



## D2.4

# Development and integration of the platform (final)

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## List of Authors and Reviewers

Authors	Partner
Luis Cordeiro	ONE
Vitor Fonseca	ONE
Bruno Sousa	ONE
Pedro Valente	ONE
Massimo Colombi	UNIMI
Andrea Trentini	UNIMI

Reviewers	Partner
Massimo Colombi	UNIMI
Michelle	ZEBRALOG
Michelangelo	CES

## Versioning and contribution history

#	Description	Contributors
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## Executive Summary

This document reports on the EMPATIA Platform development and how it is available to the public. The architecture, specification and implementation methodology described in Deliverable D2.3 were followed in the work performed, but some adjustments were required, that are recorded in this document.

This final version of the EMPATIA Platform includes several functionalities that come from the feedback received by the EMPATIA pilots and applications (other cases of use of the EMPATIA platform). The current EMPATIA Platform version (prototype 2) is richer in functionalities when compared with prototype 1 and is an outcome of the project validated in several pilots and applications. After the release of the first prototype, the EMPATIA Platform has been used, experimented and validated in more than 20 processes worldwide with a total of more than 100.000 unique visitors, 43.000 registered users and 40.000 votes.

With the release of the final version of the EMPATIA Platform all WP2 objectives were achieved. The final prototype includes all functionalities identified as fundamental in the project, but also includes an extensive number of additional functionalities that were identified in the pilots and applications.



# Table of Contents

<b>LIST OF AUTHORS AND REVIEWERS .....</b>	<b>2</b>
<b>VERSIONING AND CONTRIBUTION HISTORY .....</b>	<b>3</b>
<b>EXECUTIVE SUMMARY.....</b>	<b>4</b>
<b>TABLE OF CONTENTS.....</b>	<b>5</b>
<b>TABLE OF FIGURES.....</b>	<b>7</b>
<b>TABLE OF TABLES .....</b>	<b>11</b>
<b>ACRONYMS.....</b>	<b>12</b>
<b>1 INTRODUCTION .....</b>	<b>14</b>
<b>2 ARCHITECTURE AND FUNCTIONALITIES .....</b>	<b>15</b>
2.1 ARCHITECTURE.....	16
2.2 FUNCTIONALITIES.....	16
2.2.1 <i>Analytics</i> .....	18
2.2.2 <i>EMPATIA</i> .....	19
2.2.3 <i>Files</i> .....	25
2.2.4 <i>Logs</i> .....	25
2.2.5 <i>Noty</i> .....	25
2.2.6 <i>Q</i> .....	26
2.2.7 <i>Vote</i> .....	27
2.2.8 <i>WUI</i> .....	27
<b>3 EMPATIA PLATFORM.....</b>	<b>29</b>
3.1 DEVELOPMENT DETAILS .....	29
3.1.1 <i>Database Models</i> .....	29
3.1.2 <i>Components details</i> .....	30
3.1.3 <i>External Tools and Libraries</i> .....	30
3.1.4 <i>Security mechanisms</i> .....	33
3.2 USER INTERFACES.....	34
3.2.1 <i>Administrator space</i> .....	36
3.2.2 <i>Manager space</i> .....	49
3.2.3 <i>User space</i> .....	85
3.3 EMPAVILLE ROLE-PLAYING GAME .....	89
3.4 KIOSKS.....	92
3.4.1 <i>Voting Kiosk</i> .....	93
3.4.2 <i>Ballot Kiosk</i> .....	94
3.4.3 <i>Tablet Kiosk</i> .....	95
3.4.4 <i>Touch Kiosk</i> .....	95
3.4.5 <i>Remote Kiosk</i> .....	96
<b>4 VALIDATION EVENTS .....</b>	<b>97</b>
4.1 EMPATIA PLATFORM.....	97
4.1.1 <i>Pilots and applications timeline</i> .....	97
4.1.2 <i>Lisbon pilot</i> .....	98
4.1.3 <i>Wuppertal pilot</i> .....	101
4.1.4 <i>Ricany pilot</i> .....	103

