 activation and 10 users. There is also a different option, ENTERPRISE, and its conditions are to be negotiated between both parties.

This tool was tested in our project to assess its viability for future distribution of the tool, however we only had access to the free trial, meaning we could not test the SOLO server, which means we only were able to manually distribute the licenses.

3. Related Work

This section presents the research done in the context of our project. We start by explaining the key concepts and features that are relevant to a project specification plan. We also investigate other Excel Templates in the project management area available online, including PSL Excel Template v.2018, based on the concepts and features described before. The current popular software tools that exist on the market are analysed and compared, also based on the same concepts, to access what features are the most important, and what they lack the most between each other, that we can take advantage of.

3.1. Key Concepts and Features

This section briefly describes the concepts and features that are important in the project management scope, and as such, they will be the focus when analysing the excel templates and PM tools.

A project dashboard is a view of the current progress of a project. The Kanban board is the most commonly used. There are also boards that show the Key Performance Indicators (KPIs) and if they are being met or not. KPIs are measurable values that are used to evaluate the success of a project. The success is measured through previously established objectives by the clients or stakeholders, and over the course of the work these goals are monitored by the team, in order to understand if they are being met by the time the project is finished. Some common examples of KPIs are profit, costs and customer or employee satisfaction.

Milestones are one of the main parts of a project and are defined as scheduled events that mark the completion of one or more important tasks [24], making them significant points in the projects. A good milestone definition shall be specific, measurable, achievable, relevant and timely [24].

A key deliverable in a project is the Work Breakdown Structure (WBS), which is an enumeration of all work activities in hierarchic manner, that organizes the work to be done in short manageable tasks [25].

The Critical Path is the longest sequence of activities or tasks that determine the minimum amount of time required to complete a project from start to finish [26].

The Responsibility Assignment Matrix (RAM) also known as RACI matrix for R-esponsible, A-ccountable, C-onsulted and I-nformed, is a project deliverable that represents the participation of the organization, the people and the roles in completing each task [27].

The Gantt chart is the most popular way to show activities in a time frame, in project management. The activities are represented by a bar that starts at the starting date and ends

on the final date, making it so that the bar's length is the duration of said task, this bar should have 2 different colours to represent the current progress. This chart is defined at the start of the project, but it can be adjusted as tasks are performed, i.e. if a task ends later than usual a delay will have to be implemented, or if a tasks finishes earlier than expected the team can start working on the next one without having to wait for its starting date, if they have a dependency between each other. There are four types of dependency, Finish to Start, Start to Finish, Start to Start and Finish to Finish.

A Sprint is a fixed time iteration of a continuous cycle, normally associated to the scrum methodology. In this context the sprint is a short iteration of 2 to 4 weeks, where the team works in order to reach that sprint's goals, by setting them in the backlog during the Sprint Planning meeting. After the sprint the team does a review meeting, to give a report to the Product Owner of what was achieved during said sprint.

There are 2 types of backlog pertaining project management: the product backlog, which consists of a list of everything to be done that the product needs, led by the Product Owner, and refined during the project to accommodate for changes in the resources such as time and budget, whereas the sprint backlog is the list of work needed to be done during said sprint, decided by the team in the Sprint Planning meeting. This list is composed by some parts of the product backlog that the team deems the most important, either because it will bring the most value to the project or because there is some degree of precedence in the order of the work to be done.

3.2. Excel Templates

The idea of building a simple PM tool on top of an Excel template is not new, there are a few available online.

We researched these templates to analyse them and their features while comparing them between each other and PSL Excel Template v.2018, to understand their benefits, and what we can incorporate in our own template as well as common mistakes we should avoid in our work.

3.2.1. Vertex42

The company whose website is vertex42.com is a company that creates and sells spreadsheet templates for all purposes, from business to personal to educational. Out of all the areas covered by the company the one we focused on was project management [16].

In this area there were multiple templates available. We took a look at the free versions of the most popular ones, to identify the key to their success and what features are covered by the vertex42s Excel templates.

The first template we tested was “Gantt Chart / Project Schedule”, which is shown in Figure 3-1. This template has cells that are meant for the user to fill, and cells that update automatically, considering the information the user introduced in the previous cells. The Gantt Chart in itself is very efficient, however, even though the user can manually create task dependencies, by using an Excel formula, for example =enddate+1, the chart is not equipped with a feature to show them. This template does not determine the critical path, but vertex has another template solely for this purpose, and it is called Critical Path Method. The Gantt Chart template has a paid version, called “Gantt Chart Template PRO”, which costs $35, while the others are free.

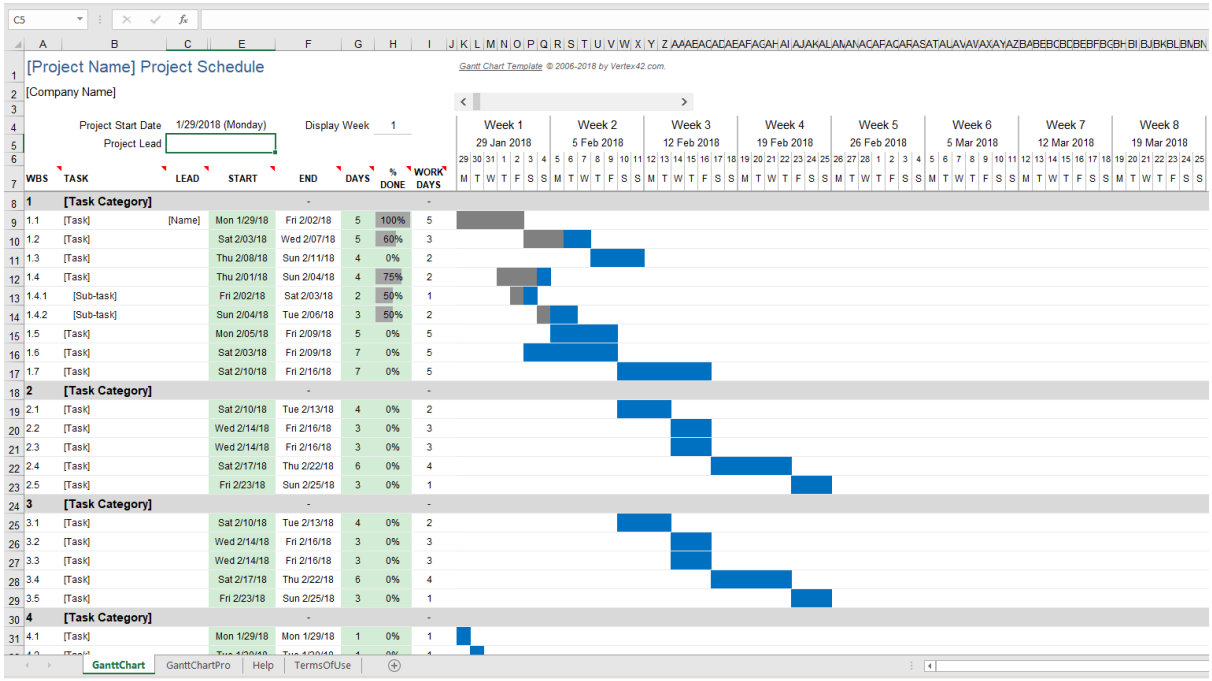


Figure 3-1 - Vertex42's Gantt Chart/Project Schedule

Other templates by vertex42 were glanced over, and they include other features such as a Kanban board, budget management, milestone tracking, a Work Breakdown Structure and a RAM/RACI. To sum up our analysis of Vertex42’s approach, it is the complete opposite of PSL, the company makes multiple small and simple templates, each with their main area of focus, whereas PSL Excel Template, integrates all areas in the one template. Vertex42’s key strengths are being very detailed and having a great number of features. On the other side the user interface is too simple and prone to user errors, hence not the best, especially for unexperienced users, since they might find some trouble in editing the sheets, specifically cells that have hidden formulas, which can lead to irreversible errors, if they don’t read instructions ahead of making these mistakes.

3.2.2. Gantt Excel

Ganttexcel.com provides an excel template that is fully automated and simple to use, that allows teams to build a Gantt Chart for the scheduling of a project [17]. The focus of this

distributor is to simplify the work for the user, by not allowing them to make unwanted errors, such as changing individual cell entries, that are dependent on other cell values.

Unlike the vertex42 template's approach, this template, although simple to use, the developers did not spare any effort, adding many features to make it a complete product. The template has a free version and an ultimate version, this last one has a price of $ 149.95 (at the time of checking this price there was a promotion, cutting the price down to $ 79.95), if the user needs compatibility with Mac OS the price changes to $199.95 ($ 99.95, with the promotion). We analysed the free version, which in itself is already very complete with a number of features.

To prevent errors when adding or modifying a task in the Gantt Chart a menu pops up where the user can input all the information needed, such as task schedule and dependencies, as shown on Figure 3-2. It also has a custom-built Ribbon with a multitude of different macros that provide a number of functionalities to the user, as we can also see in the top of in Figure 3-2.

Another primary feature of this template is the ability to automatically create a dashboard that displays all the general information, such as project status, project budget, both estimated and actual, and tasks status.

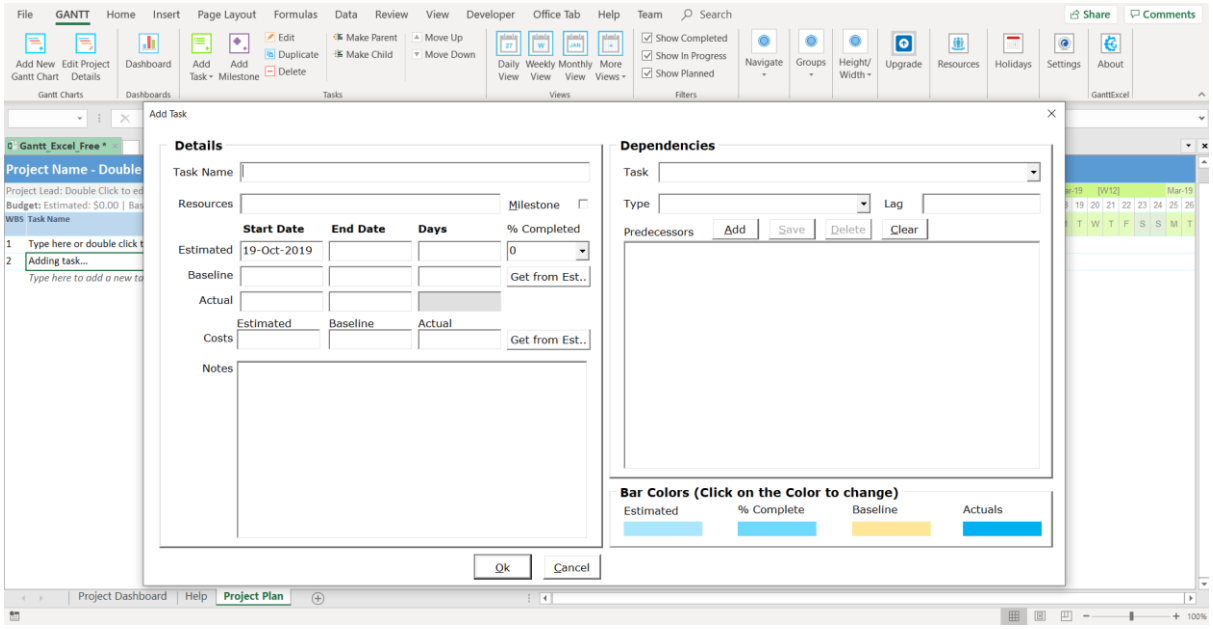


Figure 3-2 - GanttExcels Template menu for adding a new task. On the top we can also see the custom Ribbon

3.2.3. Office Timeline

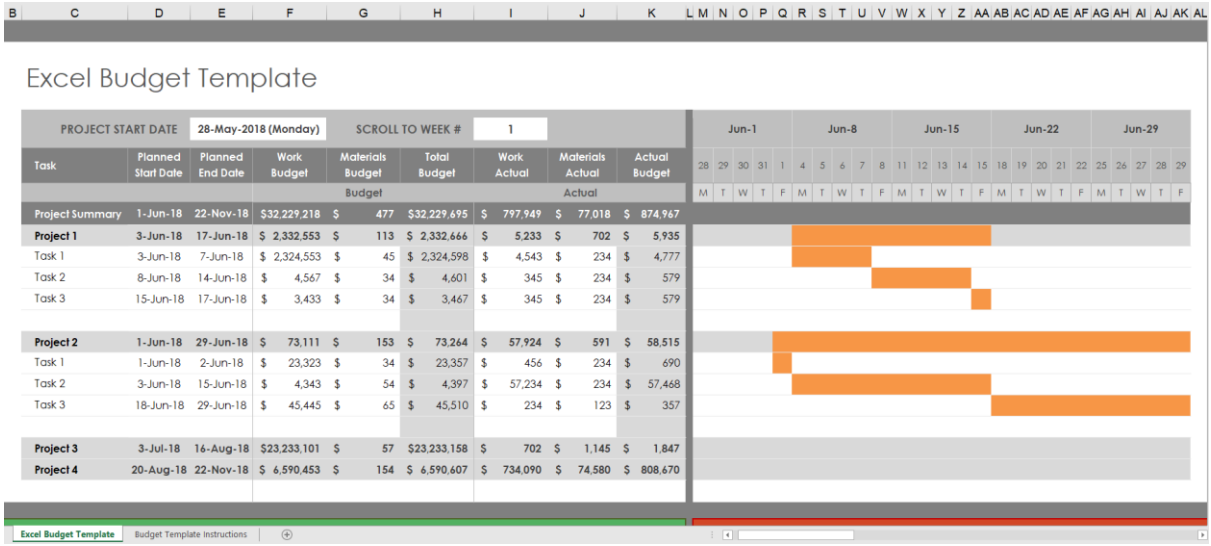
Office timeline as the name suggests is a Microsoft Office add-on for users to create timelines, for instance Gantt Charts and Milestone Trackers, in Microsoft applications. This software makes use of Visual Project Management [18], which means it uses illustrations and diagrams to represent complex data in a manner that is easier for the users to understand. In this area's

scope it includes an add-in for Microsoft PowerPoint, and 8 Excel Templates [18]. We analysed these templates and refrained from the PowerPoint aspect of the tool.

Each of the templates approach a different PM aspect, the templates are: Project Budget, Project Review, Sprint Tracker, Project Schedule, Status Report, Project Tracker, Critical Path Tracker and Milestone Tracker. Figure 3-3 depicts the Project Budget Template.

The templates are all very simple, only 2 templates, Critical Path Tracker and Excel Project Tracker, don't include instructions, which can make them somewhat confusing for an unexperienced user. They all have straightforward mechanisms that a user should expect from excel, for example, the white cells are meant to be filled by the user, and the grey cells are filled automatically, however these last ones can be changed by the user, which can lead to errors, since they include formulas that get deleted by the user input.

Overall the templates are simple and concise, while providing an elegant template that serves their goal: to help users in presenting their work, ignoring the technical part of it.



Excel Budget Template

PROJECT START DATE 28-May-2018 (Monday) SCROLL TO WEEK # 1

Task	Planned Start Date	Planned End Date	Work Budget	Materials Budget	Total Budget	Work Actual	Materials Actual	Actual Budget
			Budget			Actual		
Project Summary	1-Jun-18	22-Nov-18	$32,229,218	$ 477	$32,229,695	$ 797,949	$ 77,018	$ 874,967
Project 1	3-Jun-18	17-Jun-18	$ 2,332,553	$ 113	$ 2,332,666	$ 5,233	$ 702	$ 5,935
Task 1	3-Jun-18	7-Jun-18	$ 2,324,553	$ 45	$ 2,324,598	$ 4,543	$ 234	$ 4,777
Task 2	8-Jun-18	14-Jun-18	$ 4,567	$ 34	$ 4,601	$ 345	$ 234	$ 579
Task 3	15-Jun-18	17-Jun-18	$ 3,433	$ 34	$ 3,467	$ 345	$ 234	$ 579
Project 2	1-Jun-18	29-Jun-18	$ 73,111	$ 153	$ 73,264	$ 57,924	$ 591	$ 58,515
Task 1	1-Jun-18	2-Jun-18	$ 23,323	$ 34	$ 23,357	$ 456	$ 234	$ 690
Task 2	3-Jun-18	15-Jun-18	$ 4,343	$ 54	$ 4,397	$ 57,234	$ 234	$ 57,468
Task 3	18-Jun-18	29-Jun-18	$ 45,445	$ 65	$ 45,510	$ 234	$ 123	$ 357
Project 3	3-Jul-18	16-Aug-18	$23,233,101	$ 57	$23,233,158	$ 702	$ 1,145	$ 1,847
Project 4	20-Aug-18	22-Nov-18	$ 6,590,453	$ 154	$ 6,590,607	$ 734,090	$ 74,580	$ 808,670

Figure 3-3 - Project Budget template, an example of Office timeline template

3.2.4. PSL Excel Template v.2018

The PSL Excel Template that was used as a guide for the PSL development, has been updated and is currently on version v.2018 [4]. This version is comprised of 27 Sheets, split between different areas of the project Management area, plus 3 independent ones.

The 3 independent sheets are:

- Tutorial, which provides a brief tutorial for the users of the template;
- Dashboard, which is composed of several graphs that show information about the project plan;
- Copyright, the sheet that holds the information about the licensing of the template and its authors.

The other 27 are divided in 11 areas as such:

- Integration, it is comprised of 2 sheets, Project and Charter, that contain the information related to the identification of the project, and also information about the project's length and cost;
- Scope, which includes 4 sheets, Requirements, WBS (Work Breakdown Structure), Milestones and Deliverables, each sheet contains information pertaining to their name;
- Time, consists of a single sheet, Timetable, that shows a schedule for the project in the form of a table and a Gantt Chart, where the user can create task dependencies and track the Critical Path;
- Resources, made by 2 sheets, OBS (Organization Breakdown Structure) and RAM (Responsibility Assignment Matrix), the sheets are self-explanatory, the first holds the OBS and the second the RAM;
- Issues, which has just the one sheet with the same name, Issues, and is the sheet that holds the information about each issue, most importantly their current state;
- Quality, comprised of 2 sheets, Metrics and Deliverables, the first holds information to support the latter, while this one is used to define the acceptance criteria;
- Agile, as the name suggests, includes the sheets regarding the agile methodology. There are a total of 5: Team (Description), Team Analyser, Product Backlog, Sprint Backlog and Sprint History.
- Risk, this group is only composed of one sheet, with the same name, and deals with the known risks and possible consequences for the project;
- Communication (Comm), this cluster agglomerates 2 sheets, Flow (of Deliverables), that contains the information regarding the background of a deliverable, e.g. the owner, the target audience and the method, and Meetings, that displays the information regarding all aspects of the meetings, such as who conducts the meeting, the frequency and the audience;
- Cost, this group gathers the sheet that contain the salary information for each team member in the Rates sheet, and the Expenses sheet, that takes into account the other sheet information to provide the total amount of expenses being used for salaries;
- Configuration (.conf), finally this group is composed of 5 sheets that consist of configurations for the other sheets, some are editable, others aren't the 2 editable are General and Holiday.

Unlike the approach of the before-mentioned template distributors, in PSL there is only one template with multiple sheets, each focusing on a different area, as opposed to having multiple templates of 1 or 2 sheets. This makes the template more complicated for the user, but it helps him in defining a successful project plan, since he doesn't need to conduct a search for any particular area, seeing as the template covers them all.

3.2.5. Comparison and Discussion

In this section we compare the templates based on their features and their ability to support the process groups existing in Project Management. Afterwards we analyse the strong points of each one, so that we can understand what changes we should make to improve the current version of PSL Excel Template. To evaluate the templates, we used '+' to indicate it is acceptable, '++' means it is good and '+++' for outstanding attributes, empty cells means the features were not present.

Table 3-1 shows the different features covered by the previously mentioned Excel Templates, including PSL Excel Template v.2018.

Table 3-1 - Comparison between the different Excel Templates, according to their features

	Features \ Tools	**Vertex42**	**Gantt Excel**	**Office Timeline**	**PSL Excel Template v.2018**
Traditional	Dashboard	+	+++	+	+
	Budget	++	+	+++	++
	Milestone Tracking	+	++	++	++
	Work Breakdown Structure (WBS)	++			+++
	Organization Breakdown Structure(OBS)				+++
	Critical Path	++		++	+
	Responsibility Assignment Matrix (RAM/RACI)	+			++
	Gantt Chart	++	+++	+++	+
Agile	Product Backlog				++
	Sprint Backlog	+		+	+++
	Kanban Board	+++		+	

In the following table, table 3-2 we compare the tools based on their ability to provide support to the five different process groups, according to PMBOK: Initiating, Planning, Executing, Controlling and Closing.

Table 3-2 - Comparison between the different Excel Templates, based on the ability to support the PMBOK process groups

	Vertex42	Gantt Excel	Office Timeline	PSL Excel Template v.2018
Initiating	+	+	+	++
Planning	++	++	++	+++
Executing	+++	++	+++	+
Controlling	++	+++	++	+
Closing	+	++	+	++

All of these templates are viable, and we incorporate some of their aspects in our version of PSL Excel Template. The vertex42's templates strength is simplicity which we tried to replicate to best of our ability but taking into account that our template is inherently more complicated, seeing as it focuses on a lot of different aspects of project management.

Much like Ganttexcel, PSLs v.2018 template also includes a plenitude of macros to help automate the users work, however they are less organized than in Ganttexcel's, so we adapt its idea of a custom ribbon to group and organize all of PSLs macros. PSL Excel Template also includes a dashboard, but it lacks some general information regarding the project status and task information, so based on analysing the Ganttexcel dashboard, we shall add that information to our template.

In office timeline the focus is on simplicity and elegancy, and focusing on execution and control processes, which is currently lacking in the PSL Excel Template v.2018, so we tried to use the Visual Project management concept to increase the support to these processes by developing features that help assess the current situation of a project, such as a Weekly Schedule sheet and by improving the already existing Dashboard sheet.

3.3. PM Tools

In the project management world, the value comes from being able to do an effective job, by making it the simplest possible. To do so each company shall use the available tools on the market that best suit their needs. In this section we analyse and compare some popular tools based on their benefits, features, and particularly focusing on their support of interoperability with other software, and the price ranges. Some tools are better for smaller companies by offering package deals of up to 10 users, while others provide free trials so the users can test them beforehand.

3.3.1. Azure DevOps

Azure DevOps is one of the Microsoft Azure solutions, it has been rebranded since September,10 2018, previously known as Visual Studio Team Services (VSTS), that allows for Continuous Integration through cloud development and uses Continuous Delivery by ensuring that the code and infrastructure are always in a production-deployable state. Its name, DevOps, is a software methodology composed by a set of practices that automate processes between software development and IT teams, in order to develop software faster and more reliably [19].

Azure DevOps is free to use by everyone, all that is needed is a Microsoft Account. However, there are some features that are locked behind a paid license. For small teams up to 5 members, they have access to 4 of the DevOps Services: Azure Pipelines, Azure Boards, Azure Repos and Azure Artifacts. Each user after will increase the cost to $4/month each. The Azure Test Plans Service costs $52/month.

In terms of features Azure DevOps include a dashboard. One board for work items, where the tasks can be give a prioritization, and can be used as a Product Backlog and one Kanban board with four columns: the first column is the “New” work that hasn’t been started yet, the second column gathers the current “Active” work, and the last two columns are for the “Resolved” and “Closed” work, the only difference between them being that the someone has to approve the work in the resolved column and move them to the closed column. It also includes Sprints backlogs, making it so that its compatible with both Scrum and Kanban. It also has mechanism to track milestones and critical paths. This tool also includes other features outside of the project management scope that will not be considered here.

Azure DevOps allows to import a project from JIRA’s platform [7], it also allows to connect to Microsoft Excel, so the user can import or export Work Items [8]. Lastly it has the possibility of integration with MS Project, by using the Team Foundation Server (TFS), which is a product that serves as a backend to provide source code management.

3.3.2. JIRA

JIRA is a project management software developed by ATLASSIAN, that when launched was targeting software developers, however it has evolved to also be suitable for non-IT project management.

It is considered to be the number 1 software development tool used by agile teams.

Jira offers a free trial up to 7 days for users to get familiar with the software. After the trial ends there are 2 options for purchase: if it is a small team of up to 10 users the price is set out at a flat $10/month. If the team is over 10 members each member adds a $7/month fee [20].

JIRA is the most complete, in terms of features that benefit agile development, of the 4 tools. It includes a Dashboard showing the KPIs for the project, and a board that can be adapted into both a Scrum or a Kanban board, its Roadmap can be moulded to fit the Gantt Chart approach, which can be used to plan Sprints together with serving as a Sprint Backlog, and it includes mechanisms to track milestones as well as a critical path. The tool also offers a Product Backlog, along with a Mobile App, that can access the instances that are hosted on a Cloud Platform.

JIRA has tools that allow to import the Gantt Chart from MS Project, and full projects from Asana. Excel files carrying issues are also able to be imported or exported, but they need to first be converted to CSV files. Exporting full pages to XML or HTML is also possible.

3.3.3. MS Project

MS Project is the Microsoft project management software. It is part of the Office family, but it is not bundled with the Office suite. It was the third Microsoft Windows-based application developed by the company [21].

Microsoft offers a variety of solutions with Microsoft project. It is the only of the five tools here compared that does not provide a free trial. It has two types of solution: On-premise and cloud based. On-premise solutions are the most expensive, but they are a one-time purchase, unlike the cloud-based solutions that require a monthly payment per user. The one time purchase option has 2 version, the standard version which costs $560 and the professional edition that costs $940. The Cloud-based solutions are more accessible, with the basic version: “Project Online Essentials” costing $7/month per user, the “Project Online Professional” version costing $30/month per user and the most expensive, “Project Online Premium” is $55/month per user.

MS Project’s most notable feature is the Gantt chart, that allows for a very easy to read calendar of the work needed to be done, the possibility of including milestones and identifying the critical path, as well as budget management mechanisms. This feature also serves as a product backlog. There’s also a Team Dashboard where teams can coordinate the sprints, including its backlogs. This tool also gives the option to create a project as either Scrum or Kanban, and the latter includes a Kanban board.

Being a Microsoft tool, the company made sure that their software can be integrated with each other, so it is possible importing or exporting the project metadata to Excel and it is also able to import or export the metadata to XML.

3.3.4. Asana

Asana is the simplest tool of these, it was developed in order to simplify how teams in companies work together. This tool focuses on team collaboration and coordination, and so it

is not recommended for single person usage, unlike the other tools. It also includes a mobile app [22].

Asana also offers a variety of choices. The Basic version is free. The premium version offers what basic does and adds more features, costing 9,25€/month per user, but before purchasing the user has access to a free trial version. The Business version offers a couple more features than Premium and more support to the company. It costs 18,75€/month per user and to have access to a free trial of this versiona formal request is required. The more powerful version, Enterprise, doesn't have a fixed cost, it needs to be negotiated between the involved parties.

Out of all of these tools Asana is the most customizable one. It is possible to adapt the project to suit the Kanban or the Scrum methodology. It has a Roadmap, that along with the boards can be used as the Product Backlog, or the Sprint Backlog. Like JIRA, this Roadmap can also be moulded to fit the Gantt Chart approach, and it has milestone tracking features. Although there isn't an official Prioritization tool, there exists a tag system that the team can adapt to give tasks their priority. This tool is also supported in the Cloud and it has a mobile App.

Asana only allows to import or export tasks and spreadsheets through the CSV format or export them to JSON files.

3.3.5. SmartSheet

SmartSheet is a cloud-based application, that allows users to build multiple sheets to track all project details by means of creating timelines, managing tasks and also creating and monitoring boards, that can be dashboards, Kanban boards, or a simple Backlog [23].

This company provides a free 30-day trial of the Individual plan or the Business plan if there is more than 1 user for the same account. In total there are 3 different plans: Business, which is priced at 22€ per user per month, aside from requiring at least 3 licensed users, and limiting sheets to 100 per user, it has no other constraints, unlike the Individual plan, which stands at 13€ per user per month, but does have a number of limitations, such as allowing only up to 10 sheets, 1 dashboard and 5 reports per user. It also has an Enterprise plan, that has no set price, meaning it needs to be negotiated between both parties, which has absolutely no limitations, and provides the customer with close support, most remarkably through phone, and it has 2 more added benefits than the Business plan, which is Single Sign On and Enterprise Access Control, which allows companies to have their users log on SmartSheet servers with the companies credentials. SmartSheet also has a mobile app.

This tool is the most similar to an excel template, seeing as the whole project is divided into sheets, each focusing on a specific area of a project. The difference between this software and a normal excel document is that it provides a great amount of flexibility, in two primary ways: firstly, the same sheet template can be adapted for different uses, for example the company provides different pre-built templates built for specific areas, using the original sheet; and secondly the users get the information in real time, since it is cloud base, and they can

even choose to build or duplicate individual sheets for themselves, so they can make their preferred changes without affecting the whole team. In terms of features it includes a Dashboard, a Gantt Chart with milestone and critical path tracking mechanisms, as well as budget management mechanisms. It also includes Sprint and Product Backlogs and a Kanban board.

This tool has the options of importing directly from Microsoft Excel, Microsoft Project, Google Sheets and Atlassian Trello, and the options of exporting directly to Microsoft Excel, PDF, Microsoft Project, in XML format, and Google Sheets.

3.3.6. Tools comparison

To resume the comparison between the tools three tables have been assembled: Table 3-3 shows the features that are available for each tool. Table 3-4 and 3-5 have the properties of the project that can be imported, or exported, respectively, from one tool to an-other, or to a file format. The table is read from the left (rows) to the right (columns) e.g. Azure DevOps can import the project metadata, which is the descriptive information of the whole project, from JIRA.

Table 3-3 - Comparison between the tool's features

	Features\Tools	Azure DevOps	JIRA	MS Project	Asana	SmartSheet
Traditional	Dashboard	++	++	++	++	++
	Budget			++	+	+++
	Milestone Tracking	++	+	++	++	++
	Work Breakdown Structure (WBS)					
	Organization Breakdown Structure(OBS)					
	Critical Path	+	++	++		++
	Responsibility Assignment Matrix (RAM/RACI)					
	Gantt Chart		++	++	++	++
Agile	Product Backlog	++	++	++	++	++
	Sprint Backlog	++	++	++	++	++
	Kanban Board	++	+++	+	++	+++

Table 3-4 - Import table, the tools on the left (rows) have methods that allow to import from the tools and formats on the top (Columns)

	Tools					**File Formats**		
	Azure DevOps	**JIRA**	**MS Project**	**Asana**	**Smart Sheet**	**Excel**	**XML**	**JSON**
Azure DevOps	-	Project Metadata	Project Metadata			Work Items		
JIRA		-	Gantt Chart	Project Metadata		Issues		
MS Project			-			Project Metadata	Project Metadata	
Asana				-		Tasks/ Spreadsheets		
SmartSheet		Project Metadata	Project Metadata		-	Project Metadata		

Table 3-5 -Export table, the Tools on the left (rows) have methods that allows exporting to the tools and formats on the top (Columns)

	Tools					**File Formats**		
	Azure DevOps	**JIRA**	**MS Project**	**Asana**	**Smart Sheet**	**Excel**	**XML**	**JSON**
Azure DevOps	-		Project Metadata			Work Items		
JIRA		-				Issues	Project Metadata	
MS Project			-			Project Metadata	Project Metadata	
Asana				-		Tasks/ Spreadsheets		Tasks/ Spreadsheets
SmartSheet		Project Metadata	Project Metadata		-	Project Metadata	Project Metadata	

4. Proposal

In Chapter 3 project management tools were investigated to understand how to improve the current state of PSL Excel Template, and what errors need to be avoid in this process. This chapter describes new features defined and implemented on the PSL Excel Template v.2019, such as a number of sheet adjustments, a new Configuration group of sheets, new sheet protection mechanisms, a Custom Ribbon, a macro to generate a report onto word and new mechanisms to analyse the current situation of a project.

4.1. Minor sheet improvements

This section describes a number of small tweaks in the sheets that were meant to provide consistency and improve user experience, namely print area setup, movable objects, different sheet order and new charts to display in the Dashboard sheet.

Setup Print Area. One of the problems in the PSL Excel Template v.2018, was the fact that the sheets were not optimized for printing or exporting. There were two factors that contributed for this: there was no set Print Area, and even if the user printed it himself there were buttons being printed, which would generate some confusion. The solution to the latter problem is described in section 4.5. To fix the first problem we set a custom Print Area for each sheet, in order to fit each one into a single page, when possible.

Movable objects. There were some cells that only held informational data and had troublesome positioning. To fix this we decided to implement movable objects so the user himself could decide where to move this information. The two situations of this were: (i) the risk matrix in the Risk.Risks sheet and (ii) the legend describing the RAM roles, in the Resources.RAM sheet, both of which are shown in the Figure 4-1.

Sheet Order. The order of the sheets was also rearranged to keep a consistency with the Custom Ribbon built, described in section 4.5. In PSL Excel Template v.2018 the order of the sheets was 12 sheets pertaining to traditional project management, then 5 in the agile project management area and after that again 5 traditional project management sheets. So, it was decided that the sheets in traditional PM should be all together and only after all of them the 5 agile ones.

New Charts. In the previous version of the template there were 2 charts describing the projects Requirements displayed in the dashboard, one describing the type of the requirements and another describing their current status. For consistency and to provide the user with more on hand information charts were built and displayed in the dashboard sheet to show the progress of milestones, deliverables and issues, in addition to the already existing

requirements. Figure 4-2 represents the part of the Dashboard that represents the mentioned graphs.

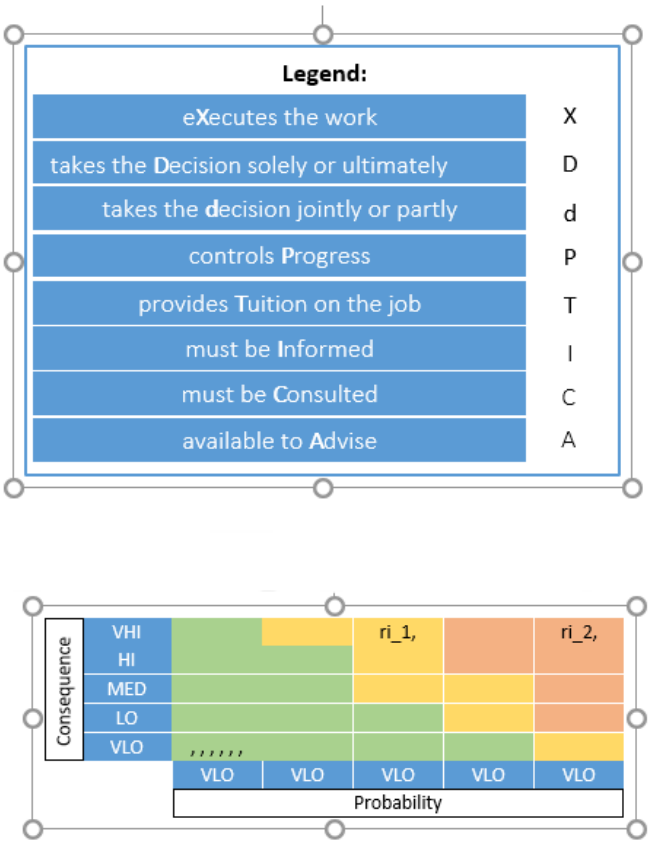


Figure 4-1 - Usage of Textboxes to create movable informative objects

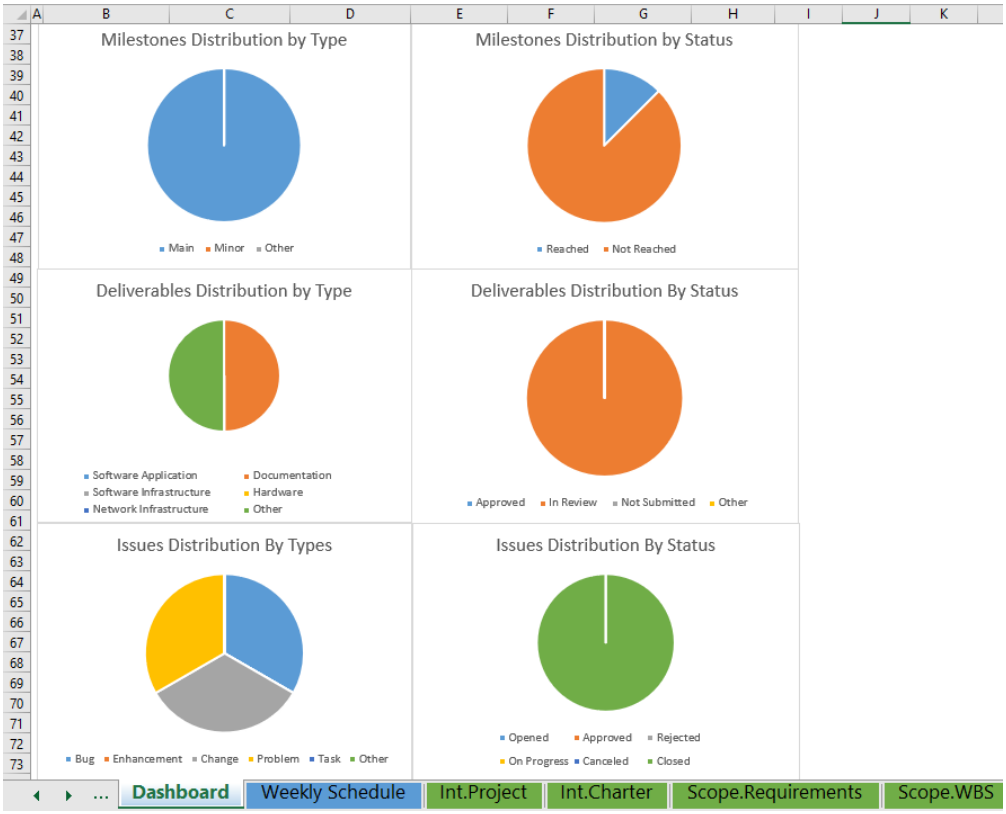


Figure 4-2 - Dashboard sheet with the added charts

4.2. Configuration Group Sheets

In the PSL Excel Template v.2018 there were four sheets in the Configuration group, which were the sheets that provide support information to be used by other sheets; however, they are not consistent, in the sense that, while 2 were meant to be unalterable, the other 2 were to be subject to user input.

To fix this inconsistency the sheets were divided in two different groups: the first kept the same name, Configuration or .conf. for sheet naming purposes. The other group was created as User Configuration, .confUser. for naming sheets. The first one gathers the sheets that should not be changed at all, since they provide information that is used elsewhere in the document. The second one groups up the ones that, although they also have a supporting role, the information may be updated by the user.

To the first group one new sheet was added, .conf.Dashboard which serves as support to the information that we've added to be displayed in the Dashboard sheet. Also, .conf.General, which is one of the sheets that is to be subject to user input in the v.2018 has been considered a part of this group, because the data that it holds is merely support for description purposes, and in no way needs to be changed by the user. To conclude, this group is now composed by

5 sheets: .conf.General, .conf.Scope.Reqs, .conf.Agile.SprintBacklog, .conf.Timetable and .conf.Dashboard.

In the second group there are a total of 3 sheets. One of them was previously part of the initial 4 sheets in the Configuration group, which is the now .confUser.Holidays, that holds information about the dates of the holidays, which can be input by the user, for scheduling purposes. The other 2 sheets are .confUser.Metrics and .confUser.Rates, which were not considered to be part of the Configuration group in the previous version, however we deemed them fit to take part in this group, since the basis for it is that the sheet's information have no value on their own, and must be used to support the information on other sheets, in the case of the .confUser.Metrics, that was previously in the Quality group, has its information supporting the Quality.Deliverables table, and in the case of .confUser.Rates, that was previously in the Cost group, provides information to support the Cost.Expenses table.

4.3. Sheet Protection

One of the common errors noticed in the Excel Templates studied was the fact that the users could input data in cells that either hold hidden formulas or are automatically updated through macros. To prevent these errors, we implemented the Excel mechanism that allows to protect sheets and consequently their cells.

In Excel cells have 2 properties in the protection context: Locked and Hidden. Both properties are only active if the sheet is protected. If a cell is Locked and the sheet is protected, that means the user cannot change the contents of that cell. If the cell is Hidden while the sheet is protected, the user can see the current value, however he doesn't have access to the formula bar. For example, in Figure 4-3 the selected cell has the following formula: '=IF([@[Actual]]>0,'.conf.General'!$D$33,'.conf.General'!$C$33)', yet the user only sees 'Reached' or in this case 'Not Reached'.

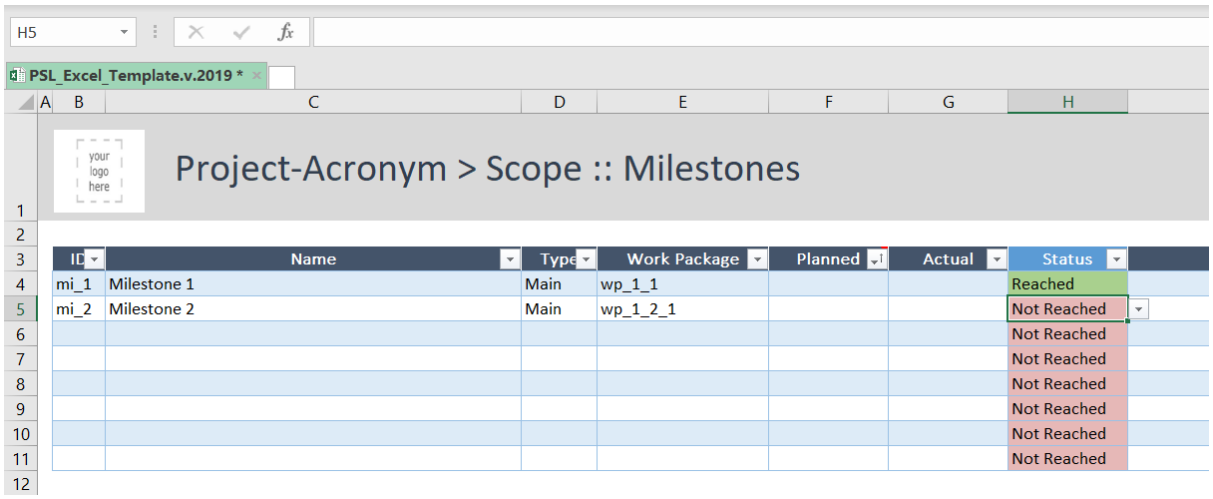


Figure 4-3 - Example of a hidden formula on a cell in the Scope.Milestones sheet

There are two ways to protect a sheet, manually and through VBA code. There are 2 parameters that can only be configured by manually protecting, which are allowing the user to select locked and select unlocked cells. For this reason, we had to first manually protect every sheet to set these parameters accordingly. The need to build this protection through a macro in VBA, stems from the fact that some macros require the sheet to be unlocked to function, so in those macros we have to unprotect the sheet, run the instructions and then protect them again.

When implementing the Sheet.protect macro there are a total of 16 parameters that can be set to True of False. We used 3 different combinations of these, depending on the expected interaction between the user and a specific sheet.

For the first two sheets, Tutorial and Dashboard, as well as the last 6 sheets, which include the configuration sheets and the Copyright, we set every parameter to its default value, except the first 3, while locking every cell, since we do not want to allow the user to do any change in them, seeing as they are merely informative sheets, the code for this is in Figure 4-4. In the Tutorial and Dashboard sheets when we protected them manually, we also remove the user's ability to select any cells. The DrawingObjects parameter when true, protects the shapes of the sheet, while Contents:= True means that the content is also protected, for example Charts and likewise Scenarios:=True protects the scenarios of the sheet.

```
Sheet2.protect Password:=palavra, DrawingObjects:=True, Contents:=True, Scenarios:=True
```

Figure 4-4 - Code used for the 2 sheets, as well as the last 6

For the remaining 24 sheets we locked the cells that the user must not change, or else it would break the code, which are mainly the table headers, but still allow them to select all cells including locked ones. Afterwards the sheets were protected with the code shown in Figure 4-5, which allows every functionality in Excel except deleting columns, to prevent users from deleting table columns, which would break the macros associated with that table. However, in 4 sheets we also allow this functionality, since it is vital for updating information in those tables, they are Resources.RAM, Cost.Expenses, Agile.TeamAnalyzer and Agile.SprintBacklog.

```
Sheet10.protect Password:=palavra, DrawingObjects:=False, Contents:=True, Scenarios:= _
    False, AllowFormattingCells:=True, AllowFormattingColumns:=True, _
    AllowFormattingRows:=True, AllowInsertingColumns:=True, AllowInsertingRows _
    :=True, AllowInsertingHyperlinks:=True, AllowDeletingColumns:=False, _
    AllowDeletingRows:=True, AllowSorting:=True, AllowFiltering:=True, _
    AllowUsingPivotTables:=True
```

Figure 4-5 - Code used for the remaining 24 sheets, except for the 4 mentioned above, where the AllowDeletingColumns is True

4.4. Licensing and Trial Version

In order to legally distribute the PSL Excel Template v.2019 a license is needed.

To provide us with the licensing software we used SoftwareKey's Instant Protection Plus 3 (IPP3). As mentioned in section 2.4.4. this tool can be used with a SOLO Server in order to automate the distribution of the document and the keys, but for our research purpose we only tested the standalone version of IPP3 wizard.

The wizard allows the distributor to customize its protection with a number of options, some of them are shown on Figure 4-6, and these options are saved in an .ipp file, while the keys are stored in an encrypted XML file.

With this software it is possible to lock the access to the Excel document, with the use of a DLL (which stands for Dynamic-link library, which is Microsoft's implementation of a shared library in Windows, and complemented by VBA code). As such, this licensing method forces the document to lock the access to the Visual Basic for Applications editor behind a protected password.

When the research of the pm tools, in section 3.5, was done, everyone but the MS Project had a trial version. Seeing as PSL is trying to compete with them, adapting this stance made sense. In today's market users are less prone to buy a product if they can't test it first. Hence, we defined a trial version, that limits the user interaction with the document, by changing the sheet protection parameters. In its current form the trial version doesn't allow users to create more rows, limiting the number of entries in each table. The Custom Ribbon, introduced in section 4.5., holds the button to upgrade the trial version to full version, behind a password.

This version can be further limited, to give more reasons for the user to purchase the full version.