4.1.5	<i>Milan pilot</i> .....	104
4.1.6	<i>Other Applications</i> .....	104
	EMPAVILLE ROLE-PLAYING GAME.....	111
4.1.7	<i>4th International Conference on PB in North America</i> .....	113
4.1.8	<i>EMPATIA National Workshop in UK</i> .....	114
4.1.9	<i>Festival della Partecipazione Aquila</i> .....	115
4.1.10	<i>Summer school in Olhão</i> .....	115
4.1.11	<i>Italian 5 Stelle meeting</i> .....	116
4.1.12	<i>EMPAVILLE School Pereira</i> .....	117
4.1.13	<i>EMPAVILLE School Caldas da Rainha</i> .....	117
4.1.14	<i>EMPAVILLE School Águeda</i> .....	118
<b>5</b>	<b>EMPATIA PLATFORM RELEASE</b> .....	<b>119</b>
5.1	OPEN SOURCE REPOSITORIES.....	119
5.2	DOCKERS.....	119
5.3	VIRTUAL MACHINES .....	119
5.4	INSTALLATION SCRIPTS .....	119
5.5	EMPAVILLE RASPBERRY PI .....	120
<b>6</b>	<b>WP2 OBJECTIVES AND ACHIEVEMENTS</b> .....	<b>121</b>
6.1	OBJECTIVES .....	121
6.2	ACHIEVEMENTS .....	122
<b>7</b>	<b>CONCLUSIONS</b> .....	<b>125</b>
<b>8</b>	<b>REFERENCES</b> .....	<b>126</b>
<b>9</b>	<b>APPENDIX A – REQUIREMENTS MAPPING</b> .....	<b>129</b>

## Table of Figures

Figure 1 – Comparison between EMPATIA prototype versions .....	15
Figure 2 – EMPATIA Platform final Architecture .....	16
Figure 3 – Home screen example .....	35
Figure 4 – Login screen.....	36
Figure 5 – Administrator home screen .....	37
Figure 6 – Entities list .....	38
Figure 7 – Entity configuration screen .....	38
Figure 8 – Entity site list .....	39
Figure 9 – Entity language configuration.....	39
Figure 10 – Languages configuration.....	40
Figure 11 - Templates configuration.....	40
Figure 12 - Countries management.....	41
Figure 13 - Time zones management .....	41
Figure 14 - Currencies management.....	42
Figure 15 - Translations management .....	42
Figure 16 – User Parameter types management .....	43
Figure 17 – Process Parameter types management.....	43
Figure 18 - Participatory Configurations management.....	44
Figure 19 – Voting methods configuration.....	44
Figure 20 - Modules configuration .....	45
Figure 21 - Site Configurations.....	45
Figure 22 - Auth Methods management.....	46
Figure 23 - Flag Types management .....	46
Figure 24 - CMS Section Types management .....	47
Figure 25 - CMS Section Type Parameters management .....	47
Figure 26 - Dashboard Elements management .....	48
Figure 27 - Dashboard Element Configurations management.....	48
Figure 28 – Administrator Logs features .....	49
Figure 29 – Manager home screen .....	49
Figure 30 – PAD details.....	50
Figure 31 – Topics list .....	52
Figure 32 – Topic details .....	52
Figure 33 – Topic technical analysis .....	53
Figure 34 – Analytics summary (total, channel) .....	53
Figure 35 – Analytics details (total, channel, table).....	54
Figure 36 – Analytics vote summary .....	54
Figure 37 – Analytics by date - day .....	55
Figure 38 – Analytics by date - hour.....	55
Figure 39 – Analytics by user parameter – Birth date .....	55
Figure 40 – Analytics by user parameter - Gender .....	56
Figure 41 – Analytics by topic parameter .....	57
Figure 42 –Analytics advanced .....	57
Figure 43 – PAD process configurations.....	58
Figure 44 – PAD parameter configuration.....	58