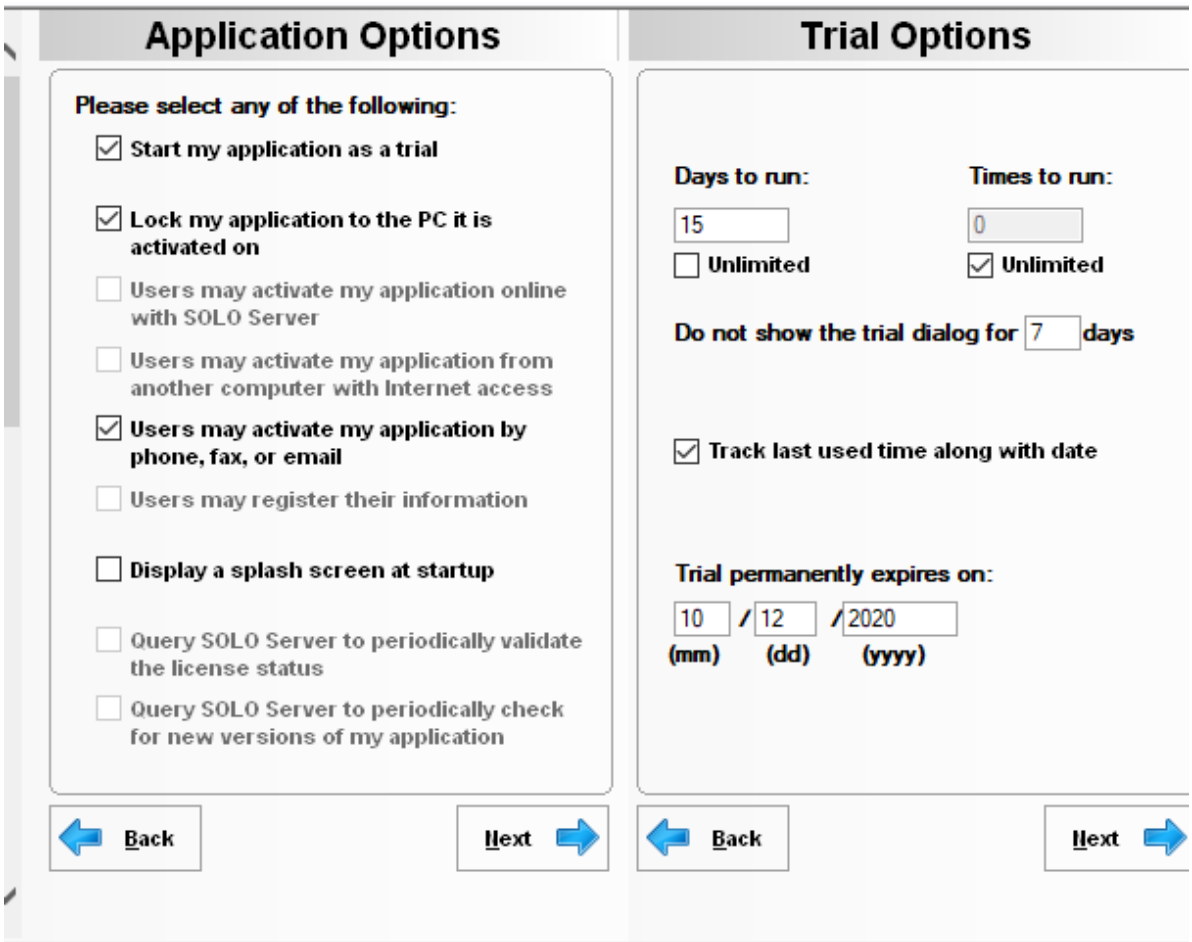


Figure 4-6 - Options available in the IPP3 wizard to customize the license

4.5. Custom Ribbon

In section 4.1.2. we described one of the problems we encountered, which was misplacement of the buttons that held the macros for each sheet. To solve this problem, we came up with a solution inspired by Ganttexcel's template, which was to build a Custom Ribbon to hold said buttons, so that it would remove the clutter off the sheet itself.

To customize the ribbon we used Office RibbonX Editor, which allows us to access the xml file associated to the Excel file, where we can make the desired changes.

Three elements compose the ribbon, Tab, Group and Buttons. A tab is formed by groups, and each group holds 1 or more buttons. Figure 4-7 represents a code sample for these elements in the office RibbonX Editor.

```
6   <tab id="MyCustomTab5" label="PSL GENERAL" insertBeforeMso="TabHome">
7    <group id="customGroup26" label="WeeklyReport">
8          <button id="customButton55" label="Update Weekly Report" size="large" onAction="CommandButton1_Click_weeklyreport" imageMso="MailMergeUpdateLabels" tag="Group20" getEnabled
9    </group>
10   <group id="customGroup1" label="Scope.Requirements">
11     <button id="customButton1" label="Generate IDs" size="large" onAction="CommandButton1_Click_Req" imageMso="EquationNormalText" tag="Group1" getEnabled="GetEnabledMacro"/>
12   </group>
13   <group id="customGroup2" label="Scope.WBS">
14     <button id="customButton2" label="Generate IDs" size="normal" onAction="CommandButton1_Click_wbs" imageMso="EquationNormalText" tag="Group2" getEnabled="GetEnabledMacro"/>
15     <button id="customButton3" label="Update Charts" size="normal" onAction="CommandButton2_Click_wbs" imageMso="TableOfContentsUpdate" tag="Group2" getEnabled="GetEnabledMacro" />
16   </group>
17   <group id="customGroup3" label="Scope.Milestones">
18     <button id="customButton4" label="Generate IDs" size="normal" onAction="CommandButton1_Click_mil" imageMso="EquationNormalText" tag="Group3" getEnabled="GetEnabledMacro"/>
19     <button id="customButton5" label="Update Dates" size="normal" onAction="CommandButton2_Click_mil" imageMso="TableOfContentsUpdate" tag="Group3" getEnabled="GetEnabledMacro"/>
20     <button id="customButton6" label="Generate Positions" size="normal" onAction="CommandButton3_Click_mil" imageMso="DateAndTimeInsert" tag="Group3" getEnabled="GetEnabledMacro"/>
21   </group>
22   <group id="customGroup4" label="Scope.Deliverables">
23     <button id="customButton7" label="Generate IDs" size="normal" onAction="CommandButton1_Click_del" imageMso="EquationNormalText" tag="Group4" getEnabled="GetEnabledMacro"/>
24     <button id="customButton8" label="Generate Positions" size="normal" onAction="CommandButton2_Click_del" imageMso="DateAndTimeInsert" tag="Group4" getEnabled="GetEnabledMacro"/>
25   </group>
```

Figure 4-7 - Code snippet for the three elements, Tabs, Groups and Buttons, in the Office RibbonX Editor

The custom ribbon is currently composed of 3 tabs, which hold 23 groups and 41 buttons.

Two types of tabs were created, one for general purposes, and one solely for the agile aspect of the template. The General area has 19 groups as opposed to the 4 on the agile one. Because of this and for clarity sake we divided the group into 2 tabs, one named PSL General and the other PSL General 2.

20 of the 23 groups have sheet names. This is because they hold the buttons that run the macros for their respective sheet. To help users avoid making mistakes we have setup a macro that activates only the group for the currently active sheet, to do this we assigned a tag and a GetEnabledMacro in the XML file, to each group, and added VBA code that enables a specific tag, whenever a worksheet activation trigger happens. This is demonstrated in Figure 4-8, where the sheet Scope.Requirements is active and only its group has clickable buttons.

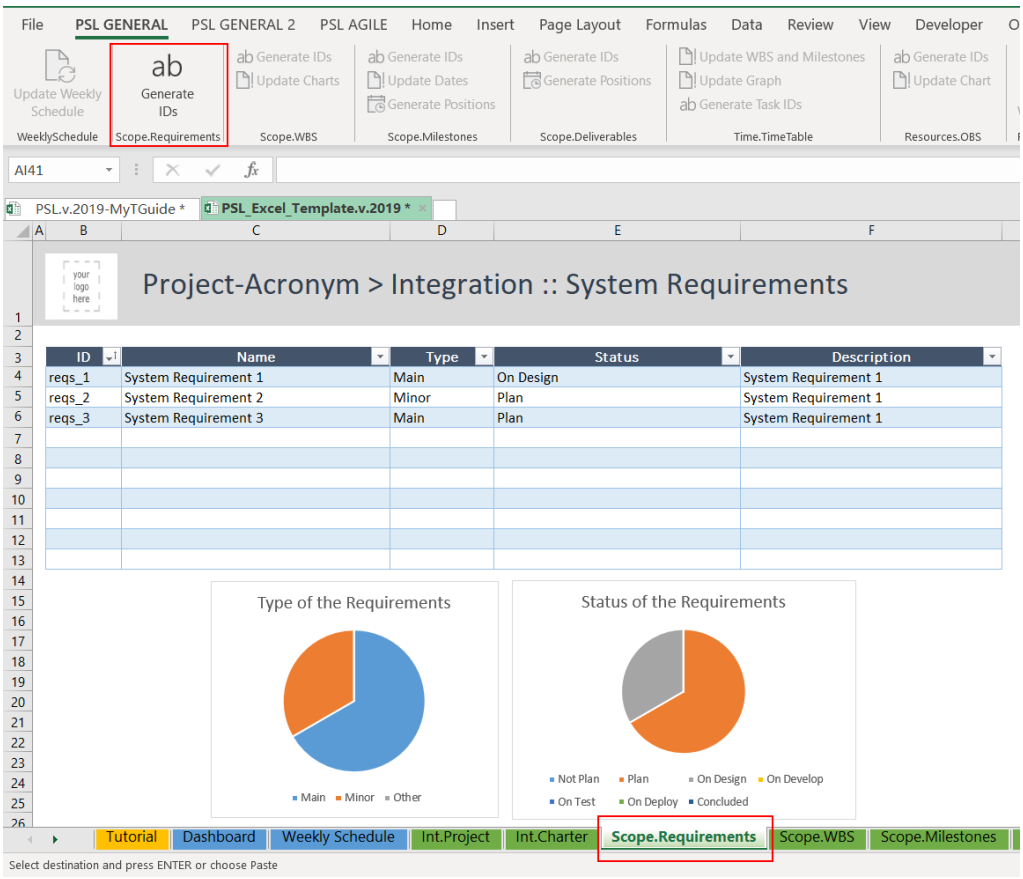


Figure 4-8 - Demonstration of how the Custom Ribbon works, only the buttons for the respective sheet are active

The remaining 3 groups are located in the PSL General tab, since its buttons have macros that don't influence a specific sheet directly and for this reason where not given a GetEnabledMacro, meaning they are always active. The first of these is the group that holds the generate report onto word macro which is described in section 4.6. The second group gathers the upgrade to Full version macro , which was previously presented in section 4.4. The last group, designated Other, is composed of 3 buttons. The first is a macro that allows the user to import a logo of his choice to the document, which is then placed in all the relevant sheets. The other 2 buttons are helpful buttons, the first provides some background information about the Template and gives the user the option to open the ITLingo website, while the second one is Help, and provides instructions to a new user, which are currently located in the Tutorial sheet. Table 4-1 describes in detail the buttons and how they are aggregated.

Table 4-1 - Description of the elements that compose the custom Ribbon

Tab	Group	Button	Description
PSL General	Weekly.Schedule	Update Weekly Schedule	This button fetches the deliverables, meeting and milestones for the current week.
	Scope.Requirements	Generate IDs	This button generates IDs for the requirements in the Scope.Requirements table.
	Scope.WBS	Generate IDs	This button generates IDs for the work in the scope.WBS table.
		Update Chart	This button updates the WBS chart in accordance with the WBS table in the Scope.WBS sheet.
	Scope.Milestones	Generate IDs	This button generates IDs for the milestones in the Scope.Milestones table.
		Update Dates	This button fetches the dates for the milestones in the Time.Timetable sheet and updates them on the Scope.Milestones table.
		Generate Positions	This button generates the display positions for the chart in the Scope.Milestones sheet.
	Scope.Deliverables	Generate IDs	This button generates IDs for the deliverables in the Scope.Deliverables table.
		Generate Positions	This button generates the display positions for the chart in the Scope.Deliverables sheet.
	Time.Timetable	Update WBS and Milestones	This button fetches the WBS and milestones data in their respective sheets and updates them on the Time.Timetable table.
		Update Graph	This button updates the Gantt chart in accordance with the Timetable in the Time.Timetable sheet.

		Generate Task IDs	This button generates IDs for the scope.requirements table.
	Resources.OBS	Generate IDs	This button generates IDs for the people in the Resources.OBS table.
		Update Chart	This button updates the OBS chart in accordance with the OBS table in the Resources.OBS sheet.
	Resources.RAM	Import from WBS and OBS	This button imports the WBS data into the columns and the OBS data into the rows of the Resources.RAM table.
	Export to Word	Generate Report onto Word	This button prompts the user to select sheet to generate a report onto Microsoft Word.
	Upgrade Version	Upgrade to Full Version	This button asks the user for a password, and if it is correct it upgrades the template into the full version.
	Other	Import Logo	This button prompts the user to select an image in his computer to add to the template in all the exportable sheets.
		About	This button provides information about the template and PSL, and gives the user the option to visit the PSL website.
		Help	This button sends the user to the tutorial page which holds all the instructions to use the template.
PSL General 2	Issues.Issues	Generate IDs	This button generates IDs for the issues in the Issues.Issues table.
	Quality.Deliverables	Generate IDs AC	This button generates IDs for the acceptance criteria in the Quality.Deliverables table.
		Update Deliverables	This button fetches the deliverables from the Scope.Deliverables table and updates them on the Quality.Deliverables table.
	Risk.Risks	Generate IDs	This button generates IDs for the risks in the Risk.Risks table.
	Comm.Flow	Generate IDs	This button generates IDs for the flows in the Comm.Flow table.
		Import Deliverables	This button imports the deliverables from the Scope.Deliverables table onto the Comm.Flow table.
	Comm.Meet	Generate IDs	This button generates IDs for the meetings in the Comm.Meet table.
		Generate Dates for Next Meetings	This button generates the dates for the next meeting based on the start date, the frequency and the current date.

	Cost.Expenses	Generate IDs	This button generates IDs for the expenses in the Cost.Expenses table.
		Insert New Year	This button adds 3 more columns to the Cost.Expenses table with the next year, e.g. if the last year is 2019, the macro creates the year 2020.
		Import from OBS	This button imports the people from the Resources.OBS table onto the Cost.Expenses table.
	confUser.Metrics	Generate IDs	This button generates IDs for the quality metrics in the confUser.Metrics table.
	confUser.Rates	Generate IDs	This button generates IDs for the person rates in the confUser.Rates table.
		Insert New Year	This button adds 1 more column to the confUser.Rates table with the next year, e.g. if the last year is 2019, the macro creates the year 2020.
PSL Agile	Agile.Team	Import from OBS	This button imports the people from the Resources.OBS table onto the Agile.Team table.
	Agile.TeamAnalyzer	Import from Team	This button imports the people from the Agile.Team table onto the Agile.TeamAnalyzer table.
	Agile.ProductBacklog	Generate IDs	This button generates IDs for the user stories in the Agile.ProductBacklog table.
	Agile.SprintBacklog	Generate IDs	This button generates IDs for the tasks in the Agile.SprintBacklog table.
		Import from Product Backlog	This button imports the items from the Agile.ProductBacklog that are scheduled for the current sprint, as well as the ones from the previous one, if they are not completed.
		Adjust to number of Days	This button adjusts the number of columns of the Agile.SprintBacklog table to the number of days defined for the sprint in the same sheet.
		Send to History and Go to Next Sprint	This button exports the current sprint to the Agile.SprintHistory sheet and clears the Agile.SprintBacklog table.

4.6. Generate Report onto Word

The Generate Report onto Word was developed for the sake of exporting pm information between team members or even customers, allowing the user to quickly share information, within a few simple steps.

The current Excel template includes 22 sheets that hold information relevant to project plans. This feature was designed to help users in sharing specific information relative to one area or even just a single sheet to other team members. Furthermore, it even allows to share information with people that should not have access to the document.

It is accessible through a button in the Custom Ribbon, named “Generate Report onto Word”, which prompts the user with a dialog box with a checkbox for each sheet, which the user then can decide which ones to check. If the sheet is checked the macro retrieves the information from that sheet and pastes it onto Word, with MS Word AutoFit To Window property for tables turned on. To help the users in sharing a great amount of information we also added 2 buttons that help Select or Unselect all. This is shown in Figure 4-9. The sheets that are checked will have their information extracted into a MS Word document, like the example in figure 4-10, where the Int.Project sheet was exported.

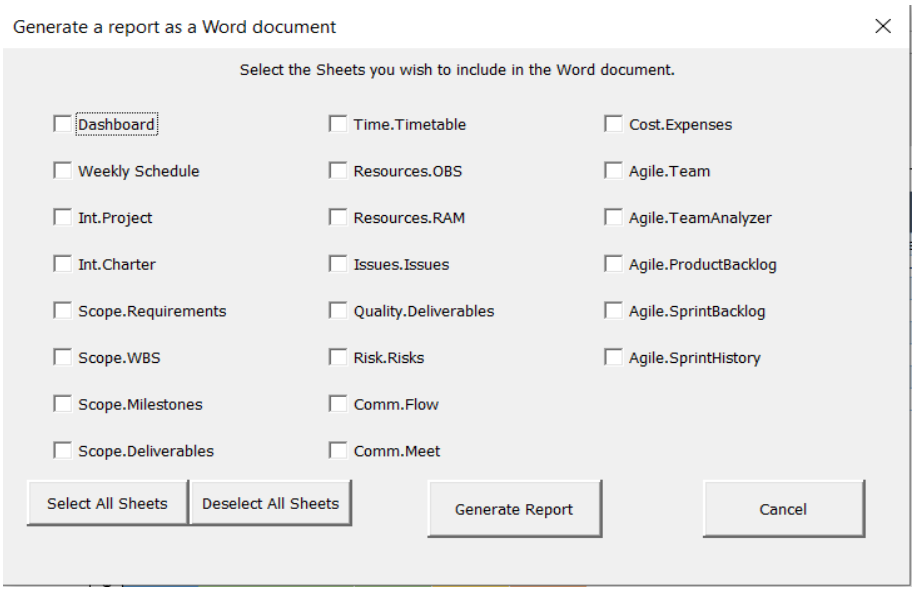


Figure 4-9 - User Form prompted when the Generate Report macro runs

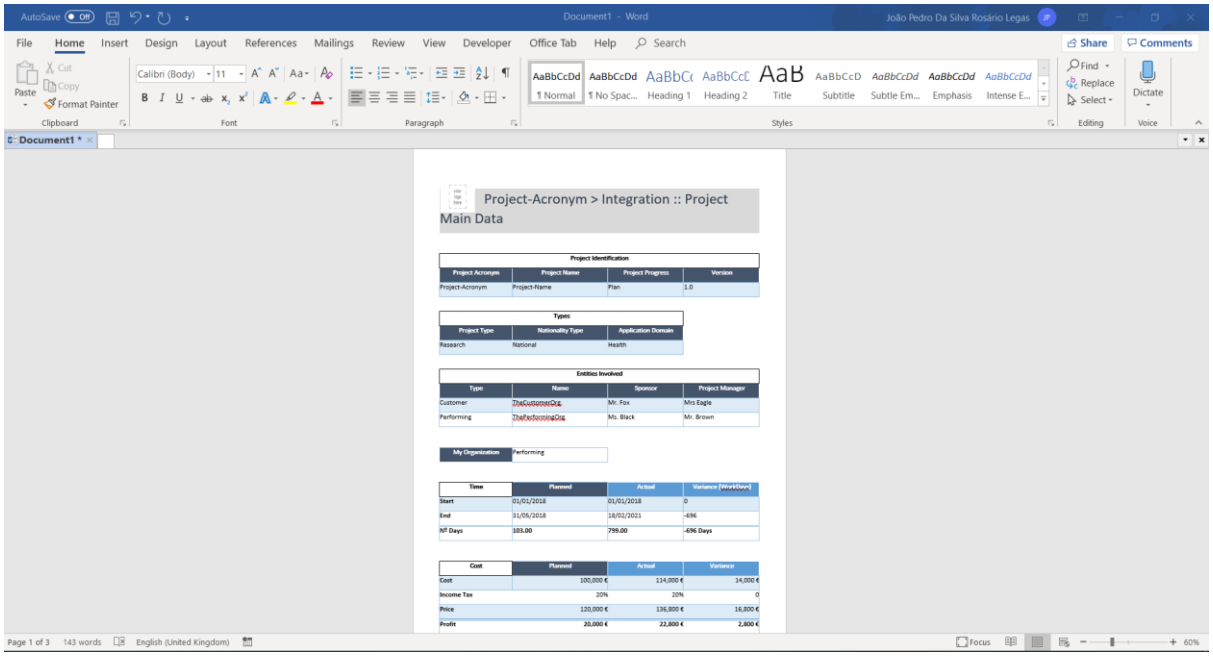
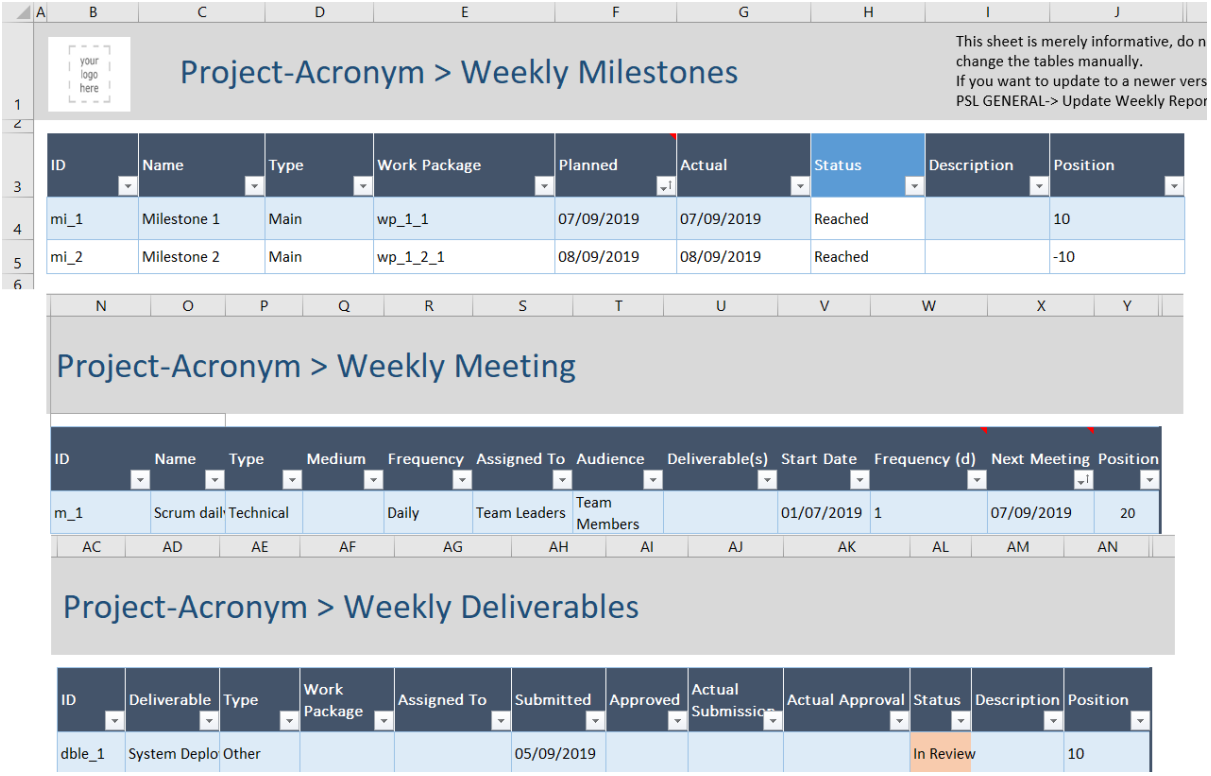


Figure 4-10 - Int.Project sheet generated to Word format

4.7. Analysis of the Current Situation

A feature that we added to help in the Executing and Controlling processes, was a way for users to quickly perceive the project's current situation. For this purpose, we enhanced the Dashboard sheet and created the Weekly Schedule sheet.

Weekly Schedule is a sheet that allows the users to identify what is happening in the current week of the project, such as the meetings, and the objectives that are due in that week, both the deliverables and the milestones. For the user to update the sheet with the current week information a macro was created, and its respective button was added in the Custom Ribbon. When the macro runs it fetches the information from the respective sheets that have a "Planned Date" in the current week. Figure 4-11 shows the sheet information for the week of September 2 to September 8.



Project-Acronym > Weekly Milestones

This sheet is merely informative, do n
change the tables manually.
If you want to update to a newer vers
PSL GENERAL-> Update Weekly Repor

ID	Name	Type	Work Package	Planned	Actual	Status	Description	Position
mi_1	Milestone 1	Main	wp_1_1	07/09/2019	07/09/2019	Reached		10
mi_2	Milestone 2	Main	wp_1_2_1	08/09/2019	08/09/2019	Reached		-10

Project-Acronym > Weekly Meeting

ID	Name	Type	Medium	Frequency	Assigned To	Audience	Deliverable(s)	Start Date	Frequency (d)	Next Meeting	Position
m_1	Scrum dail	Technical		Daily	Team Leaders	Team Members		01/07/2019	1	07/09/2019	20

Project-Acronym > Weekly Deliverables

ID	Deliverable	Type	Work Package	Assigned To	Submitted	Approved	Actual Submission	Actual Approval	Status	Description	Position
dble_1	System Deplo	Other			05/09/2019				In Review		10

Figure 4-11 - Weekly Schedule for the week of 02/09/2019 to 08/09/2019

In the Dashboard sheet we made two different groups that distinguish the type of information presented. The General Information group, which includes the general project status data, such as the project's beginning and end dates, current project progress (in days), current expenses, as well as the total planned cost, and multiple charts that display information, specifically the distribution of the requirements, the milestones, the deliverables and the issues, both by their types and their status. Figure 4-12 depicts the dashboard sheet with the added information.

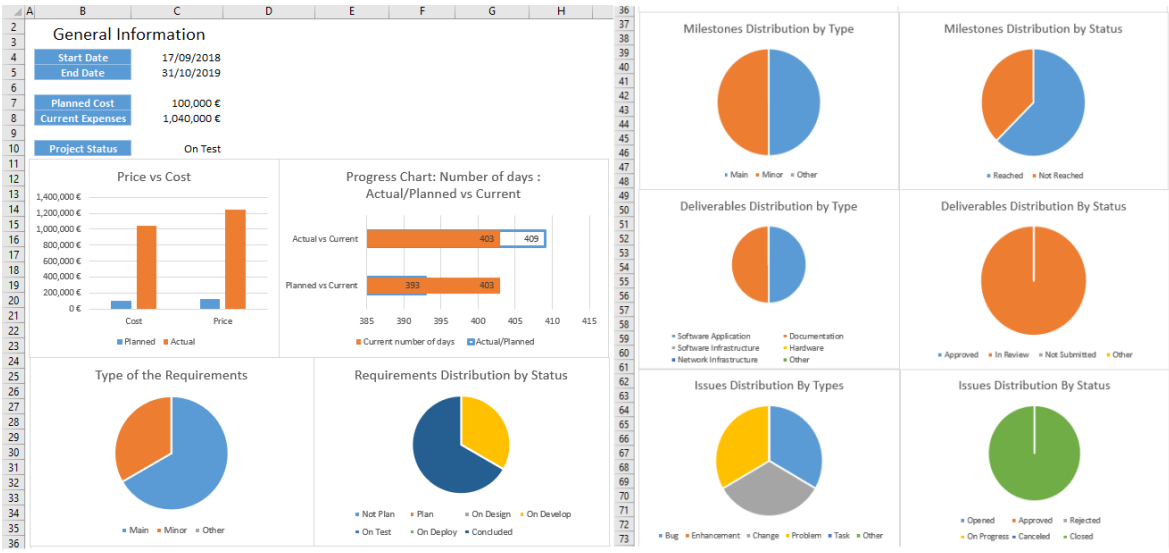


Figure 4-12 - Dashboard sheet in PSL Excel Template v.2019 with the added information

5. Evaluation

To understand the progress of the work developed we evaluated the proposed template by applying it to two case studies: the MyTGuide Project and this MSc project itself.

5.1. MyTGuide Project

MyTGuide is a fictious project, which was the 2017/2018 group project for the Information Systems Project Management course and since I've attended that class, we thought it would be fitting to use the project for the evaluation purposes. MyTGuide is a project conducted by the FreeTime company that plans to launch a new service supported by the MyTGuide digital platform. This project involves the development of two new products: one targeting the tourists, Guided Tour Reservation (GTReservation), and the other to target the tour guides, Guided Tour Offer.

We built the project plan specification in both PSL Excel Template v.2018 and PSL Excel Template v.2019.

5.1.1. PSL Excel Template v.2018

We started defining the project plan for MyTGuide to get familiar with the tool, using the work we did for the Information Systems Project Management class, in the beginning of the thesis. We revisited the document later to finish it for evaluation purposes. We found the tool to be extremely useful for gathering all the necessary information, since when we did the project for the class, we had to juggle between multiple tools to accomplish the same result.

There were a few complications during the evaluation process such as macro buttons that would overlap when columns sizes were adjusted. The timetable sheet also created some confusion when trying to create precedencies between activities. As shown on figure 5-1 the Risk.Risks sheet had a risk table that to avoid errors was to the right of the Pivot Table in that sheet. Since this table had a great amount of details, the table was easily missed.

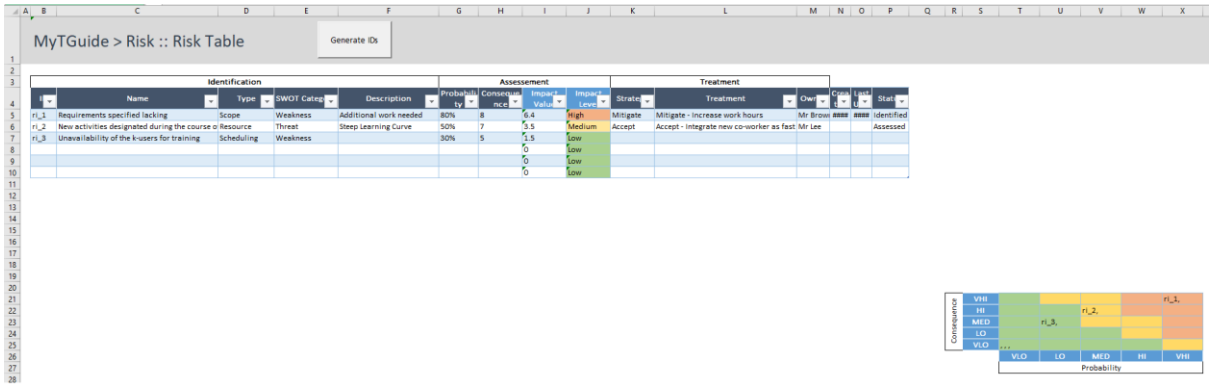


Figure 5-1 - PSL Excel Template v.2018, demonstrating risk table positioning in the Risk.Risks sheet

The Resources.OBS sheet had a macro to Update Chart, but it kept on displaying an error.

The figures in Appendix A show the sheets of the document used for this evaluation.

5.1.2. PSL Excel Template v.2019

When building the same project in this new version, the experience went smoother, however this can also be justified by already having experience with the template.

There were, however, clear improvements. Every macro could be run since it was impossible for them to overlap in the new custom ribbon. The way the macros are built it is very important that the table headers are not changed. In the previous template, we unknowingly broke some macros, by doing just that, forcing to roll back the document several times. With these cells being locked, we avoided this mistake. Another advantage of the new template is the fact that, in the sheet Risk.Risks there is a risk table, that displays the risks according to their impact, but like we mentioned in the last section in the old version it had a very disadvantageous positioning. The Figure 5-2 shows the new position of the table, and it is currently attached to a textbox, which means the user can move it and place it where he sees fit.

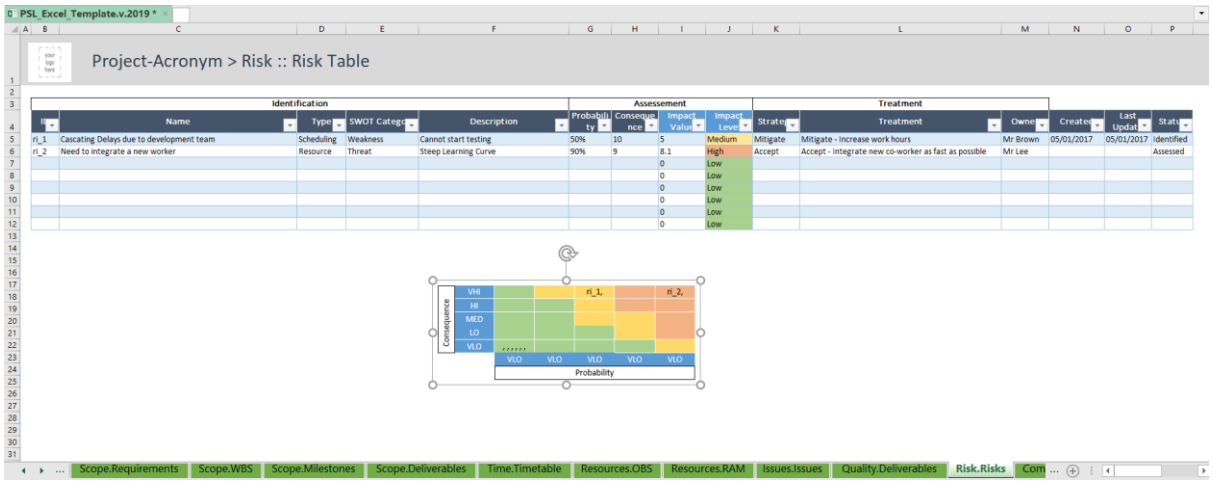


Figure 5-2 - PSL Excel template v.2019, demonstrating the movable risk matrix in the Risk.Risks sheet

A lot of the improvements that were made from the previous version didn't have great impact on this experience, namely features such as the analysis of the current situation, seeing as these features focus on the execution and control processes, and this simulation was done as if the project had already ended.

Appendix B aggregates the sheets of the evaluation document for this project, generated using the macro described in section 4.6, Generate Report onto Word.

5.2. MSc Thesis Project

To test the tools evolution, we used our own project to build a project plan in the PSL Excel Template. We started defining the project plan in the beginning of the thesis and concluded it with the evaluation. At the beginning we started with six, 2-week sprints, but later changed to 4-weeks for the remaining four sprints, to fit the feature implementations schedule.

This evaluation allowed us to test for bugs, which were quickly fixed. The bugs encountered involved cells that were locked in sheets that needed to have whole columns deleted, and if a single cell on that column was locked Excel would not allow the user, and sometimes macros, to delete them correctly. The problem was hence encountered in the Resources.RAM, Cost.Expenses and Agile.TeamAnalyzer sheets.

Every new feature was simulated to find inconsistencies, and to understand if the template was ready for delivery. We were able to fix the bugs found, giving more stability to the template.

The figures in Appendix C show the sheets of the template used in this evaluation.

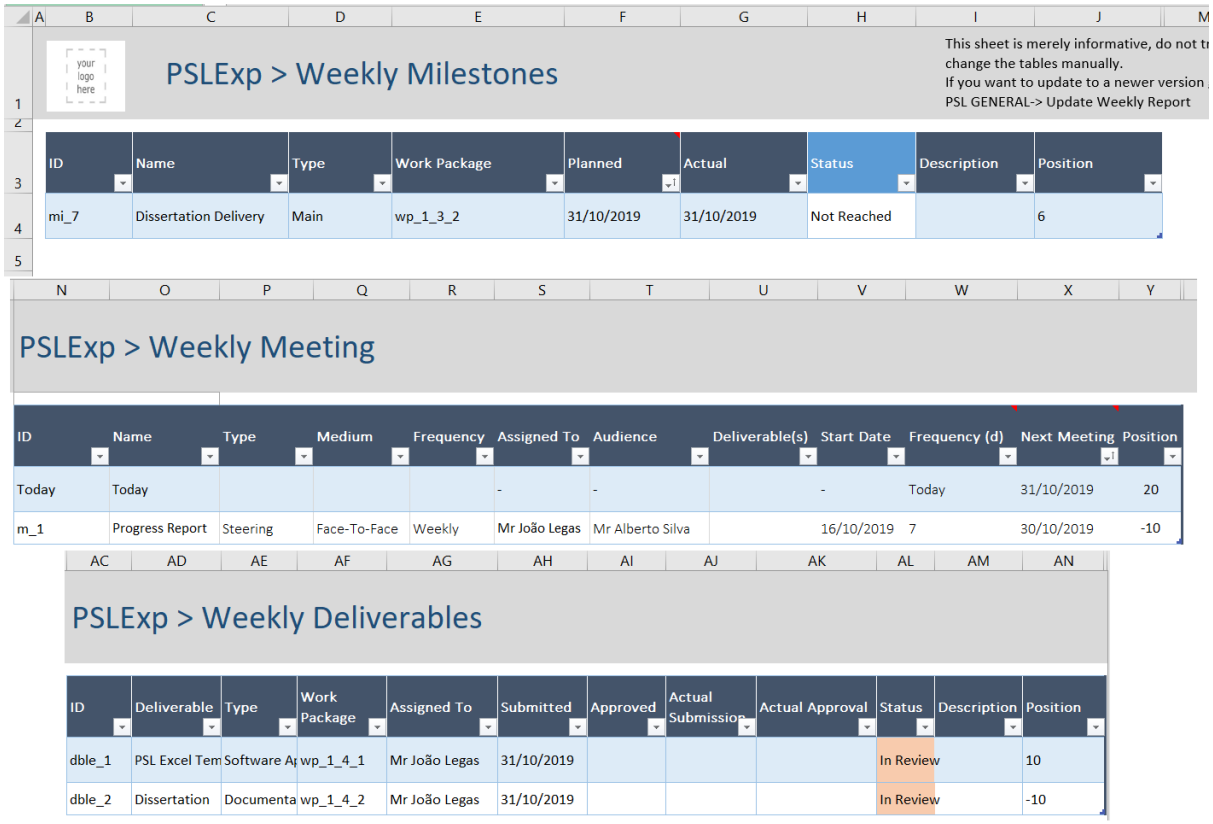
5.3. Comparison and Discussion

In this section we compare PSL Excel Template v.2019 to the other templates analysed in section 3.2, including PSL Excel Template v.2018.

A common problem we saw in the templates we analysed before was the user interface not being optimal, such as implicit rules that are not explained, like cells with hidden formulas that cannot be changed. We tried to minimize this by locking cells, such as column headers, since during the project we broke some macros by doing changing them without knowing. There are also cells with hidden formulas, which have headers with a different colour, to signalize to the user that he should not manually input data in those cells, however we were not able to test the viability of this feature, because we didn't have tests with real users.

Since we focused mainly on improving executing and controlling processes, we tested these features more extensively. While building the MSc Thesis Project, we used the weekly

schedule sheet to display the weekly objectives, in Figure 5-3 it is shown the sheet information for the last week of the thesis.



PSLExp > Weekly Milestones

This sheet is merely informative, do not tr
change the tables manually.
If you want to update to a newer version
PSL GENERAL-> Update Weekly Report

ID	Name	Type	Work Package	Planned	Actual	Status	Description	Position
mi_7	Dissertation Delivery	Main	wp_1_3_2	31/10/2019	31/10/2019	Not Reached		6

PSLExp > Weekly Meeting

ID	Name	Type	Medium	Frequency	Assigned To	Audience	Deliverable(s)	Start Date	Frequency (d)	Next Meeting	Position
Today	Today				-	-		-	Today	31/10/2019	20
m_1	Progress Report	Steering	Face-To-Face	Weekly	Mr João Legas	Mr Alberto Silva		16/10/2019	7	30/10/2019	-10

PSLExp > Weekly Deliverables

ID	Deliverable	Type	Work Package	Assigned To	Submitted	Approved	Actual Submission	Actual Approval	Status	Description	Position
dble_1	PSL Excel Tem	Software Ar	wp_1_4_1	Mr João Legas	31/10/2019				In Review		10
dble_2	Dissertation	Documenta	wp_1_4_2	Mr João Legas	31/10/2019				In Review		-10

Figure 5-3 - Weekly schedule sheet for the last week of the MSc Thesis Project in PSL Excel Template v.2019

The dashboard sheet is also helpful for analysing the current situation of the project. In Figure 5-4 we can see the dashboard in PSL Excel template v.2018 and Figure 5-5 shows the improved dashboard for the v.2019 template.

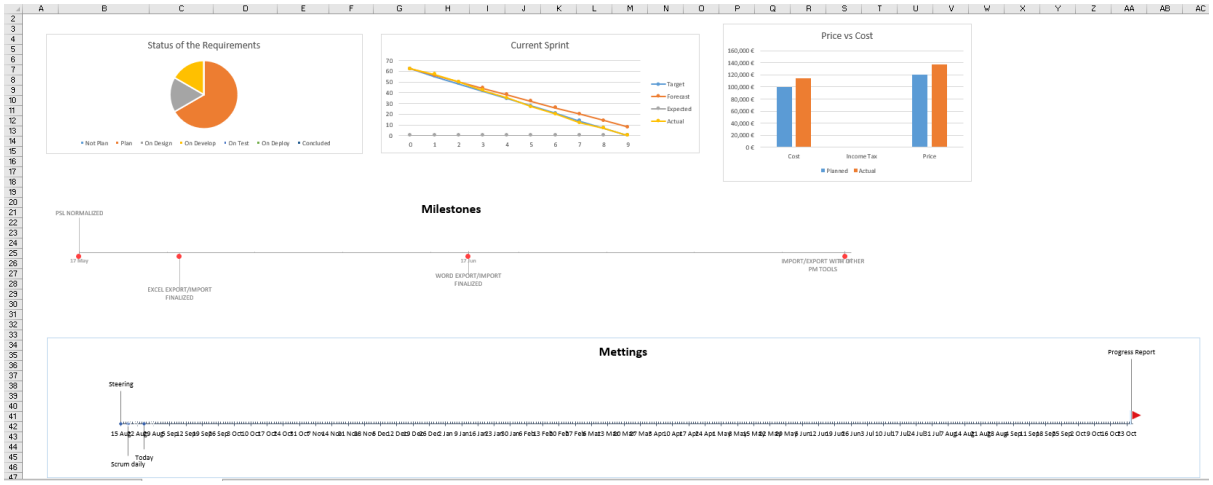


Figure 5-4 - PSL Excel Template v.2018 dashboard sheet

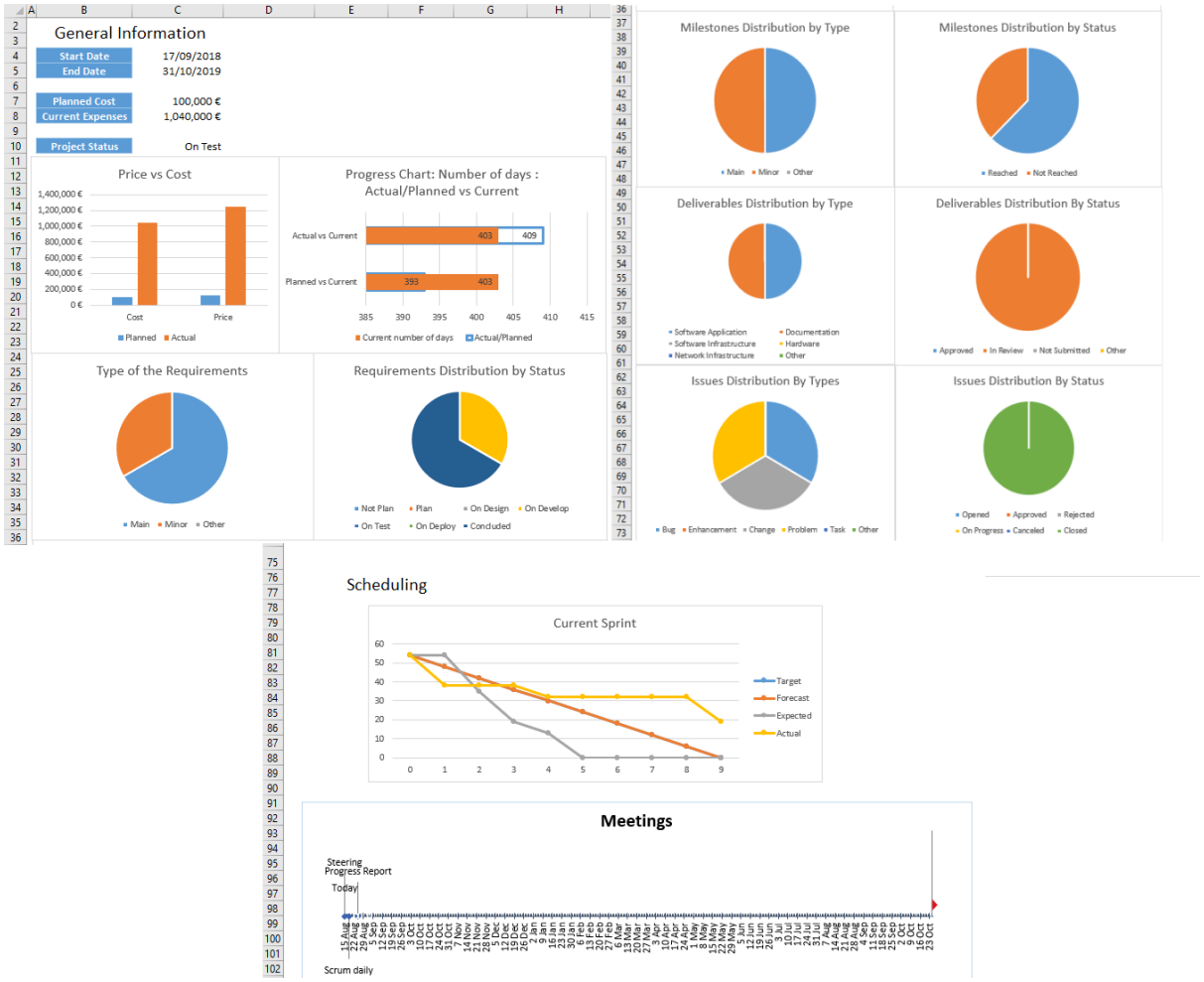


Figure 5-5 - PSL Excel Template v.2019 dashboard sheet

Overall, and as shown on Table 5-1, we can say that the main goal of improving the executing and controlling processes was reached and we also succeeded in improving the user interface.

Table 5-1 - Comparison table between the templates ability to support the PMBOK group processes

	Vertex42	**Gantt Excel**	**Office Timeline**	**PSL Excel Template v.2018**	**PSL Excel Template v.2019**
Initiating	+	+	+	++	++
Planning	++	++	++	+++	+++
Executing	+++	++	+++	+	+++
Controlling	++	+++	++	+	+++
Closing	+	++	+	++	++

Two features were also improved with the new template, milestone tracking was improved, with the addition of the information in the weekly schedule, as well as the RAM sheet also became more user friendly with the addition of the movable legend. Hence, Table 5-2 shows the comparison between the template's features.

Table 5-2 - Comparison between the templates features, including both versions of the PSL Excel Template, v.2018 and v.2019

	Features \Tools	**Vertex42**	**Gantt Excel**	**Office Timeline**	**PSL Excel Template v.2018**	**PSL Excel Template v.2018**
Traditional	Dashboard	+	+++	+	+	+
	Budget Management	++	+	+++	++	++
	Milestone Tracking	+	++	++	++	+++
	Work Breakdown Structure (WBS)	++			+++	+++
	Organization Breakdown Structure(OBS)				+++	+++
	Critical Path	++		++	+	+
	Responsibility Assignment Matrix (RAM/RACI)	+			++	+++
	Gantt Chart	++	+++	+++	+	+
Agile	Product Backlog				++	++
	Sprint Backlog	+		+	+++	+++
	Kanban Board	+++	+	+	+	+

6. Conclusion

This final chapter presents the conclusion of the research and implementation of the PSL Excel Template v.2019 and the future work that still remains open and that would allow to further improve the template.

6.1. Discussion

The market for project management tools is ever increasing, companies continue to strive to give their customers the necessary features to define complete project plan specifications. However, most of these tools are meant to be used as standalone, meaning the companies do not focus on allowing their customers to transfer specifications between different tools.

In the ITLingo initiative, the focus is the opposite, developing a language that allows to transfer the specifications between different software tools. At the time of writing this dissertation, PSL allows to import or export project specifications with Microsoft Excel, while also allowing to export to Microsoft Word.