Figure 45 – Vote event configuration .....	59
Figure 46 – Notifications configuration .....	60
Figure 47 – PAD Login Levels security .....	60
Figure 48 – PAD Data Migration feature .....	61
Figure 49 – PAD Questionnaire configuration .....	62
Figure 50 – PAD Technical Analysis configuration .....	62
Figure 51 – PAD translations.....	63
Figure 52 – PAD schedules configuration .....	63
Figure 52 – PAD Apache Solr configuration.....	64
Figure 53 – PAD wizard.....	64
Figure 54 – Second Cycle configuration .....	65
Figure 55 - Site management screens .....	66
Figure 56 – Menus configuration .....	67
Figure 57 – Pages configuration .....	67
Figure 58 – Users list.....	68
Figure 59 – Managers groups .....	69
Figure 60 – User details .....	69
Figure 61 – Users analytics .....	70
Figure 62 – Users moderation .....	70
Figure 63 – Participation moderation .....	71
Figure 64 – Comments moderation .....	71
Figure 65 – Emails summary.....	72
Figure 66 – Emails list and details.....	72
Figure 67 – Newsletter list .....	73
Figure 68 – Newsletter details .....	73
Figure 69 – Subscriptions list .....	74
Figure 70 – Send email .....	74
Figure 71 – SMSs summary .....	75
Figure 72 – SMS sent list .....	75
Figure 73 – SMS received list.....	76
Figure 74 – SMS analytics.....	76
Figure 75 – Send SMS .....	77
Figure 76 – Internal messages list .....	77
Figure 77 – User internal message history.....	78
Figure 78 – Polls configuration.....	78
Figure 79 - Short Links configuration .....	79
Figure 80 – Questionnaire configuration .....	79
Figure 81 - Entity details.....	80
Figure 82 - Entity languages .....	81
Figure 83 – Authentication VAT numbers .....	81
Figure 84 – Entity notifications .....	82
Figure 85 – Entity Login Level .....	83
Figure 86 – User parameters.....	83
Figure 87 – Gamification configuration.....	84
Figure 88 – Kiosks configuration .....	84
Figure 89 – Open data configuration .....	85

Figure 90 – Open data JSON .....	85
Figure 91 – User home screen .....	87
Figure 92 – Topics list and details .....	87
Figure 93 – Topic creation .....	88
Figure 94 – Topic collaboration .....	88
Figure 95 –Public page and map examples .....	89
Figure 96 – Public user profile .....	89
Figure 97 – EMPAVILLE city map and citizen ID Card .....	90
Figure 98 – EMPAVILLE public screens .....	91
Figure 99 – EMPAVILLE CB configuration .....	91
Figure 100 – EMPAVILLE presentation and analytics .....	92
Figure 101 – Voting Kiosk hardware .....	93
Figure 102 – Voting Kiosk TV screens .....	94
Figure 103 – Ballot Kiosk hardware and LCD screens .....	95
Figure 104 – Tablet Kiosk screens .....	95
Figure 105 – Touch Kiosk screens .....	96
Figure 106 – Remote Kiosk .....	96
Figure 107 – Remote Kiosk voting session real-time results screen .....	96
Figure 108 -- Pilots timeline .....	98
Figure 109 – Lisbon pilot home screens .....	99
Figure 110 – Lisbon pilot LisBOAideia screens .....	100
Figure 111 – Lisbon pilot Debate screens .....	100
Figure 112 – Lisbon pilot other sections .....	101
Figure 113 – Wuppertal pilot home screens .....	102
Figure 114 – Wuppertal pilot facts section .....	102
Figure 115 – Wuppertal pilot facts section .....	103
Figure 116 – Ricany pilot screens .....	104
Figure 117 – Milan pilot screens .....	104
Figure 118 – Condeixa application .....	106
Figure 119 – CoGlobal applications .....	106
Figure 120 – Cananea application .....	107
Figure 121 – Lagoa application .....	108
Figure 122 – BiPart applications .....	108
Figure 123 – OIDP application .....	109
Figure 124 – OPP application .....	109
Figure 125 – ANAMM application .....	110
Figure 126 – Cascais applications .....	110
Figure 127 – OPJP application home page .....	111
Figure 128 – OPJP application projects .....	111
Figure 129 – EMPAVILLE PBP session proposals and analytics .....	113
Figure 130 – EMPAVILLE PBP session photos .....	114
Figure 131 – EMPATIA PB UK session proposals and analytics .....	114
Figure 132 – EMPATIA PB UK session photos .....	115
Figure 133 – EMPAVILLE Aquilla session proposals and analytics .....	115
Figure 134 – EMPAVILLE Olhão session proposals and analytics .....	116
Figure 135 – EMPAVILLE 5 Stelle session proposals and analytics .....	117