The excel template used as a guide for this transfer, the v.2018 is already in a position to be competitive with other Excel templates and PM tools, however it had some inconsistencies and lacked a good user interface.

The new PSL Excel template v.2019 aimed to solve this, improving the user interface which allows for a better user experience, especially for new users. To achieve this, we implemented a Custom Ribbon to hold all the macros in the template, rearranged the sheet order, added a new group of sheets, User Configuration, and created movable objects for instances of data that are merely informative. To prevent user errors, we added sheet protection along with locking cells that the user must not change, preventing irreversible errors. To quickly share the project information between different parties we also implemented a macro to generate a report onto word with the ability to select which sheets should be implemented in that report.

For distribution of the template we tested a licensing management software, to assess its viability for the future, while also defining a trial version of the template, that limits user interaction with it.

After the work was done, we tested the template, firstly with a fictious project, which was built on the 2 versions, v.2018 and v.2019, to be able to compare them, and afterwards we defined the MSc thesis in the new version to find and fix bugs in it and also to compare this version of the template with the ones we researched in the beginning of the work.

To conclude PSL Excel template v.2019 is definitely an improvement of the previous version and is on par with other popular templates and software tools available on the market.

6.2. Future Work

The PSL Excel template has been improved, but there are still some areas and aspects that can be improved.

The trial version is an interesting feature that was only touched on this work, and it can still be further explored by using the code from the licensing software tool and giving users different limitations such as not allowing a number of macros to be used, or even remove access to specific sheets.

From the PSL language standpoint this has been the second iteration that this Excel template has gone through with no changes made to the language itself, thus limiting the import or even export capabilities of it.

Also, in our evaluation we only had one point of view, which is not enough when evaluating a promising tool. Further tests should be conducted, especially with real end-users, to find aspects that can be improved.

References

1. Project Management Institute, A guide to Project Management Body of Knowledge, 6th edition, Newton Square, Pennsylvania USA, 2017
2. PSLingo, accessed September 15, 2019, http://itbox.inesc-id.pt/ITLingo/PSLingo
3. ITLingo, accessed September 15, 2019, http://itbox.inesc-id.pt/ITLingo
4. Tavares Veiga, J. M., Rigorous Project Plans with the ITLingo PSL Excel Template, Msc Thesis, Instituto Superior Técnico, 2018
5. Vieira Gonçalves, J. F., ProjectLingo: Rigorous Specification of Project Plans, MSc Thesis, Instituto Superior Técnico, 2017.
6. Baskerville, Richard L. (1999) "Investigating Information Systems with Action Research", Communications of the Association for Information Systems: Vol. 2, Article 19.DOI: 10.17705/1CAIS.00219
7. Daniel J. Fernandez & John D. Fernandez (2008) Agile Project Management—Agilism versus Traditional Approaches, Journal of Computer Information Systems, 49:2,10-17. DOI:10.1080/08874417.2009.11646044
8. Schwaber, K., Agile Project Management with Scrum, 1st Edition, 2004
9. Kniberg, H. & Skarin, M., Kanban and Scrum – Making the Best of Both, 2010
10. Bettini, L, Implementing Domain-Specific Languages with Xtext and Xtend, 2nd Edition, 2016
11. Daniel Maciel, Ana C.R. Paiva, Alberto Rodrigues da Silva, From Requirements to Automated Acceptance Tests of Interactive Apps: An Integrated Model-based Testing Approach, in Proceedings of ENASE'2019, 2019, SCITEPRESS
12. Microsoft Excel Definition, accessed September 09, 2019, https://www.techopedia.com/definition/5430/microsoft-excel
13. Kenton, W., Visual Basic for Applications (VBA), accessed September 09, 2019, https://www.investopedia.com/terms/v/visual-basic-for-applications-vba.asp
14. Office Ribbon X, accessed March 6, 2019, https://github.com/fernandreu/office-ribbonx-editor
15. SoftwareKey Licensing System, accessed June 13, 2019, https://www.softwarekey.com
16. Vertex42 – Project Management Templates, accessed September 25, 2019, https://www.vertex42.com/ExcelTemplates/excel-project-management.html
17. Gantt Excel – Free Gantt Chart Excel Template, accessed July 18, 2019, http://www.ganttexcel.com
18. Office Timeline – Using Excel for Project Management, accessed October 10, 2019, https://www.officetimeline.com/project-management/excel
19. Azure DevOps, accessed November 31, 2018, https://azure.microsoft.com/en-us/services/devops
20. JIRA, Atlassian, accessed December 1, 2018, https://www.atlassian.com/software/jira
21. MS Project, accessed November 20, 2018, https://products.office.com/en/project/project-and-portfolio-management-software

22. Asana, accessed November 31, 2018, https://asana.com/

23. Smartsheet, accessed October 2, 2019, https://www.smartsheet.com

24. Altahtooh, U., & Alaskar, T. (2018). Understanding Relationship between Milestone and Decision-Making in Project Management: A Qualitative Study among Project Managers in Saudi Arabia. International Journal of Business and Management, 13(8), 184.doi:10.5539/ijbm.v13n8p184

25. Tausworthe, R. C. (1979). *The work breakdown structure in software project management. Journal of Systems and Software, 1, 181–186.* doi:10.1016/01641212(79)90018-9

26. Kelley, J. E., & Walker, M. R. (1959). Critical-path planning and scheduling. Papers Presented at the December 1-3, 1959, Eastern Joint IRE-AIEE-ACM Computer Conference on - IRE-AIEE-ACM '59 (Eastern). doi:10.1145/1460299.1460318

27. Delos Santos, J. M., Understanding Responsibility Assignment Matrix (RACI Matrix), accessed October 15, 2019, https://project-management.com/understanding-responsibility-assignment-matrix-raci-matrix/

28. Pew, K., Microsoft Excel – Excel from Beginner to Advanced, accessed on March 19, 2019, https://www.udemy.com/course/microsoft-excel-2013-from-beginner-to-advanced-and-beyond/

29. Alberto Rodrigues da Silva, "Rigorous Specification of Use Cases with the RSL Language", Proceedings of International Conference on Information Systems Development'2019, AIS, 2019.

30. Alberto Rodrigues da Silva, "Linguistic Patterns and Linguistic Styles for Requirements Specification (I): An Application Case with the Rigorous RSL/Business-Level Language", Proceedings of EuroPLOP'2017, ACM, 2017.

Appendix A – MyTGuide on PSL Excel Template v.2018

MyTGuide > Integraton :: Project Main Data

Project Identification

Project Acronym	Project Name	Project Progress	Version
MyTGuide	MyTGuide Platform Project	Plan	1.0

Types

Project Type	Nationality Type	Application Domain
System Development	National	Telecoms

Entities Involved

Type	Name	Sponsor	Project Manager
Customer	MyTGuide	DAP Director	DSI Deputy Director
Performing	FreeTime	CFO	João Legas

My Organization	Performing

Time	Planned	Actual	Variance (WorkDays)
Start	02/01/2018	02/01/2018	1
End	01/07/2018	16/07/2018	-11
Nº Days	**124.00**	**135.00**	**-11 Days**

Cost	Planned	Actual	Variance
Cost	300,000 €	200,000 €	-100,000 €
Income Tax	20%	20%	0
Price	360,000 €	136,800 €	-223,200 €
Profit	**60,000 €**	**-63,200 €**	**-123,200 €**

Executive Summary

Purpose: Why?	To launch and manage the development of the MyTGuide platform for the FreeTime company.
Purpose: What?	Proposition to the FreeTime company for the implementation of the new MyTGuidePartner platforr

Business Benefits

ID	Description	Logical Expresion	Value
BB_1	Invoice	>	200,000.00 €
BB_2	Overall Budget	<	300,000 €
BB_3	Budget Variance	<	6%

Success Criteria

ID	Description	Logical Expresion	Value
SC_1	Training sessions evaluation	>	3,5 (0 to 5)
SC_2	Number of non-conformities during ac	<	12%
SC_3	Time for non-conformities correction	<	48 Hours

Success Factors

SF_1	Project Manager should have enough competency to lead teams.
SF_2	Periodical reports to the Project Manager and Sponsor.
SF_3	Communication between all parties needs to be encouraged so that everyone can be informed.

MyTGuide > Integraton :: Project Charter

Project Identification			
Project Name	MyTGuide	Project Acronym	MyTGuide Platform Project
Project Sponsor	CFO	Project Manager	João Legas
Application Domain	Telecoms	Nationality Type	National

Planned Dates		Actual Dates	
Start	02/01/2018	Start	02/01/2018
End	01/07/2018	End	16/07/2018

Executive Summary	
Purpose: Why?	To launch and manage the development of the MyTGuide platform for the FreeTime company.
Purpose: What?	Proposition to the FreeTime company for the implementation of the new MyTGuidePartner platform.

Business Benefits

ID	Description	Logical Expressio	Value
BB_1	Invoice		
BB_2	Overall Budget		
BB_3	Budget Variance		

Success Criteria

ID	Description	Logical Expressio	Value
SC_1	Training sessions evaluation	>	3,5 (0 to 5)
SC_2	Number of non-conformities during acceptance tes	<	0.12
SC_3	Time for non-conformities correction	<	48 Hours

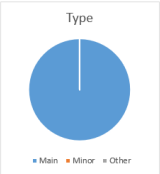
Success Factors	
SF_1	Project Manager should have enough competency to lead teams.
SF_2	Periodical reports to the Project Manager and Sponsor.
SF_3	Communication between all parties needs to be encouraged so that everyone can be informed.

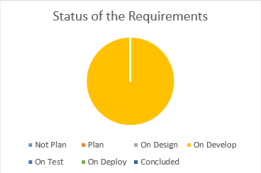
Project Sponsor	
	Signature:
	Name:
	Date:

MyTGuide > Integraton :: System Requirements

Generate IDs

ID	Name	Type	Status	Description
reqs_1	MyTGuide Partner App	Main	On Develop	System Requirement 1
reqs_2	MyTGuide Client App	Main	On Develop	System Requirement 2
reqs_3	MyTguide.com	Main	On Develop	System Requirement 3

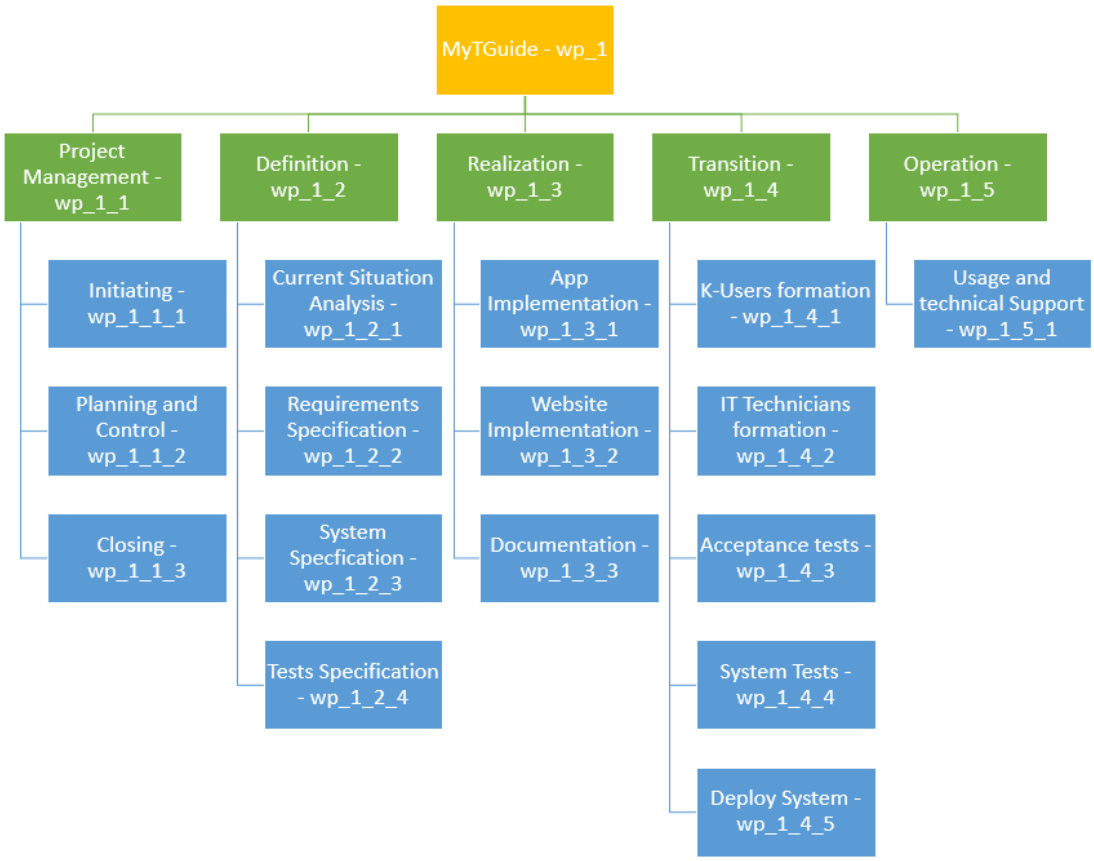




MyTGuide > Scope :: Work Breakdown Structure

Generate IDs | Update Chart

Level	WBS	ID	Name	Type	Description	Milestone	Milestone Name
1	1	wp_1	MyTGuide	Project			
2	1.1	wp_1_1	Project Management	Phase			
3	1.1.1	wp_1_1_1	Initiating	Phase			
3	1.1.2	wp_1_1_2	Planning and Control	Phase			
3	1.1.3	wp_1_1_3	Closing	Phase			
2	1.2	wp_1_2	Definition	Phase			
3	1.2.1	wp_1_2_1	Current Situation Analysis	Workpackage			
3	1.2.2	wp_1_2_2	Requirements Specification	Workpackage			
3	1.2.3	wp_1_2_3	System Specfication	Workpackage			
3	1.2.4	wp_1_2_4	Tests Specification	Workpackage			
2	1.3	wp_1_3	Realization	Phase			
3	1.3.1	wp_1_3_1	Client App Implementation	Phase		mi_1	MyTGuidePartner App
3	1.3.2	wp_1_3_2	Partner App Implementation	Phase		mi_2	MyTGuideClient App
3	1.3.3	wp_1_3_3	Website Implementation	Phase		mi_3	Website MyTGuide.com
3	1.3.4	wp_1_3_4	Documentation	Workpackage			
2	1.4	wp_1_4	Transition	Phase			
3	1.4.1	wp_1_4_1	K-Users formation	Workpackage			
3	1.4.2	wp_1_4_2	IT Technicians formation	Workpackage			
3	1.4.3	wp_1_4_3	Acceptance tests	Workpackage			
3	1.4.4	wp_1_4_4	System Tests	Workpackage			
3	1.4.5	wp_1_4_5	Deploy System	Workpackage			
2	1.5	wp_1_5	Operation	Phase			
3	1.5.1	wp_1_5_1	Usage and technical Support	Phase			



MyTGuide > Scope :: Milestones

Gene | Update Dates | Generate Positions

ID	Name	Type	Work Package	Planned	Actual	Status	Description	Position
mi_1	MyTGuidePartner App	Main	wp_1_3_1	20/04/2018	13/05/2018	Reached		10
mi_2	MyTGuideClient App	Main	wp_1_3_2	20/05/2018	20/05/2018	Reached		6
mi_3	Website MyTGuide.com	Main	wp_1_3_3	25/05/2018	26/05/2018	Reached		-10
						Not Reached		-6
						Not Reached		-2
						Not Reached		-8
						Not Reached		-4
						Not Reached		-10

MyTGuide > Scope :: Deliverables

Generate IDs | Generate Positions

ID	Deliverable	Type	Work Package	Assigned T	Planned Dates Submitted	Planned Dates Approved	Actual Dates Submitted	Actual Dates Approved	Status	Description
dble_1	MyTGuide Project Plan	Documentation	wp_1_1_2		05/04/2014		10/04/2018		Approved	
dble_2	Requirements Specification	Documentation	wp_1_2_2		24/04/2014					
dble_3	System Specification	Documentation	wp_1_2_3							
dble_4	MyTGuidePartner App	Software Application	wp_1_4_1							
dble_5	MyTGuideClient App	Software Application	wp_1_4_2							
dble_6	MyTGuide Website	Software Application	wp_1_4_4							

MyTGuide > Time :: Timetable

Update WBS and Milestones | Update Graph | Generate Task IDs

Project Start Date	02/01/2018
Project End Date	01/06/2018

Task ID	ID	Level	Task	Type	Quality Type	Start	End	Duration (d)	Type of Precendenc	Predecessors	Status	Critical Path	Late Start	Late Finish	Slack
1	wp_1	1	MyProject	Project		02/01/2018	Waiting	Waiting					Waiting	01/06/2018	Waiting
2	wp_1_1	2	Project Management	Phase		02/01/2018	01/06/2018	104				Critical Path	02/01/2018	01/06/2018	0
19	wp_1_1_1	3	Initiating	Phase		02/01/2018	02/01/2018	1					01/06/2018	01/06/2018	103
20	wp_1_1_2	3	Planning and Control	Phase		02/01/2018	01/06/2018	104				Critical Path	02/01/2018	01/06/2018	0
21	wp_1_1_3	3	Closing	Phase		02/01/2018	02/01/2018	1					01/06/2018	01/06/2018	103
30	wp_1_2	2	Definition	Phase		02/01/2018	Waiting	Waiting					Waiting	01/06/2018	Waiting
31	wp_1_2_1	3	Current Situation Analysis	Workpackage		02/01/2018	03/01/2018	2					30/05/2018	01/06/2018	102
32	wp_1_2_2	3	Requirements Specification	Workpackage		02/01/2018	Waiting	Insert					Waiting	01/06/2018	Waiting
33	wp_1_2_3	3	System Specfication	Workpackage		02/01/2018	Waiting	Insert					Waiting	01/06/2018	Waiting
34	wp_1_2_4	3	Tests Specification	Workpackage		02/01/2018	Waiting	Insert					Waiting	01/06/2018	Waiting
35	wp_1_3	2	Realization	Phase		02/01/2018	Waiting	Waiting					Waiting	01/06/2018	Waiting
36	wp_1_3_1	3	App Implementation	Phase		02/01/2018	Waiting	Insert					Waiting	01/06/2018	Waiting
	mi_1	3	MyTGuidePartner App	Milestone		02/01/2018	02/01/2018	0					01/06/2018	01/06/2018	103
37	wp_1_3_2	3	Website Implementation	Phase		02/01/2018	Waiting	Insert					Waiting	01/06/2018	Waiting
	mi_2	3	MyTGuideClient App	Milestone		02/01/2018	02/01/2018	0					01/06/2018	01/06/2018	103
38	wp_1_3_3	3	Documentation	Workpackage		02/01/2018	Waiting	Insert					Waiting	01/06/2018	Waiting
22	wp_1_4	2	Transition	Phase		02/01/2018	Waiting	Waiting					Waiting	01/06/2018	Waiting
23	wp_1_4_1	3	K-Users formation	Workpackage		02/01/2018	Waiting	Insert					Waiting	01/06/2018	Waiting
24	wp_1_4_2	3	IT Technicians formation	Workpackage		02/01/2018	Waiting	Insert					Waiting	01/06/2018	Waiting
25	wp_1_4_3	3	Acceptance tests	Workpackage		02/01/2018	Waiting	Insert					Waiting	01/06/2018	Waiting
26	wp_1_4_4	3	System Tests	Workpackage		02/01/2018	Waiting	Insert					Waiting	01/06/2018	Waiting
27	wp_1_4_5	3	Deploy System	Workpackage		02/01/2018	Waiting	Insert					Waiting	01/06/2018	Waiting
28	wp_1_5	2	Operation	Phase		02/01/2018	Waiting	Waiting					Waiting	01/06/2018	Waiting
29	wp_1_5_1	3	Usage and technical Support	Phase		02/01/2018	Waiting	Insert					Waiting	01/06/2018	Waiting

MyTGuide > Resources :: Organization Breakdown Structure

Generate IDs | Update Chart

ID	Name	Type	Role	Organization	PartOf	Report To	Description
org_1	FreeTime Board	Organization	Other	Other			
org_2	DAF	Business Unit	Other	Customer			
org_3	DMC	Business Unit	Other	Customer			
org_4	DAP	Business Unit	Other	Customer			
org_5	DSI	Business Unit	Other	Customer			
org_6	DSI Deputy Director	Person	Project Manager	Customer	org_5		
org_7	DAP Director	Person	Project Owner	Customer	org_4		
org_8	K-User	Person	Team Member	Performing	org_4	org_7	
org_9	K-User	Person	Team Member	Performing	org_2		
org_10	K-User	Person	Team Member	Performing	org_3		
org_11	Sys Admin	Person	Team Member	Performing	org_5	org_6	
org_12	Supplier Project Manager	Person	Project Manager	Performing		org_7	

Ensure a person reports to a someone in a line above him

MyTGuide > Resources :: Responsabilty Ass Import from WBS and OBS Matrix

Legend:

eXecutes the work	X
takes the **D**ecision solely or ultimately	D
takes the **d**ecision jointly or partly	d
controls **P**rogress	P
provides **T**uition on the job	T
must be **I**nformed	I
must be **C**onsulted	C
available to **A**dvise	A

Table Validation: Correct

	Customer		Performing
RAM	DSI Deputy Director (Project Manager) - *DSI*	DAP Director (Project Owner) - *DAP*	Supplier Project Manager (Project Manager)
wp_1 - MyTGuide			
wp_1_1 - Project Management			
wp_1_1_1 - Initiating	P	X	P
wp_1_1_2 - Planning and Control	P	P	X
wp_1_1_3 - Closing	P	X	P
wp_1_2 - Definition			
wp_1_2_1 - Current Situation Analysis	X	I	T
wp_1_2_2 - Requirements Specificatic	d	X	C
wp_1_2_3 - System Specfication	d	X	C
wp_1_2_4 - Tests Specification	I	I	X
wp_1_3 - Realization			
wp_1_3_1 - App Implementation	I		X
wp_1_3_2 - Website Implementation	I		X
wp_1_3_3 - Documentation	I		X
wp_1_4 - Transition			
wp_1_4_1 - K-Users formation	I		X
wp_1_4_2 - IT Technicians formation	I		X
wp_1_4_3 - Acceptance tests	I		X
wp_1_4_4 - System Tests	I		X
wp_1_4_5 - Deploy System	I		X
wp_1_5 - Operation			
wp_1_5_1 - Usage and technical Support			

MyTGuide > Agile :: Team Description

Import from OBS

ID	Name	Type	Role	Organization	Part of	ReportTo	Description
org_6	DSI Deputy Director	Person	Project Manager	Customer	org_5	-	-
org_1	FreeTime Board	Organization	Other	Other	-	-	-
org_2	DAF	Business Unit	Other	Customer	-	-	-
org_5	DSI	Business Unit	Other	Customer	-	-	-
org_8	K-User	Person	Team Member	Performing	org_4	org_7	-
org_9	K-User	Person	Team Member	Performing	org_2	-	-
org_10	K-User	Person	Team Member	Performing	org_3	-	-
org_11	Sys Admin	Person	Team Member	Performing	org_5	org_6	-
org_12	Supplier Project Manager	Person	Project Manager	Performing	-	org_7	-

MyTGuide > Agile :: Product Backlog

Generate IDs

Current Sprint 6

Agile.SprintBacklog's Button "Send to History" fills in these last two columns

ID	Story / Feature	Effort	Sprint	Priorit	Dates: Created	Dates: Last Updated	Status	Actual	Final Sprint
us_1	Requirements specification gathered	6	1	LO			Not Completed	>341	
us_2	Mobile App implementation	60	2 to 4	HI			Not Completed	>25	
us_3	Website Implementation	45	2 to 4	HI			Not Completed		
us_4	Documentation developed	10	1	LO			Not Completed		
us_5	K-Users and IT technicians Formation	12	4	LO			Not Completed		
us_6	Tests ran and approved	15	4	MED			Not Completed		
							Not Completed		

Sprint # 1

Sprint Started on 31/01/2018

Sprint Number	1
Start date	31/01/2018
Duration (d)	20
End Date	01/03/2018
Number of Developers	3
Dev Utilization	100%
Daily Work hours	4
Dev total hours	300
Dev Daily hours	30
Today's Date	24/10/2019

ID	Task	User Story	Expected Concluded Day	Status	Assigned to	Planned Effort
ta_1	Requirements specification building	us_1	8	Completed		45
ta_2	Client App Implementation	us_2		Not Completed		35
ta_3	Partner App Implementation	us_2		Not Completed		35
ta_4	Website Implementation	us_3		Not Completed		35
Total						**150**

Sprint # 2

Sprint Started on 02/03/2018

Sprint Number	2
Start date	02/03/2018
Duration (d)	20
End Date	02/04/2018
Number of Developers	3
Dev Utilization	100%
Daily Work hours	4
Dev total hours	300
Dev Daily hours	30
Today's Date	24/10/2019

ID	Task	User Story	Expected Concluded Day	Status	Assigned to	Planned Effort
ta_1	Website Implementation	us_3		Not Completed		50
ta_2	Client App Implementation	us_2		Not Completed		50
ta_3	Partner App Implementation	us_2		Not Completed		50
Total						**150**

Sprint # 3

Sprint Started on 03/04/2018

Sprint Number	3
Start date	03/04/2018
Duration (d)	20
End Date	03/05/2018
Number of Developers	3
Dev Utilization	100%
Daily Work hours	4
Dev total hours	300
Dev Daily hours	30
Today's Date	24/10/2019

ID	Task	User Story	Expected Concluded Day	Status	Assigned to	Planned Effort
ta_1	Website Implementation	us_3	17	Completed		40
ta_2	Client App Implementation	us_2	18	Completed		40
ta_3	Partner App Implementation	us_2	19	Completed		40
ta_4	Documentation Building	us_4	20	Completed		20
Total						**140**

MyTGuide > Agile :: Sprint History

Sprint # 4

Sprint Started on 04/05/2018

Sprint Number	4
Start date	04/05/2018
Duration (d)	20
End Date	04/06/2018
Number of Developers	3
Dev Utilization	100%
Daily Work hours	4
Dev total hours	300
Dev Daily hours	30
Today's Date	24/10/2019

ID	Task	User Story	Expected Concluded Day	Status	Assigned to	Planned Effort
ta_1	K-user Formation	us_5	7	Completed		40
ta_2	IT Technicians Training	us_5	7	Completed		40
ta_3	Acceptance Tests	us_6	18	Completed		20
ta_4	System Tests	us_6	18	Completed		20
ta_5	Deploy System	us_6	20	Completed		30
Total						**150**

Appendix B – MyTGuide on PSL Excel Template v.2019

your logo here

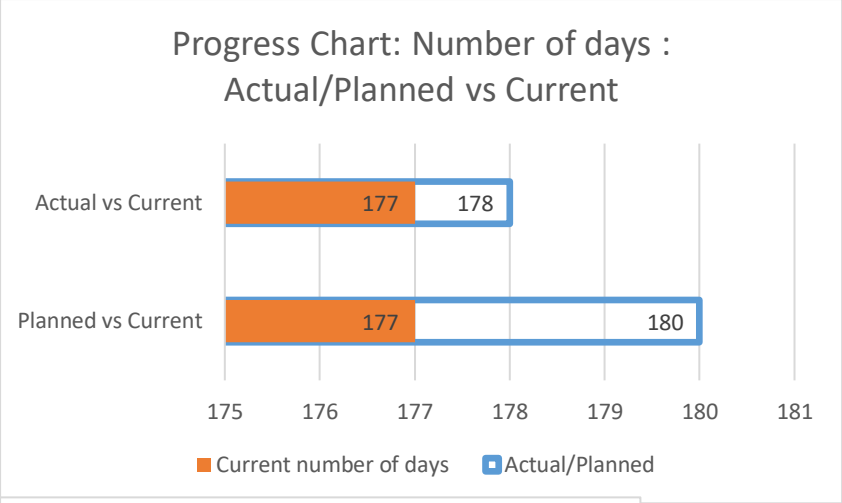
MyTGuide > Dashboard

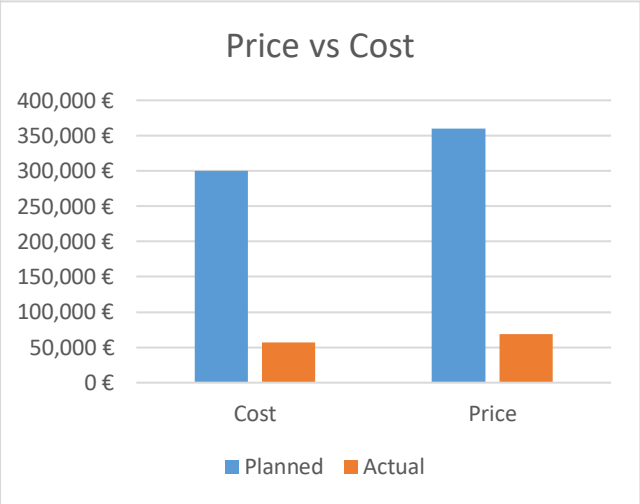
General Information

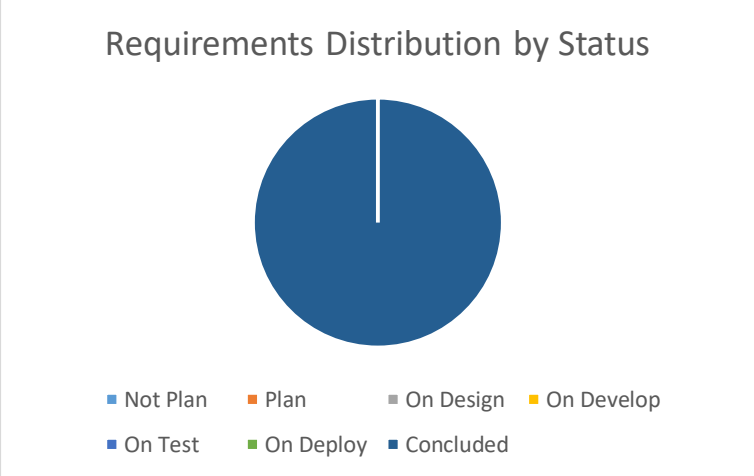
Start Date	02/01/2018
End Date	29/06/2018

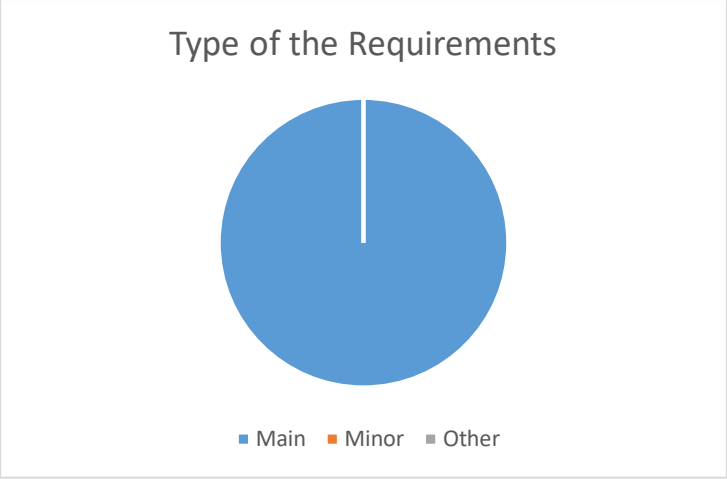
Planned Cost	300,000 €
Current Expenses	57,000 €

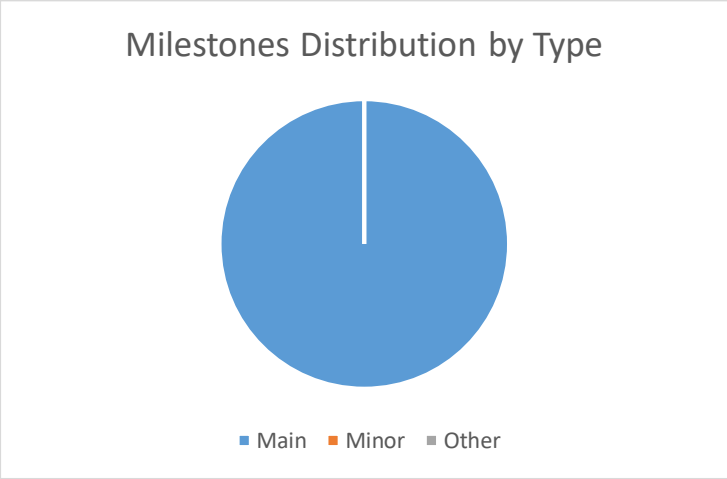
Project Status	Concluded

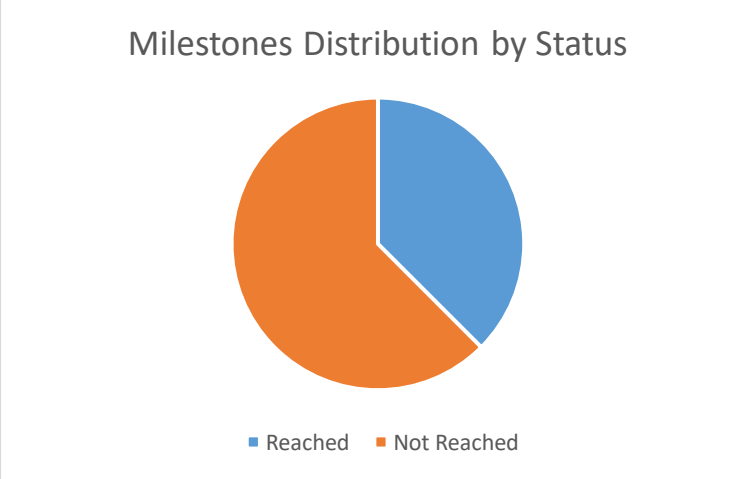

Progress Chart: Number of days : Actual/Planned vs Current
Actual vs Current
177
178
Planned vs Current
177
180
175
176
177
178
179
180
181
Current number of days
Actual/Planned

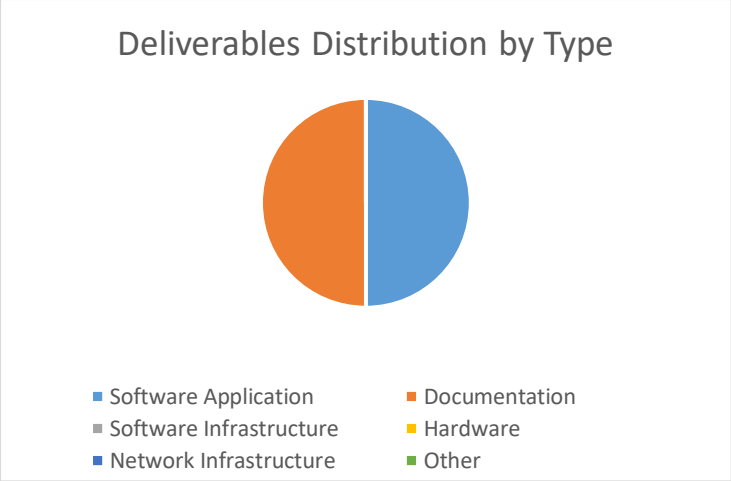

Price vs Cost
400,000 €
350,000 €
300,000 €
250,000 €
200,000 €
150,000 €
100,000 €
50,000 €
0 €
Cost
Price
Planned
Actual

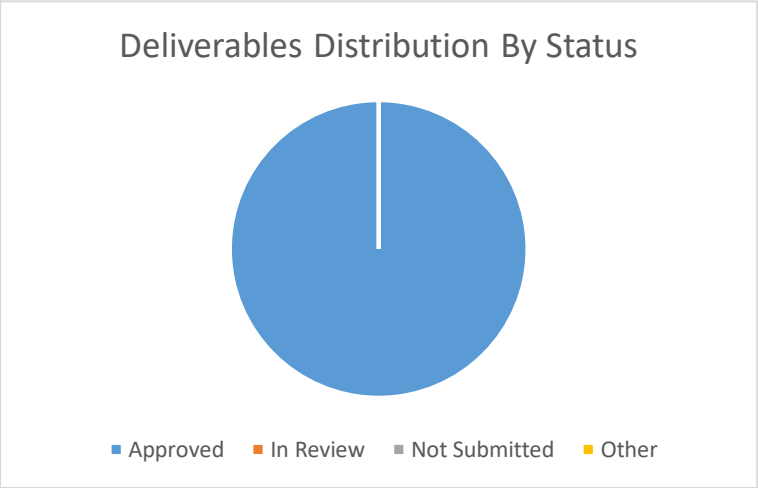

Requirements Distribution by Status
Not Plan
Plan
On Design
On Develop
On Test
On Deploy
Concluded

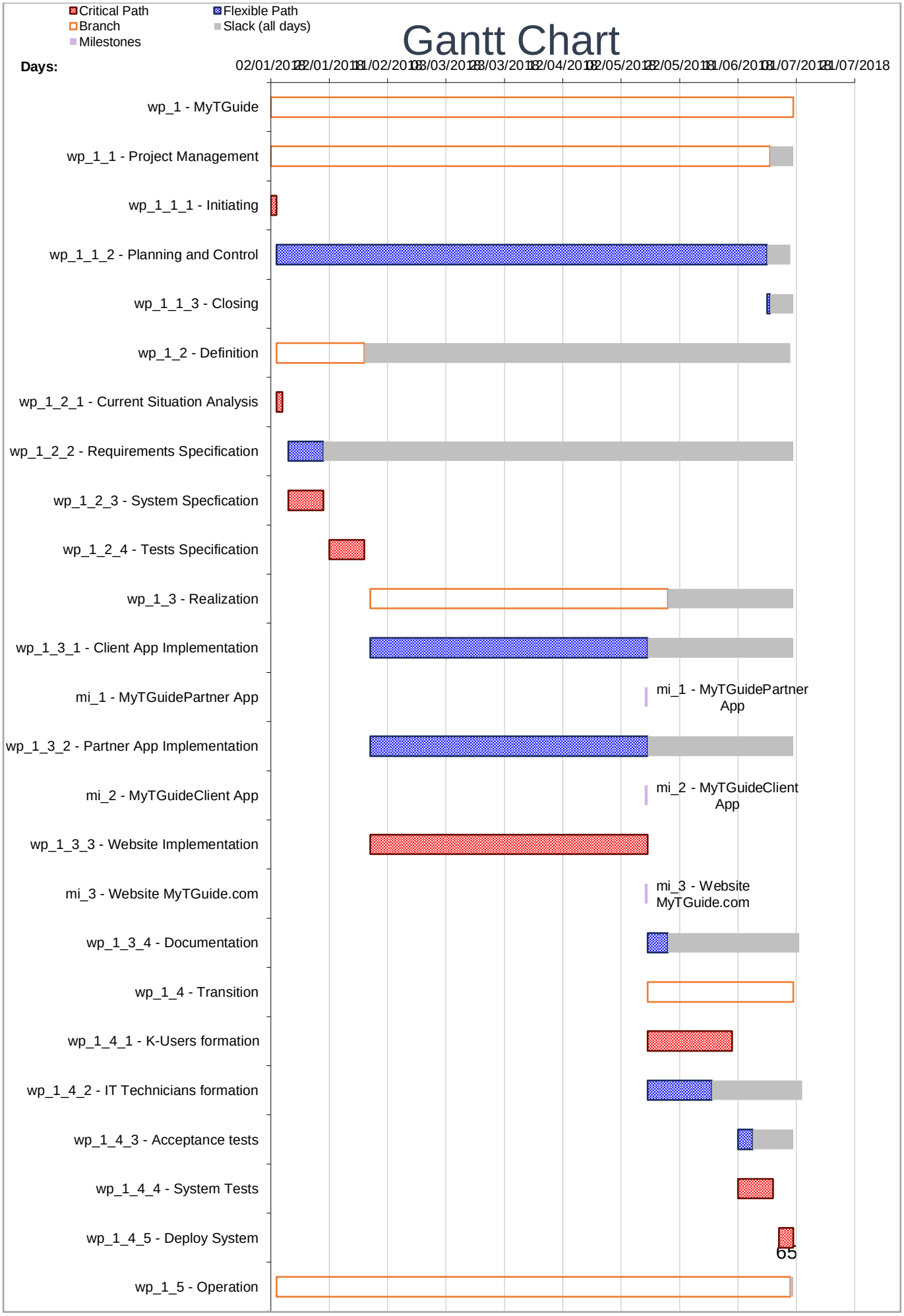

Type of the Requirements
Main
Minor
Other


Milestones Distribution by Type
Main
Minor
Other


Milestones Distribution by Status
Reached
Not Reached


Deliverables Distribution by Type
Software Application
Documentation
Software Infrastructure
Hardware
Network Infrastructure
Other


Deliverables Distribution By Status
Approved
In Review
Not Submitted
Other


Critical Path
Flexible Path
Branch
Slack (all days)
Milestones
Gantt Chart
Days:
02/01/2018
22/01/2018
11/02/2018
03/03/2018
23/03/2018
12/04/2018
02/05/2018
22/05/2018
11/06/2018
01/07/2018
21/07/2018
wp_1 - MyTGuide
wp_1_1 - Project Management
wp_1_1_1 - Initiating
wp_1_1_2 - Planning and Control
wp_1_1_3 - Closing
wp_1_2 - Definition
wp_1_2_1 - Current Situation Analysis
wp_1_2_2 - Requirements Specification
wp_1_2_3 - System Specfication
wp_1_2_4 - Tests Specification
wp_1_3 - Realization
wp_1_3_1 - Client App Implementation
mi_1 - MyTGuidePartner App
wp_1_3_2 - Partner App Implementation
mi_2 - MyTGuideClient App
wp_1_3_3 - Website Implementation
mi_3 - Website MyTGuide.com
wp_1_3_4 - Documentation
wp_1_4 - Transition
wp_1_4_1 - K-Users formation
wp_1_4_2 - IT Technicians formation
wp_1_4_3 - Acceptance tests
wp_1_4_4 - System Tests
wp_1_4_5 - Deploy System
wp_1_5 - Operation
mi_1 - MyTGuidePartner App
mi_2 - MyTGuideClient App
mi_3 - Website MyTGuide.com

MyTGuide > Weekly Milestones

ID	Name	Type	Work Package	Planned	Actual	Status	Description	Position
mi_1	Milestone 1	Main	wp_1_1	07/09/2019	13/05/2018	Reached		10
mi_2	Milestone 2	Main	wp_1_2_1	08/09/2019	25/01/2018	Reached		-10

MyTGuide > Weekly Meeting

ID	Name	Type	Medium	Frequency	Assigned To	Audience	Deliverable(s)	Start Date	Frequency (d)	Next Meeting	Position
Today	Today				-	-		-	Today	06/09/2019	20

MyTGuide > Weekly Deliverables

ID	Deliverable	Type	Work Package	Assigned To	Submitted	Approved	Actual Submission	Actual Approval	Status	Description	Position

MyTGuide > Integration :: Project Main Data

Project Identification			
Project Acronym	Project Name	Project Progress	Version
MyTGuide	MyTGuide Platform Project	Concluded	1.0

Types		
Project Type	Nationality Type	Application Domain
System Development	National	Telecoms

Entities Involved			
Type	Name	Sponsor	Project Manager
Customer	FreeTime	DAP Director	DSI Deputy Director
Performing	IST Development Team	IST	João Legas

My Organization	Performing

Time	Planned	Actual	Variance (WorkDays)
Start	02/01/2018	02/01/2018	1
End	01/07/2018	29/06/2018	1
Nº Days	**124.00**	**124.00**	**0 Days**

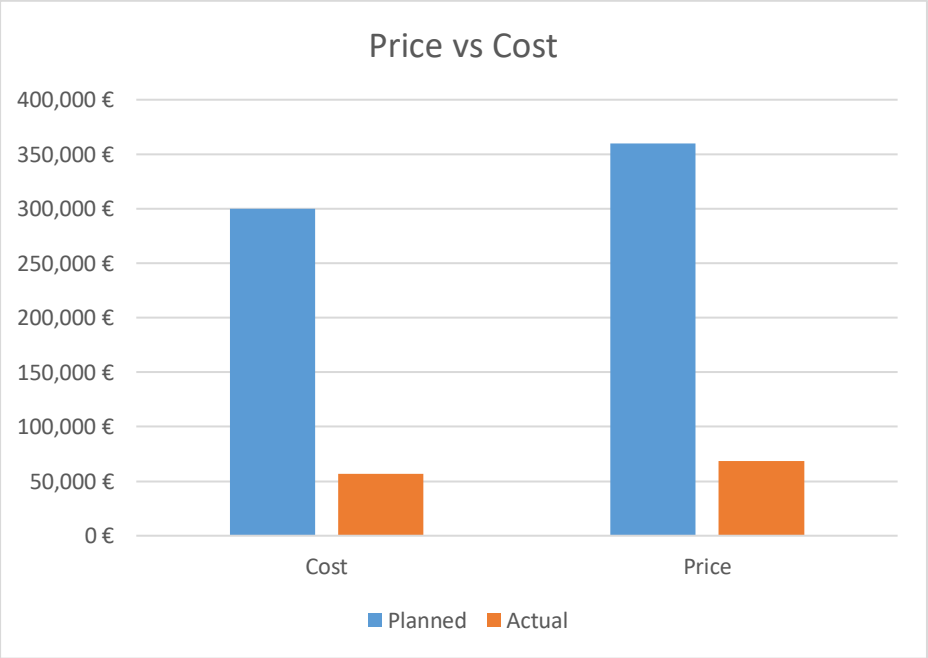
Cost	Planned	Actual	Variance
Cost	300,000 €	57,000 €	-243,000 €
Income Tax	20%	20%	0
Price	360,000 €	68,400 €	-291,600 €
Profit	**60,000 €**	**11,400 €**	**-48,600 €**

Executive Summary	
Purpose: Why?	To launch and manage the development of the MyTGuide platform for the FreeTime company.
Purpose: What?	Proposition to the FreeTime company for the implementation of the new MyTGuidePartner platform.

Business Benefits			
ID	Description	Logical Expresion	Value
BB_1	Invoice	>	200,000.00 €
BB_2	Overall Budget	<	300,000 €
BB_3	Budget Variance	<	6%

Success Criteria			
ID	Description	Logical Expresion	Value
SC_1	Training sessions evaluation	>	3,5 (0 to 5)
SC_2	Number of non-conformities during acceptance tests	<	12%
SC_3	Time for non-conformities correction	<	48 Hours

Success Factors	
SF_1	Project Manager should have enough competency to lead teams.
SF_2	Periodical reports to the Project Manager and Sponsor.
SF_3	Communication between all parties needs to be encouraged so that everyone can be informed.