Figure 136 – EMPAVILLE 6 School Pereira session proposals and analytics .....	117
Figure 137 – EMPAVILLE 6 School Caldas da Rainha session proposals and analytics .....	117
Figure 138 – EMPAVILLE 6 School Águeda session proposals and analytics.....	118
Figure 139 – Requirements mapping .....	133

## Table of Tables

Table 1 – EMPATIA Platform final main functionalities .....	16
Table 2 – Functionalities of Analytics Component .....	18
Table 3 – Functionalities of EMPATIA (Authentication) Component .....	19
Table 4 – Functionalities of EMPATIA (PAD) Component .....	20
Table 5 – Functionalities of Content Management Component .....	21
Table 6 – Functionalities of Open Data Component .....	22
Table 7 – Functionalities of EMPATIA - Orchestrator Component .....	23
Table 8 – Functionalities of 2 <sup>nd</sup> Cycle Component .....	24
Table 9 – Functionalities of Files Component .....	25
Table 10 – Functionalities of Monitoring Component .....	25
Table 11 – Functionalities of Notifications Component .....	25
Table 12 – Functionalities of Questionnaires Component .....	26
Table 13 – Functionalities of Voting Component .....	27
Table 14 – Functionalities of WUI Component .....	27
Table 15 – Functionalities of WUI (Kiosk) Component .....	28
Table 16 – Database models' details .....	29
Table 17 – Components development details .....	30
Table 18 – Required and exclusive functionalities of Lisbon pilot .....	99
Table 19 – Support Activities in Lisbon pilot .....	101
Table 20 – Required and exclusive functionalities of Wuppertal pilot .....	101
Table 21 – Support Activities in Wuppertal pilot .....	103
Table 22 – Required and exclusive functionalities of Ricany pilot .....	103
Table 23 – Support Activities in Ricany pilot .....	104
Table 24 – Support Activities in Milan pilot .....	104
Table 25 – Other applications .....	105
Table 26 – Required and exclusive functionalities of Condeixa pilot .....	105
Table 27 – Required and exclusive functionalities of Lagoa pilot .....	107
Table 28 – Required and exclusive functionalities of BiPart application .....	108
Table 29 – Required and exclusive functionalities of Cascais application .....	<b>Error! Bookmark not defined.</b>
Table 30 – Required and exclusive functionalities of OPJP application .....	<b>Error! Bookmark not defined.</b>
Table 31 – EMPAVILLE sessions .....	112
Table 32 – WP2 objectives .....	121
Table 33 – WP2 objectives achievement .....	122

## Acronyms

Acronyms	Description
AES	Advanced Encryption Standard
API	Application Programming Interface
CB	Community Building
CM	Content Management
CSRF	Cross-site Request Forgery
CRUD	Create Read Update Delete
CSV	Comma Separated Values
EU	European Union
JSON	JavaScript Object Notation
JWT	JSON Web Token
IT	Information Technology
KPI	Key Performance Indicator
MAC	Message Authentication Code
MP	Multichannel Participation
MQTT	Message Queue Telemetry Transport
N/A	Not Available
PB	Participatory Budget
Q	Questionnaire
Q&A	Questions and Answers
REST	Representational State Transfer
SMS	Short Message Service
WUI	Web User Interface
SaaS	Software as a Service
EMPATIAaaS	EMPATIA as a Service
P1	EMPATIA Platform First Prototype
OAI	Open API Initiative
VM	Virtual Machine



WLAN	Wireless Local Area Network
XSS	Cross-site Scripting

# 1 Introduction

This document reports on the EMPATIA Platform development and how it is available to the public. The architecture, specification and implementation methodology described in Deliverable D2.3 [6] were followed in the work performed, but some adjustments were required, that are recorded in this document.

The EMPATIA Platform includes several functionalities that come from the feedback received by the EMPATIA pilots and applications (other non-official pilots). The current version (prototype 2) include all WP1 identified requirements and a high number of additional requirements received from all experimentations (pilots and applications). The EMPATIA Platform at the time of writing of this report, has been used, experimented and validated in more than 20 processes worldwide with a total of more than 100 thousand unique visitors, 43 thousand registered users and 40 thousand votes.

With the release of the final version of the EMPATIA Platform all WP2 objectives were achieved. The final prototype includes all functionalities identified as fundamental in the project, but also includes an extensive number of additional functionalities that were identified in the pilots and applications.

The EMPATIA Platform has been released as open-source (available in GitHub) and has been used to support several participation processes (e.g. participatory budgeting, ideation, consultation, debates) both by EMPATIA partners and by external entities (ex: CoGlobal, BiPart). The EMPATIA Platform has been released in different mechanisms, like Docker, virtual machines and through installation scripts that automates the deployment of the platform (using the GitHub open-source code).

In this deliverable, we start by presenting an updated version of the architecture and functionalities in section 2, followed by the details of the EMPATIA Platform in section 3. Section 4 presents the validation events and their dimensions regarding participation where the EMPATIA Platform has been used. Next, section 5 presents how the platform has been released to the public.

Finally, section 6 provides an overview of WP2 objectives and how these objectives were achieved and section 7 presents the main conclusions regarding the EMPATIA Platform development and validation.

## 2 Architecture and functionalities

This section details the major changes in architecture and functionalities of the final version of the EMPATIA Platform. The EMPATIA Platform requirements, functionalities and architecture was first presented in Deliverable D2.1 [1] and implemented in prototype 1, which included the first version of all components, and all basic functionalities to support participation processes. Later, in Deliverable D2.3 [6], a revised version of the requirements, functionalities and architecture have been documented which were integrated into prototype 1.

Despite the detailed specification of the EMPATIA Platform and some of the validations performed in the first year of the project, with the start of the pilots it was identified a big gap between the identified requirements and the pilots (and other applications) real requirements. The feedback received was quickly integrated into the requirements, specifications and architecture, resulting in an updated version of the EMPATIA Platform specification. Additional functionalities have been incorporated in the diverse components of EMPATIA, some of them coming from the requirements raised in pilots. Appendix A provides detailed information regarding the mapping of requirements, considering WP1, WP2 and pilots overall requirements.

The EMPATIA Platform was released in two versions: P1, documented in Deliverable D2.2 [21]; and P2, current and final version. At the time of P1 release and based on the validation events already occurred (1 pilot, 1 application, internal testing and several EMPAVILLE sessions) it was considered that the platform was ready to support all planned pilots and other participation processes. With the start of additional applications and all pilots it was identified a big gap between the identified requirements, the developed features and the real features the platform should include to support all the applications.

Thus, the final version of the platform has more functionalities, those coming from the requirements gathered in Deliverables D1.1 [2] and D1.4 [22], and also from the specificities required by pilots and applications. Indeed, the deployment in a high number of pilots (more than 20) introduced new challenges that resulted in more functionalities to the platform.

Figure 1 depicts an overview of the differences between the two versions of the platform, in terms of number of components, supported functionalities, external tools/libraries employed and deployed pilots (official and non-official). One remarkable difference between the two versions of the platform is the number of functionalities 175 in P1 and 258 in P2, as mentioned previously.