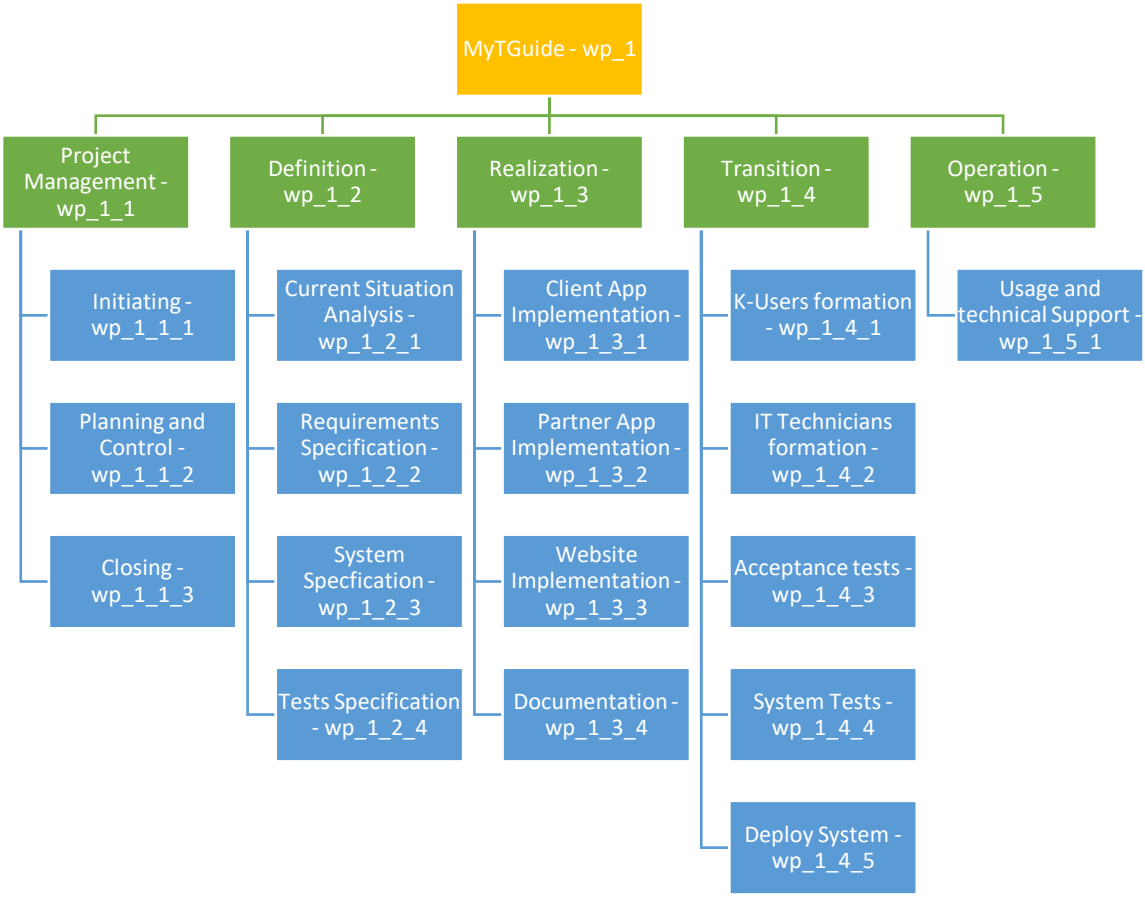
MyTGuide > Integration :: System Requirements

ID	Name	Type	Status	Description
reqs_1	MyTGuide Partner App	Main	Concluded	System Requirement 1
reqs_2	MyTGuide Client App	Main	Concluded	System Requirement 1
reqs_3	MyTguide.com	Main	Concluded	System Requirement 1

MyTGuide > Scope :: Work Breakdown Structure

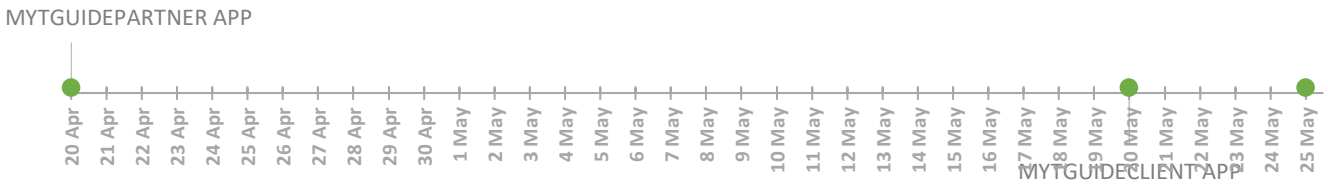
Level	WBS	ID	Name	Type	Description	Milestone ID	Milestone Name
1	1	wp_1	MyTGuide	Project			
2	1.1	wp_1_1	Project Management	Phase			
3	1.1.1	wp_1_1_1	Initiating	Phase			
3	1.1.2	wp_1_1_2	Planning and Control	Phase			
3	1.1.3	wp_1_1_3	Closing	Phase			
2	1.2	wp_1_2	Definition	Phase			
3	1.2.1	wp_1_2_1	Current Situation Analysis	Workpackage			
3	1.2.2	wp_1_2_2	Requirements Specification	Workpackage			
3	1.2.3	wp_1_2_3	System Specfication	Workpackage			
3	1.2.4	wp_1_2_4	Tests Specification	Workpackage			
2	1.3	wp_1_3	Realization	Phase			
3	1.3.1	wp_1_3_1	Client App Implementation	Phase		mi_1	MyTGuide Partner App
3	1.3.2	wp_1_3_2	Partner App Implementation	Phase		mi_2	MyTGuide Client App
3	1.3.3	wp_1_3_3	Website Implementation	Phase		mi_3	Website MyTGuide.com
3	1.3.4	wp_1_3_4	Documentation	Phase			
2	1.4	wp_1_4	Transition	Phase			

3	1.4.1	wp_1_4_1	K-Users formation	Workpackage			
3	1.4.2	wp_1_4_2	IT Technicians formation	Workpackage			
3	1.4.3	wp_1_4_3	Acceptance tests	Workpackage			
3	1.4.4	wp_1_4_4	System Tests	Workpackage			
3	1.4.5	wp_1_4_5	Deploy System	Workpackage			
2	1.5	wp_1_5	Operation	Phase			
3	1.5.1	wp_1_5_1	Usage and technical Support	Phase			
Insert	Waiting						
Insert	Waiting						
Insert	Waiting						
Insert	Waiting						



MyTGuide > Scope :: Milestones

ID	Name	Type	Work Package	Planned	Actual	Status	Description	Position
mi_1	MyTGuidePartner App	Main	wp_1_3_1	20/04/2018	13/05/2018	Reached		10
mi_2	MyTGuideClient App	Main	wp_1_3_2	20/05/2018	20/05/2018	Reached		-10
mi_3	Website MyTGuide.com	Main	wp_1_3_3	25/05/2018	26/05/2018	Reached		
						Not Reached		
						Not Reached		
						Not Reached		
						Not Reached		
						Not Reached		-6



MyTGuide > Scope :: Deliverables

					Planned Dates		Actual Dates		
ID	Deliverable	Type	Work Package	Assigned To	Submitted	Approved	Submitted3	Approved3	Status
dble_1	MyTGuide Project Plan	Documentation	wp_1_1_1						Approved
dble_2	Requirements Specification	Documentation	wp_1_2_2						Approved
dble_3	System Specification	Documentation	wp_1_2_3						Approved
dble_4	MyTGuidePartner App	Software Application	wp_1_3_1						Approved
dble_5	MyTGuideClient App	Software Application	wp_1_3_2						Approved
dble_6	MyTGuide Website	Software Application	wp_1_3_3						Approved

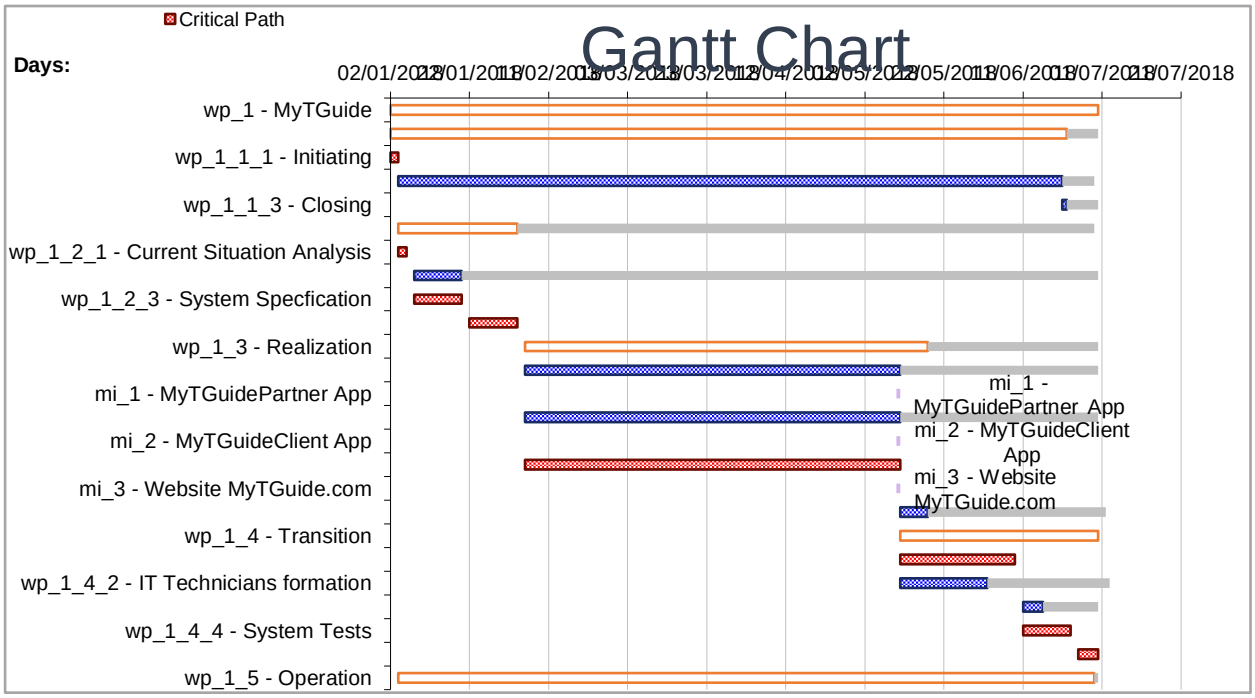
MyTGuide > Time :: Timetable

Project Start Date	02/01/2018
Project End Date	29/06/2018

Task ID	ID	Level	Task	Type	Quality Type	Start	End	Duration (d)	Type of Precendency	Predecessors	Status	Critical Path	Late Start	Late Finish	Slack
1	wp_1	1	MyTGuide	Project		02/01/2018	29/06/2018	124				Critical Path	02/01/2018	29/06/2018	0
2	wp_1_1	2	Project Management	Phase		02/01/2018	21/06/2018	118					10/01/2018	29/06/2018	6
3	wp_1_1_1	3	Initiating	Phase		02/01/2018	03/01/2018	2				Critical Path	02/01/2018	03/01/2018	0
4	wp_1_1_2	3	Planning and Control	Phase		04/01/2018	20/06/2018	115	Finish-To-Start	3			12/01/2018	28/06/2018	6
5	wp_1_1_3	3	Closing	Phase		21/06/2018	21/06/2018	1	Finish-To-Start	4			29/06/2018	29/06/2018	6
6	wp_1_2	2	Definition	Phase		04/01/2018	02/02/2018	22					30/05/2018	29/06/2018	100
7	wp_1_2_1	3	Current Situation Analysis	Work package		04/01/2018	05/01/2018	2	Finish-To-Start	3		Critical Path	04/01/2018	05/01/2018	0
8	wp_1_2_2	3	Requirements Specification	Work package		08/01/2018	19/01/2018	10	Finish-To-Start	7			18/06/2018	29/06/2018	110

9	wp_1_2_3	3	System Specfication	Work package		08/01/2018	19/01/2018	10	Finish-To-Start	7		Critical Path	08/01/2018	19/01/2018	0
10	wp_1_2_4	3	Tests Specification	Work package		22/01/2018	02/02/2018	10	Finish-To-Start	9		Critical Path	22/01/2018	02/02/2018	0
11	wp_1_3	2	Realization	Phase		05/02/2018	17/05/2018	70					20/03/2018	29/06/2018	30
12	wp_1_3_1	3	Client App Implementation	Phase		05/02/2018	10/05/2018	65	Finish-To-Start	10			27/03/2018	29/06/2018	35
	mi_1	3	MyTGuidePartner App	Milestone		10/05/2018	10/05/2018	0	Finish-To-Start	12			29/06/2018	29/06/2018	35
13	wp_1_3_2	3	Partner App Implementation	Phase		05/02/2018	10/05/2018	65	Finish-To-Start	10			27/03/2018	29/06/2018	35
	mi_2	3	MyTGuideClient App	Milestone		10/05/2018	10/05/2018	0	Finish-To-Start	13			29/06/2018	29/06/2018	35
14	wp_1_3_3	3	Website Implementation	Phase		05/02/2018	10/05/2018	65	Finish-To-Start	10		Critical Path	05/02/2018	10/05/2018	0
	mi_3	3	Website MyTGuide.com	Milestone		10/05/2018	10/05/2018	0	Finish-To-Start	14			29/06/2018	29/06/2018	35
15	wp_1_3_4	3	Documentation	Phase		11/05/2018	17/05/2018	5	Finish-To-Start	14			25/06/2018	29/06/2018	30
16	wp_1_4	2	Transition	Phase		11/05/2018	29/06/2018	35				Critical Path	11/05/2018	29/06/2018	0
17	wp_1_4_1	3	K-Users formation	Work package		11/05/2018	08/06/2018	20	Finish-To-Start	14		Critical Path	11/05/2018	08/06/2018	0
18	wp_1_4_2	3	IT Technicians formation	Work package		11/05/2018	01/06/2018	15	Finish-To-Start	14			11/06/2018	29/06/2018	20
19	wp_1_4_3	3	Acceptance tests	Work package		11/06/2018	15/06/2018	5	Finish-To-Start	17			25/06/2018	29/06/2018	10

20	wp_1_4_4	3	System Tests	Work package		11/06/2018	22/06/2018	10	Finish-To-Start	17		Critical Path	11/06/2018	22/06/2018	0
21	wp_1_4_5	3	Deploy System	Work package		25/06/2018	29/06/2018	5	Finish-To-Start	20		Critical Path	25/06/2018	29/06/2018	0
22	wp_1_5	2	Operation	Phase		04/01/2018	28/06/2018	121					05/01/2018	29/06/2018	1
23	wp_1_5_1	3	Usage and technical Support	Phase		04/01/2018	28/06/2018	121	Finish-To-Start	3			05/01/2018	29/06/2018	1



MyTGuide > Resources :: Organization Breakdown Structure

ID	Name	Type	Role	Organization	PartOf	Report To	Description
org_1	FreeTime Board	Organization	Other	Other			
org_2	DAF	Business Unit	Other	Customer			
org_3	DMC	Business Unit	Other	Customer			
org_4	DAP	Business Unit	Other	Customer			
org_5	DSI	Business Unit	Other	Customer			
org_6	DSI Deputy Director	Person	Project Manager	Customer	org_5		
org_7	DAP Director	Person	Project Owner	Customer	org_4		
org_8	K-User	Person	Team Member	Performing	org_4	org_7	
org_9	K-User	Person	Team Member	Performing	org_2		
org_10	K-User	Person	Team Member	Performing	org_3	org_6	
org_11	Sys Admin	Person	Team Member	Performing	org_5	org_7	
org_12	João Legas	Person	Project Manager	Performing		org_7	

MyTGuide > Resources :: Responsibility Assignment Matrix

Table Validation:	Correct

	Customer		Performing
RAM	DSI Deputy Director (Project Manager) - *DSI*	DAP Director (Project Owner) - *DAP*	João Legas (Project Manager)
wp_1 - MyTGuide (Project)			
wp_1_1 - Project Management (Phase)			
wp_1_1_1 - Initiating (Phase)	P	X	P
wp_1_1_2 - Planning and Control (Phase)	P	P	X
wp_1_1_3 - Closing (Phase)	P	X	P
wp_1_2 - Definition (Phase)			
wp_1_2_1 - Current Situation Analysis (Workpackage)	X	I	T
wp_1_2_2 - Requirements Specification (Workpackage)	d	X	C
wp_1_2_3 - System Specfication (Workpackage)	d	X	C

wp_1_2_4 - Tests Specification (Workpackage)	I	I	X
wp_1_3 - Realization (Phase)			
wp_1_3_1 - Client App Implementation (Phase)	I		X
wp_1_3_2 - Partner App Implementation (Phase)	I		X
wp_1_3_3 - Website Implementation (Phase)	I		X
wp_1_3_4 - Documentation (Phase)	I		X
wp_1_4 - Transition (Phase)			
wp_1_4_1 - K-Users formation (Workpackage)	I		X
wp_1_4_2 - IT Technicians formation (Workpackage)	I		X
wp_1_4_3 - Acceptance tests (Workpackage)	I		X
wp_1_4_4 - System Tests (Workpackage)	I		X
wp_1_4_5 - Deploy System (Workpackage)	I		X
wp_1_5 - Operation (Phase)			
wp_1_5_1 - Usage and technical Support (Phase)			

MyTGuide > Agile :: Team Description

ID	Name	Type	Role	Organization	Part of	ReportTo	Description
org_6	DSI Deputy Director	Person	Project Manager	Customer	org_5	-	-
org_1	FreeTime Board	Organization	Other	Other	-	-	-
org_7	DAP Director	Person	Project Owner	Customer	org_4	-	-
org_8	K-User	Person	Team Member	Performing	org_4	org_7	-
org_9	K-User	Person	Team Member	Performing	org_2	-	-
org_10	K-User	Person	Team Member	Performing	org_3	org_6	-
org_11	Sys Admin	Person	Team Member	Performing	org_5	org_7	-
org_12	João Legas	Person	Project Manager	Performing	-	org_7	-

your logo here

MyTGuide > Agile :: Product Backlog

Current Sprint	6

					Dates				
ID	Story / Feature	Effort	Sprint	Priority	Created	Last Updated	Status	Actual Effort	Final Sprint
us_1	Requirements specification gathered	6	1	MED			Completed		
us_2	Mobile App implementation	60	2 to 4	HI			Completed		
us_3	Website implementation	45	2 to 4	HI			Completed		
us_4	Documentation developed	10	1	LO			Completed		
us_5	K-Users and IT technicians Formation	12	4	MED			Completed		
us_6	Tests ran and approved	15	4	HI			Completed		
							Not Completed		
							Not Completed		

your logo here

MyTGuide > Agile :: Sprint History

Sprint # 4	
Sprint Started on 04/05/2018	
Sprint Number	4
Start date	04/052018
Duration (d)	20
End Date	04/06/2018
Number of Developers	5
Dev Utilization	100%
Daily Work hours	4
Dev total hours	400
Dev Daily hours	20
Today's Date	31/10/2019

ID	Task	User Story	Expected Concluded Day	Status	Assigned to	Planned Effort
ta_1	K-user Formation	us_5	7	Completed		40
ta_2	IT Technicians Training	us_5	7	Completed		40
ta_3	Acceptance Tests	us_6	18	Completed		20
ta_4	System Tests	us_6	18	Completed		20
ta_5	Deploy System	us_6	20	Completed		30
Total						150

Sprint # 3	
Sprint Started on 03/04/2019	
Sprint Number	3
Start date	03/04/2018
Duration (d)	20
End Date	03/05/2018
Number of Developers	3
Dev Utilization	100%
Daily Work hours	4
Dev total hours	240
Dev Daily hours	12
Today's Date	31/10/2019

ID	Task	User Story	Expected Concluded Day	Status	Assigned to	Planned Effort
ta_1	Website Implementation	us_3	17	Completed		40
ta_2	Client App Implementation	us_2	18	Completed		40
ta_3	Partner App Implementation	us_2	19	Completed		40
ta_4	Documentation Building	us_4	20	Completed		20
Total						140

Sprint # 2	
Sprint Started on 02/03/2018	
Sprint Number	2
Start date	02/03/2018
Duration (d)	20
End Date	02/04/2018
Number of Developers	3
Dev Utilization	100%
Daily Work hours	4
Dev total hours	240
Dev Daily hours	12
Today's Date	31/10/2019

ID	Task	User Story	Expected Concluded Day	Status	Assigned to	Planned Effort
ta_1	Website Implementation	us_3		Not Completed		50
ta_2	Client App Implementation	us_2		Not Completed		50
ta_3	Partner App Implementation	us_2		Not Completed		50
Total						150

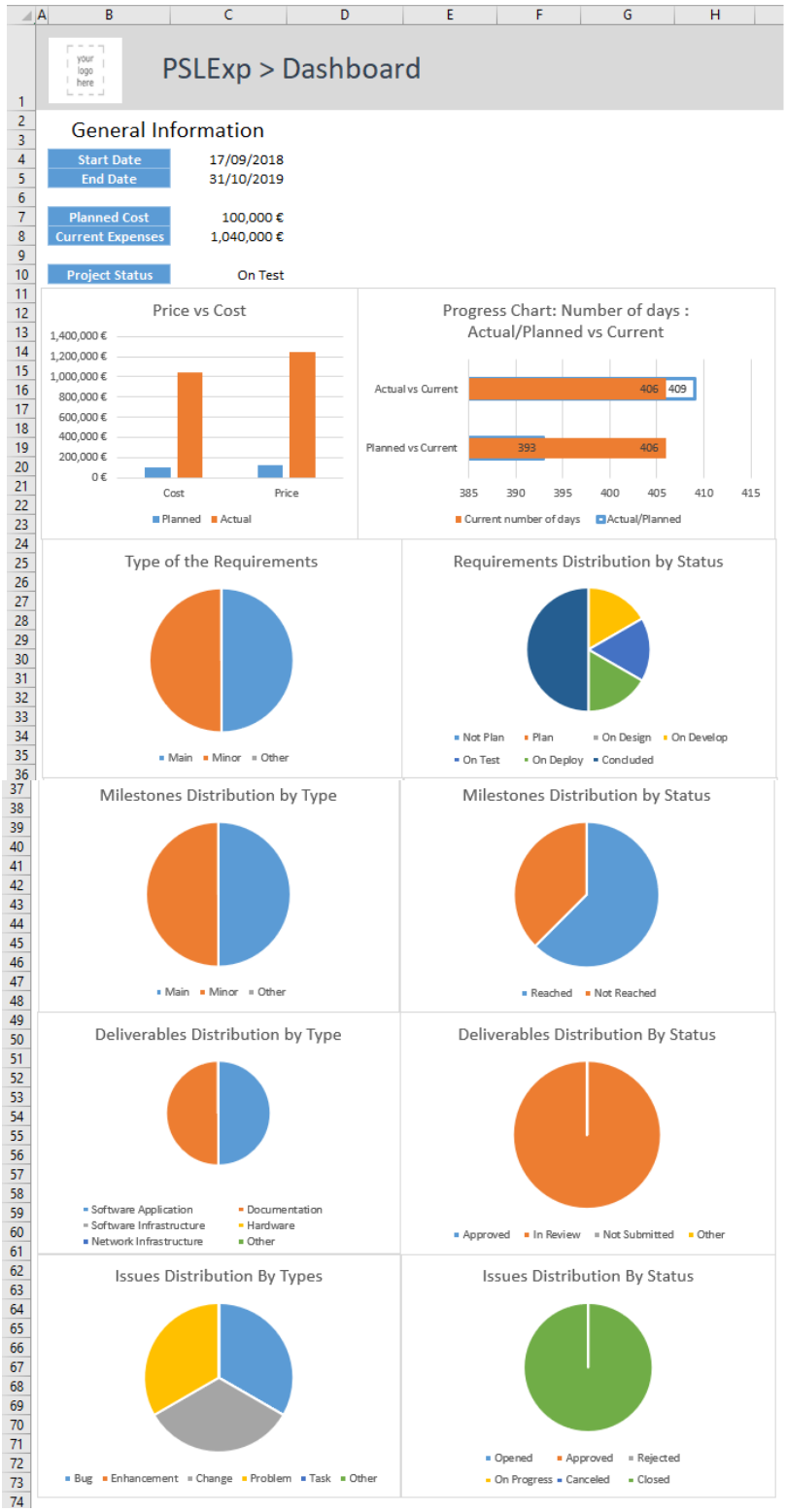
Sprint # 1

Sprint Started on 31/01/2018

Sprint Number	1
Start date	31/01/2018
Duration (d)	20
End Date	01/03/2018
Number of Developers	3
Dev Utilization	100%
Daily Work hours	4
Dev total hours	240
Dev Daily hours	12
Today's Date	31/10/2019

ID	Task	User Story	Expected Concluded Day	Status	Assigned to	Planned Effort
ta_1	Requirements specification building	us_1	8	Completed		45
ta_2	Client App Implementation	us_2		Not Completed		35
ta_3	Partner App Implementation	us_2		Not Completed		35
ta_4	Website Implementation	us_3		Not Completed		35
Total						150

Appendix C – MSc Thesis Project on PSL Excel Template v.2019



PSLExp > Integration :: Project Main Data

Project Identification			
Project Acronym	Project Name	Project Progress	Version
PSLExp	PSL Exploration	On Test	1.0

Types		
Project Type	Nationality Type	Application Domain
Research	National	Education

Entities Involved			
Type	Name	Sponsor	Project Manager
Customer	INESC-ID	Prof. Alberto Silva	Prof. Alberto Silva
Performing	IST	Mr. João Legas	Mr. João Legas

My Organization	Performing

Time	Planned	Actual	Variance (WorkDays)
Start	17/09/2018	17/09/2018	1
End	15/10/2019	31/10/2019	-13
Nº Days	**271.00**	**283.00**	**-12 Days**

Cost	Planned	Actual	Variance
Cost	100,000 €	1,040,000 €	940,000 €
Income Tax	20%	20%	0
Price	120,000 €	1,248,000 €	1,128,000 €
Profit	**20,000 €**	**208,000 €**	**188,000 €**

Executive Summary	
Purpose: Why?	Understand and develop PSLs capabilites, focusing on improving the user interface.
Purpose: What?	PSL is a Project Management tool to specify a project plan specification.