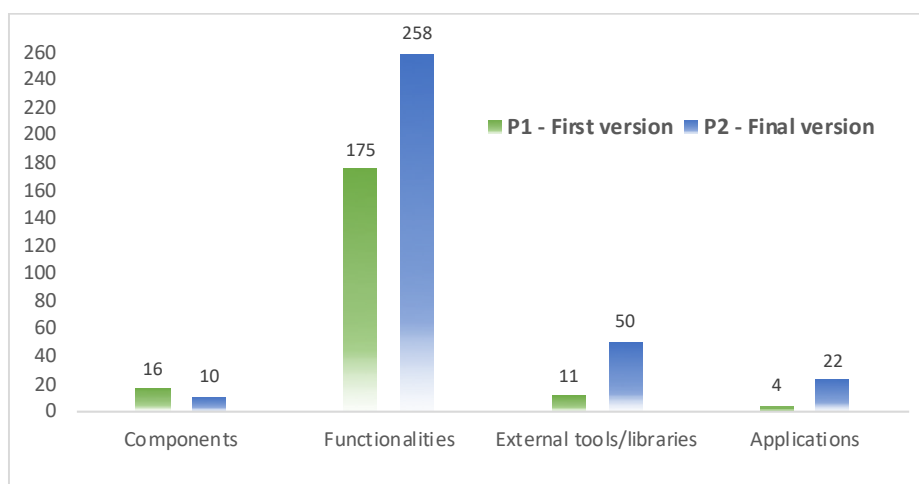
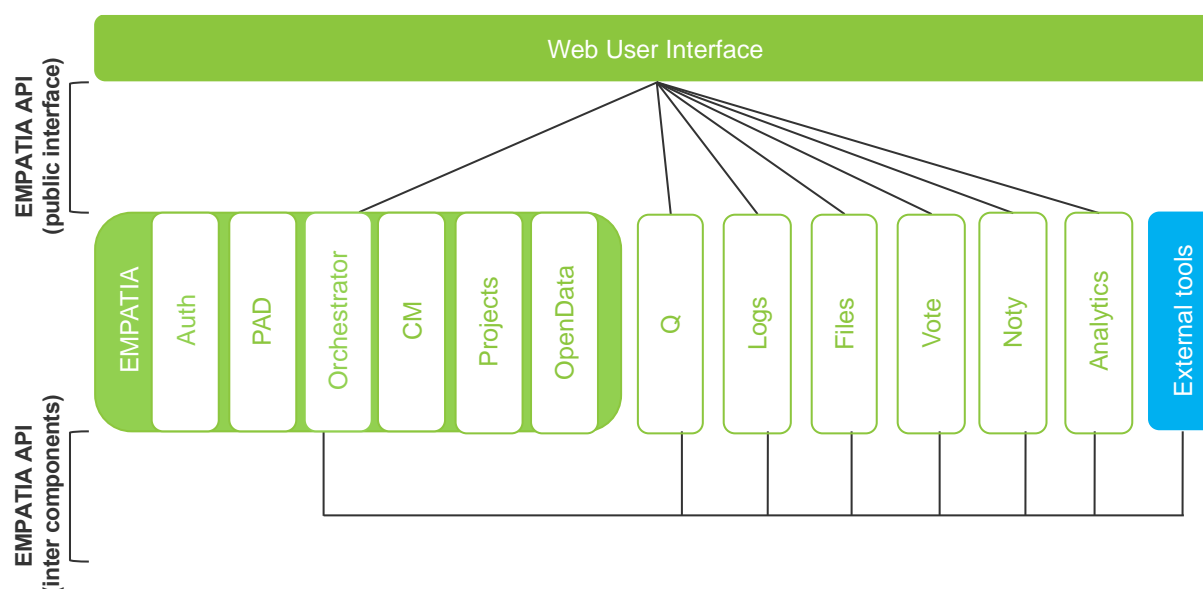


Figure 1 – Comparison between EMPATIA prototype versions

Not only the difference in functionalities from P1 to P2 is much higher than planned in the project, but many of the P1 functionalities had to be adapted or reimplemented to support the new requirements received from all the pilots and applications.

## 2.1 Architecture

Figure 2 depicts the components that were reformulated in the final version of the EMPATIA platform. The major change was the creation of the EMPATIA component, a new component that integrates the functionalities from the Authentication, PAD, Orchestrator, Content Management, Open Data and Projects previous components. This aggregation of functionalities was required by the fact that the new requirements and functionalities created a mesh of relations between the many functionalities, removing the benefit of isolation (main goal of the components separation) and increasing the overhead of communication between components. Despite the new requirements increased dependency between many of the components in almost all functionalities, it was considered important to keep some components separated like the Vote (to isolate vote information), Noty and Analytics.



**Figure 2 – EMPATIA Platform final Architecture**

Despite the theoretical correctness in the component isolation, after the implementation of the new functionalities required to support the pilots, we concluded that such aggregation can simplify the development process and the delivery time of features to pilots.

## 2.2 Functionalities

The functionalities of the EMPATIA Platform have been documented in Deliverable D2.3 [6], which updates the initial set of functionalities documented in Deliverable D2.1 [1]. Both deliverables consider the requirements associated with the EMPATIA use cases, as reported in Deliverable D1.1 [2] and updated in Deliverable D1.4 [22]. This section presents the functionalities that have been implemented due to the input received from all validation events, pilots and other applications.

The non-functional requirements are also supported in most of the EMPATIA Platform components due to their cross-cutting nature (e.g. security, scalability). Table 1 presents an overview of the final prototype main functionalities.

**Table 1 – EMPATIA Platform final main functionalities**

Component	Partner	Functionalities
Analytics	ONE	<ul style="list-style-type: none"> <li>Aggregate, transform collected data,</li> <li>Streaming of processed data to other components</li> <li>Customizable graphics</li> <li>Dashboards and advanced rules for presenting and exporting data</li> </ul>
EMPATIA	ONE	Auth <ul style="list-style-type: none"> <li>JWT validation</li> <li>Registration of users</li> <li>Profile management</li> <li>Basic authentication</li> <li>Support authentication using identity cards</li> <li>Support granular authorization mechanisms</li> <li>Enable accounting of users' operations</li> <li>OAuth integration</li> <li>Integration with external platforms</li> </ul>
	ONE	PAD/CB <ul style="list-style-type: none"> <li>CB, topics, posts management</li> <li>Versioning</li> <li>Moderation</li> <li>Comments</li> <li>Collaborative writing</li> </ul>
	ONE	CM <ul style="list-style-type: none"> <li>Site, menu, content management</li> <li>Translations management</li> </ul>
	ONE	Orchestrator <ul style="list-style-type: none"> <li>Manage components</li> <li>Entities management</li> <li>Sites management</li> <li>User roles and permissions management</li> </ul>
	UNIMI	Projects <ul style="list-style-type: none"> <li>PAD/CB monitoring phase (2<sup>nd</sup> cycle)</li> </ul>
	ONE	OpenData <ul style="list-style-type: none"> <li>Data Export tools management</li> <li>Open Data management</li> <li>Integration with CKAN</li> <li>Privacy policy management</li> </ul>
Files	ONE	<ul style="list-style-type: none"> <li>Upload</li> <li>Download</li> <li>Images processing</li> </ul>
Logs	ONE	<ul style="list-style-type: none"> <li>Auditing logging</li> <li>Access and usage logging</li> <li>Integration with Graylog2</li> </ul>
Noty	ONE	<ul style="list-style-type: none"> <li>Email management</li> <li>Emails templates</li> <li>Newsletters</li> <li>SMS management</li> <li>Real-time notifications</li> <li>Integration with SMS Gateways (Go4Mobility, BulkSMS, Skebby)</li> </ul>

Q	ONE	<ul style="list-style-type: none"> <li>• Questionnaires management</li> <li>• Integration with internal newsletter</li> <li>• Flash questionnaires</li> </ul>
Vote	ONE	<ul style="list-style-type: none"> <li>• Vote methods management</li> <li>• Vote events management</li> <li>• Polls management</li> <li>• Vote analytics</li> </ul>
WUI	ONE	<ul style="list-style-type: none"> <li>• Public template system</li> <li>• Default template</li> <li>• Manager and Administrator private area</li> </ul>

The following subsections present the final functionalities implemented per component. The functionalities that were not planned initially, either in the requirement gathering process, or in the preliminary version of the platform are identified as *Required by pilot(s)*.