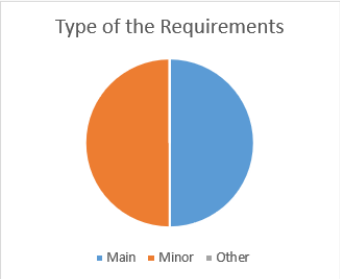
Business Benefits			
ID	Description	Logical Expresion	Value
BB_1	TBD_BB_1		
BB_2	TBD_BB_2		
BB_3	TBD_BB_3		

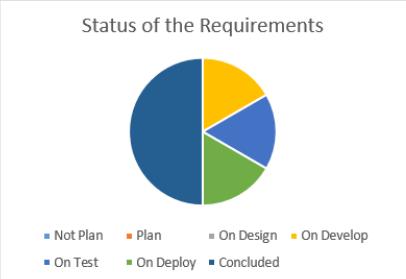
Success Criteria			
ID	Description	Logical Expresion	Value
SC_1	TBD_SC_1		
SC_2	TBD_SC_2		
SC_3	TBD_SC_3		

Success Factors	
SF_1	TBD_SF_1
SF_2	TBD_SF_2
SF_3	TBD_SF_3

PSLExp > Integration :: System Requirements

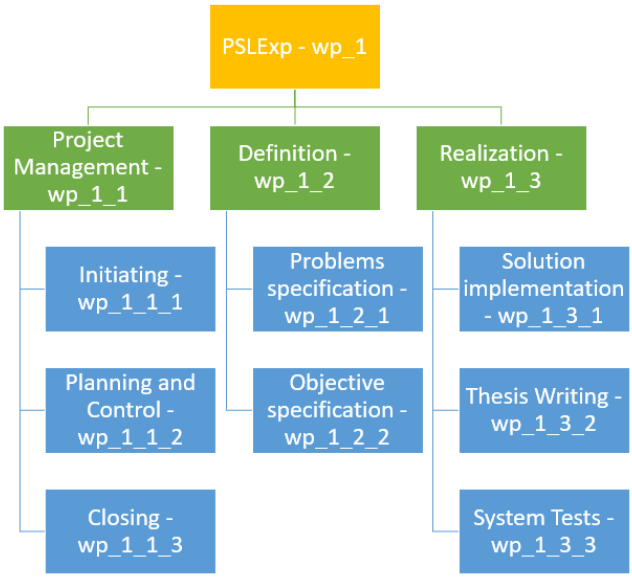
ID	Name	Type	Status	Description
reqs_1	Adapt PSL language to be used during Proje	Minor	On Develop	System Requirement 1
reqs_2	Make changes to allow for better printing/e	Main	Concluded	System Requirement 1
reqs_3	Macro to generate a report in word	Main	Concluded	System Requirement 1
reqs_4	Custom Ribbon	Main	Concluded	System Requirement 1
reqs_5	Trial version Definition	Minor	On Deploy	System Requirement 1
reqs_6	Licensing options exploration	Minor	On Test	System Requirement 1





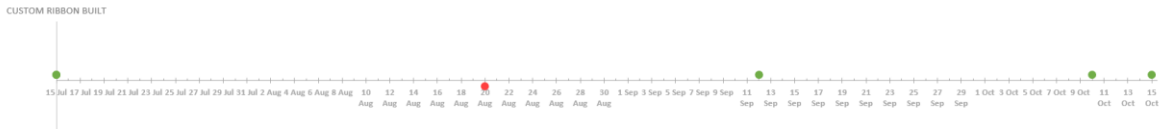
PSLExp > Scope :: Work Breakdown Structure

Level	WBS	ID	Name	Type	Description	Milestone	Milestone Name
1	1	wp_1	PSLExp	Project			
2	1.1	wp_1_1	Project Management	Phase			
3	1.1.1	wp_1_1_1	Initiating	Phase			
3	1.1.2	wp_1_1_2	Planning and Control	Phase			
3	1.1.3	wp_1_1_3	Closing	Phase			
2	1.2	wp_1_2	Definition	Phase			
3	1.2.1	wp_1_2_1	Problems specification	Workpackage			
3	1.2.2	wp_1_2_2	Objective specification	Workpackage			
2	1.3	wp_1_3	Realization	Phase			
3	1.3.1	wp_1_3_1	Solution implementation	Workpackage		mi_1	Custom Ribbon Built
3	1.3.2	wp_1_3_2	Thesis Writing	Workpackage			
3	1.3.3	wp_1_3_3	System Tests	Workpackage			
Insert	Waiting						
Insert	Waiting						
Insert	Waiting						
Insert	Waiting						



PSLExp > Scope :: Milestones

ID	Name	Type	Work Package	Planned	Actual	Status	Description	Position
mi_1	Custom Ribbon Built	Main	wp_1_3_1	15/07/2019	19/07/2019	Reached		10
mi_2	Sheet buttons removed	Main	wp_1_3_1	15/07/2019	15/07/2019	Reached		-10
mi_3	Trial Version implementation	Minor	wp_1_3_1	12/09/2019	11/09/2019	Reached		
mi_4	Licensing software implemented	Minor	wp_1_3_1	20/08/2019		Not Reached		
mi_5	Evaluation of the PSL Excel Template	Main	wp_1_3_1	15/10/2019	20/10/2019	Reached		
mi_6	Dashboard Updated	Minor	wp_1_3_1	10/10/2019	05/10/2019	Reached		
						Not Reached		
						Not Reached		-6



PSLExp > Scope :: Deliverables

ID	Deliverable	Type	Work Package	Assigned To	Planned Dates: Submitted	Planned Dates: Approved	Actual Dates: Submitted	Actual Dates: Approved	Status
dble_1	PSL Excel Template	Software Application	wp_1_4_1	Mr João Legas	31/10/2019				In Review
dble_2	Dissertation	Documentation	wp_1_4_2	Mr João Legas	31/10/2019				In Review

PSLExp > Resources :: Responsibility Assignment Matrix

Table Validation: Correct

RAM	Customer: Prof Alberto Silva (Project Owner)	Performing: Mr João Legas (Team Leader)
wp_1 - PSLExp (Project)		
wp_1_1 - Project Management (Phase)		
wp_1_1_1 - Initiating (Phase)	T	X
wp_1_1_2 - Planning and Control (Phase)	D	d
wp_1_1_3 - Closing (Phase)	C	X
wp_1_2 - Definition (Phase)		
wp_1_2_1 - Problems specification (Workpackage)	T	X
wp_1_2_2 - Objective specification (Workpackage)	C	d
wp_1_3 - Realization (Phase)		
wp_1_3_1 - Solution implementation	T	X
wp_1_3_2 - Thesis Writing (Workpackage)	T	X
wp_1_3_3 - System Tests (Workpackage)	T	X

Legend:

eXecutes the work	X
takes the Decision solely or ultimately	D
takes the decision jointly or partly	d
controls Progress	P
provides Tuition on the job	T
must be Informed	I
must be Consulted	C
available to Advise	A

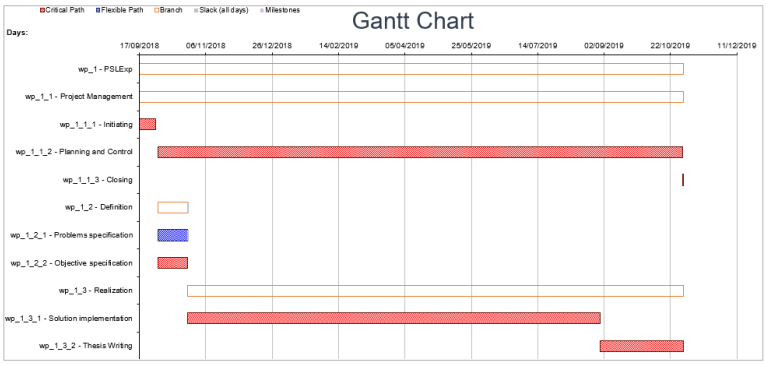
PSLExp > Resources :: Organization Breakdown Structure

ID	Name	Type	Role	Organization	PartOf	Report To	Description
org_1	Prof Alberto Silva	Person	Project Owner	Customer			
org_2	Mr João Legas	Person	Team Leader	Performing		org_1	

PSLExp > Time :: Timetable

Project Start Date	17/09/2018
Project End Date	31/10/2019

Task ID	ID	Level	Task	Type	Quality Type	Start	End	Duration (d)	Type of Precendence	Predecessors	Status	Critical Path
1	wp_1	1	PSLExp	Project		17/09/2018	31/10/2019	283				Critical Path
2	wp_1_1	2	Project Management	Phase		17/09/2018	31/10/2019	283				Critical Path
3	wp_1_1_1	3	Initiating	Phase		17/09/2018	28/09/2018	10				Critical Path
4	wp_1_1_2	3	Planning and Control	Phase		01/10/2018	30/10/2019	272	Finish-To-Start	3		Critical Path
5	wp_1_1_3	3	Closing	Phase		31/10/2019	31/10/2019	1	Finish-To-Start	4		Critical Path
6	wp_1_2	2	Definition	Phase		01/10/2018	22/10/2018	15				
7	wp_1_2_1	3	Problems specification	Workpackage		01/10/2018	22/10/2018	15	Finish-To-Start	3		
8	wp_1_2_2	3	Objective specification	Workpackage		01/10/2018	22/10/2018	15	Start-To-Start	7		Critical Path
9	wp_1_3	2	Realization	Phase		23/10/2018	31/10/2019	258				Critical Path
10	wp_1_3_1	3	Solution implementation	Workpackage		23/10/2018	29/08/2019	213	Finish-To-Start	8		Critical Path
11	wp_1_3_2	3	Thesis Writing	Workpackage		30/08/2019	31/10/2019	45	Finish-To-Start	10		Critical Path
12	wp_1_3_3	3	System Tests	Workpackage		30/08/2019	19/09/2019	15	Finish-To-Start	10		



Sprint # 1

Sprint Started on 14/02/2019

Sprint Number	1
Start date	14/02/2019
Duration (d)	10
End Date	28/02/2019
Number of Developers	1
Dev Utilization	100%
Daily Work hours	6
Dev total hours	60
Dev Daily hours	6
Today's Date	29/10/2019

ID	Task	User Story	Expected Concluded Day	Status	Assigned to	Planned Effort	1	2	3	4	5	6	7	8	9	10
ta_1	Learn Excel	us_1	6	Completed	Mr João Legas	25	19	13	5	0	0	0	0	0	0	0
ta_2	Understand VBA Code	us_2	10	Completed	Mr João Legas	20	20	20	20	18	14	8	8	8	3	0
ta_3	Excel template simulated	us_1	8	Completed	Mr João Legas	2	2	2	2	2	0	0	0	0	0	0
ta_4	Gantt Excel Experienced	us_1	9	Completed	Mr João Legas	3	3	3	3	3	3	3	3	0	0	0
Total						**50**	**44**	**38**	**30**	**23**	**17**	**11**	**11**	**8**	**3**	**0**

Sprint # 2

Sprint Started on 01/03/2019

Sprint Number	2
Start date	01/03/2019
Duration (d)	10
End Date	15/03/2019
Number of Developers	1
Dev Utilization	100%
Daily Work hours	6
Dev total hours	60
Dev Daily hours	6
Today's Date	29/10/2019

ID	Task	User Story	Expected Concluded Day	Status	Assigned to	Planned Effort	1	2	3	4	5	6	7	8	9	10
ta_1	Build MyTGuide project in PSL	us_1	09/03/2019	Completed	Mr João Legas	7	7	7	5	3	1	0	0	0	0	0
ta_2	Identify Problems with the Excel Template	us_2	15/03/2019	Completed	Mr João Legas	20	18	16	14	12	10	8	6	4	2	0
ta_3	Create and share Dropbox	us_1	15/03/2019	Completed	Mr João Legas	2	2	2	2	2	0	0	0	0	0	0
ta_4	Purchase and take an Excel course	us_1	15/03/2019	Not Completed	Mr João Legas	16	16	16	16	16	16	16	16	16	14	10
Total						**45**	**43**	**41**	**37**	**33**	**27**	**24**	**22**	**20**	**16**	**10**

Sprint # 3

Sprint Started on 24/04/2019

Sprint Number	3
Start date	24/04/2019
Duration (d)	8
End Date	08/05/2019
Number of Developers	1
Dev Utilization	100%
Daily Work hours	6
Dev total hours	48
Dev Daily hours	6
Today's Date	29/10/2019

ID	Task	User Story	Expected Concluded Day	Status	Assigned to	Planned Effort	1	2	3	4	5	6	7	8
ta_1	Buttons rearranged	us_3		Completed	Mr João Legas	1	1	1	0	0	0	0	0	0
ta_2	All sheets locked and protected	us_3		Completed	Mr João Legas	20	20	15	10	5	0	0	0	0
ta_3	License studied and applied	us_3		Completed	Mr João Legas	20	20	20	20	19	18	11	4	0
Total						41	41	36	30	24	18	11	4	**0**

Sprint # 4

Sprint Started on 09/05/2019

Sprint Number	4
Start date	09/05/2019
Duration (d)	10
End Date	23/05/2019
Number of Developers	1
Dev Utilization	100%
Daily Work hours	6
Dev total hours	60
Dev Daily hours	6
Today's Date	29/10/2019

ID	Task	User Story	Expected Concluded Day	Status	Assigned to	Planned Effort	1	2	3	4	5	6	7	8	9	10
ta_1	Licensing protocols investigation	us_6		Completed	Mr João Legas	25	18	12	6	0	0	0	0	0	0	0
ta_2	Macro display solution design	us_7		Completed	Mr João Legas	8	6	5	5	5	2	0	0	0	0	0
ta_3	Learn and prepare a document license demonstration	us_6		Completed	Mr João Legas	10	10	10	10	10	10	10	10	6	0	0
ta_4	Build presentation comparing licensing software	us_6		Completed	Mr João Legas	25	25	24	20	19	13	7	2	0	0	0
Total						**68**	**59**	**51**	**41**	**34**	**25**	**17**	**12**	**6**	**0**	**0**

Sprint # 5

Sprint Started on 12/06/2019

Sprint Number	5
Start date	12/06/2019
Duration (d)	10
End Date	21/06/2019
Number of Developers	1
Dev Utilization	100%
Daily Work hours	6
Dev total hours	60
Dev Daily hours	6
Today's Date	29/10/2019

ID	Task	User Story	Expected Concluded Day	Status	Assigned to	Planned Effort	1	2	3	4	5	6	7	8	9	10
ta_1	Learn Custom Ribbon X	us_7		Completed	Mr João Legas	15	10	6	3	0	0	0	0	0	0	0
ta_2	Build Custom Ribbon for macro presentation	us_7		Completed	Mr João Legas	20	20	17	14	9	4	0	0	0	0	0
ta_3	Investigate SoftwareKey license options	us_6		Completed	Mr João Legas	7	7	7	7	7	4	0	0	0	0	0
ta_4	Implement the desired SoftwareKey options	us_6		Completed	Mr João Legas	20	20	20	20	20	20	12	6	0	0	0
						62	**62**	**50**	**44**	**36**	**28**	**12**	**6**	**0**	**0**	**0**

Sprint # 6

Sprint Started on 22/06/2019

Sprint Number	6
Start date	22/06/2019
Duration (d)	10
End Date	05/07/2019
Number of Developers	1
Dev Utilization	100%
Daily Work hours	6
Dev total hours	60
Dev Daily hours	6
Today's Date	29/10/2019

ID	Task	User Story	Expected Concluded Day	Status	Assigned to	Planned Effort	1	2	3	4	5	6	7	8	9	10
ta_1	Custom Ribbon implementation	us_6		Completed	Mr João Legas	30	25	20	15	10	7	6	2	0	0	0
ta_2	Adapt VBA code to new Ribbon	us_7		Completed	Mr João Legas	25	25	23	20	18	13	7	3	0	0	0
ta_3	Clean old macro buttons	us_6		Completed	Mr João Legas	3	3	3	3	3	3	3	3	3	0	0
ta_4	Update Sprint Backlogs	us_3		Completed	Mr João Legas	4	4	4	4	4	4	4	4	4	0	0
						57	**57**	**50**	**42**	**35**	**27**	**20**	**12**	**7**	**0**	**0**

Sprint # 7

Sprint Started on 08/07/2019

Sprint Number	7
Start date	08/07/2019
Duration (d)	20
End Date	05/08/2019
Number of Developers	1
Dev Utilization	100%
Daily Work hours	6
Dev total hours	120
Dev Daily hours	6
Today's Date	29/10/2019

ID	Task	User Story	Expected Concluded Day	Status	Assigned to	Actual Effort	Planned Effort	1	2	3	4	5	6	7	8	9
ta_1	Protect sheets with locked/hidden cells defined	us_6		Completed	Mr João Legas	28	30	30	25	19	13	7	1	0	0	0
ta_2	Define new macros	us_7		Completed	Mr João Legas	32	35	35	35	35	35	35	35	30	24	18
ta_3	Adapt Custom ribbon to new macros	us_4		Completed	Mr João Legas	12	10	10	10	10	10	10	10	10	10	10
ta_4	Gantt Excel template exploration	us_1		Completed	Mr João Legas	33	30	30	30	30	30	30	30	30	30	30
						105	**105**	**105**	**100**	**94**	**88**	**82**	**76**	**70**	**64**	**58**

10	11	12	13	14	15	16	17	18	19	20
0	0	0	0	0	0	0	0	0	0	0
12	6	0	0	0	0	0	0	0	0	0
10	10	10	5	0	0	0	0	0	0	0
30	30	30	30	30	25	20	15	10	5	0
52	**46**	**40**	**35**	**30**	**25**	**20**	**15**	**10**	**5**	**0**

Sprint # 8

Sprint Started on 06/08/2019

Sprint Number	8
Start date	06/08/2019
Duration (d)	20
End Date	04/09/2019
Number of Developers	1
Dev Utilization	100%
Daily Work hours	6
Dev total hours	120
Dev Daily hours	6
Today's Date	29/10/2019

ID	Task	User Story	Expected Concluded Day	Status	Assigned to	Actual Effort	Planned Effort	1	2	3	4	5	6	7	8	9
ta_1	Generate Report in word	us_5		Completed	Mr João Legas	90	80	72	68	62	56	50	44	38	32	26
ta_2	Create movable textboxes for risk table and RAM legend	us_7		Completed	Mr João Legas	8	10	10	10	10	10	10	10	10	10	10
ta_3	User configuration group definition and configuration group clean up	us_3		Completed	Mr João Legas	22	25	25	25	25	25	25	25	25	25	25
						120	**115**	**107**	**103**	**97**	**91**	**85**	**79**	**73**	**67**	**61**

10	11	12	13	14	15	16	17	18	19	20
20	12	6	0	0	0	0	0	0	0	0
10	10	10	10	4	0	0	0	0	0	0
25	25	25	25	25	23	17	11	5	0	0
55	**47**	**41**	**35**	**29**	**23**	**17**	**11**	**5**	**0**	**0**

Sprint # 9

Sprint Started on 05/09/2019

Sprint Number	9
Start date	05/09/2019
Duration (d)	20
End Date	03/10/2019
Number of Developers	1
Dev Utilization	100%
Daily Work hours	6
Dev total hours	120
Dev Daily hours	6
Today's Date	29/10/2019

ID	Task	User Story	Expected Concluded Day	Status	Assigned to	Actual Effort	Planned Effort	1	2	3	4	5	6	7	8	9
ta_1	Dashboard Update	us_3		Completed	Mr João Legas	30	30	30	25	20	16	10	3	0	0	0
ta_2	Weekly Schedule sheet implementation	us_3		Completed	Mr João Legas	30	25	25	22	20	20	20	20	20	18	12
ta_3	Find and fix bugs	us_8		Completed	Mr João Legas	30	25	25	25	25	25	25	25	22	20	20
ta_4	Trial version definition	us_6		Completed	Mr João Legas	30	25	25	25	25	25	25	25	25	25	25
						120	**105**	**105**	**97**	**90**	**86**	**80**	**73**	**67**	**63**	**57**

10	11	12	13	14	15	16	17	18	19	20
0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0
20	20	16	12	6	0	0	0	0	0	0
25	21	21	21	21	21	13	5	0	0	0
49	**41**	**37**	**33**	**27**	**21**	**13**	**5**	**0**	**0**	**0**

Sprint # 10

Sprint Started on 04/10/2019

Sprint Number	10
Start date	04/10/2019
Duration (d)	19
End Date	31/10/2019
Number of Developers	1
Dev Utilization	100%
Daily Work hours	6
Dev total hours	114
Dev Daily hours	6
Today's Date	29/10/2019

ID	Task	User Story	Expected Concluded Day	Status	Assigned to	Actual Effort	Planned Effort	1	2	3	4	5	6	7	8	9
ta_1	Define MSc Thesis Project on PSL Excel template v.2019 for evaluation	us_8		Completed	Mr João Legas	19	15	15	15	15	15	13	13	13	11	8
ta_2	Define MyTGuide Project in PSL Excel template v.2019 for evaluation	us_8		Completed	Mr João Legas	17	15	15	10	6	0	0	0	0	0	0
ta_3	Thesis Writing	us_9		Completed	Mr João Legas	100	90	90	85	82	82	76	68	60	56	53
						127	**120**	**120**	**110**	**103**	**97**	**89**	**81**	**73**	**67**	**61**

10	11	12	13	14	15	16	17	18	19	20
3	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
50	44	36	30	24	18	12	6	3	1	0
53	**44**	**36**	**30**	**24**	**18**	**12**	**6**	**3**	**1**	**0**

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PSLExp > Agile :: Product Backlog

Current Sprint	11

					Dates				
ID	Story / Feature	Effort	Sprint	Priority	Created	Last Updated	Status	Actual Effo	Final Sprint
us_1	Learn Excel Advanced uses	25	1,2,7	HI			Completed	>341	
us_2	Understand Visual Basic Code already implemented	30	1,2	HI			Completed	>25	
us_3	Excel Template improved and protected	35	3,6,8,9	MED			Completed		
us_4	Custom Ribbon	50	7	HI			Completed		
us_5	Generate Report in Word	85	8	HI			Completed		
us_6	Document licensed and protected	60	4,5,6,7,9	MED			Completed		
us_7	Build Solution for macro presentation	75	4,5,6,7,8	HI			Completed		
us_8	PSL Excel Template v.2019 Evaluation	30	9,10	HI			Completed		
us_9	Thesis Document Writing	100	10	VHI			Completed		