## 2.2.1 Analytics

The Analytics component allows the analysis of diverse types of events. For such, diverse statistics are collected considering diverse parameters such as, the number of votes per gender, per town, per profession, among others as summarized in Table 2. The functionalities in the analytics component includes two main groups the Vote Event and Daily Vote Event.

**Table 2 – Functionalities of Analytics Component**

ID	Functionality	Associated Requirement
F1	Information of Votes	FR1 – Information of Votes
F2	Information of Daily Votes	FR2 – Information of Daily Votes
F3	Verify Votes by gender	FR3 – Statistics of Votes by gender
F4	Count Votes by gender	FR3 – Statistics of Votes by gender
F5	First Votes by gender	FR3 – Statistics of Votes by gender
F6	Second Votes by gender	FR3 – Statistics of Votes by gender
F7	Verify Votes by profession	FR4 – Statistics of Votes by profession
F8	Count Votes by profession	FR4 – Statistics of Votes by profession
F9	First Votes by profession	FR4 – Statistics of Votes by profession
F10	Second Votes by profession	FR4 – Statistics of Votes by profession
F11	Verify Votes by Channel	FR5 – Statistics of Votes by channel
F12	Count Votes by Channel	FR5 – Statistics of Votes by channel
F13	First Votes by Channel	FR5 – Statistics of Votes by channel
F14	Second Votes by Channel	FR5 – Statistics of Votes by channel
F15	Verify Votes by Neighborhood	FR6 – Statistics of Votes by Neighbourhood
F16	Count Votes by Neighborhood	FR6 – Statistics of Votes by Neighbourhood
F17	First Votes by Neighborhood	FR6 – Statistics of Votes by Neighbourhood
F18	Second Votes by Neighborhood	FR6 – Statistics of Votes by Neighbourhood
F19	Verify Votes by Age	FR7 – Statistics of Votes by Age

F20	Count Votes by Age	FR7 – Statistics of Votes by Age
F21	First Votes by Age	FR7 – Statistics of Votes by Age
F22	Second Votes by Age	FR7 – Statistics of Votes by Age
F23	Statistics by Date	FR8 – Statistics by Date
F24	Statistics by Town	FR9 – Statistics by Town
F25	Statistics by Education	FR10 – Statistics by Education
F26	Proposal Analysis	FR11 – Proposal Analysis
F27	Ideas Analysis	FR12 – Ideas Analysis
F28	Issues Analysis	FR13 – Issues Analysis
F29	Participation Analysis	FR14 – Participation Analysis
F30	Customization of dashboards	FR15 – Dashboards Customization
F31	Automated Reports	FR16 – Support elaboration of reports
F32	Dynamic Dashboards	FR15 – Dashboards Customization
F33	SMS analytics	Required by pilot(s)
F34	Email analytics	Required by pilot(s)
F35	User access analytics	Required by pilot(s)
F36	Administrator access analytics	Required by pilot(s)
F37	Users analytics	Required by pilot(s)
F38	Questionnaires analytics	Required by pilot(s)

## 2.2.2 EMPATIA

As described in section 2.1, the EMPATIA is a composed component, aggregating functionalities of diverse sub-components, which include authentication, Content Management, PAD (or CB), Orchestrator, OpenData and Projects.

### Auth

The Authentication and Authorization component has been merged in the EMPATIA component. The Authentication component assures the required functionalities, as summarized in Table 3, to allow the authentication of users in the platform. The Management of users, include all the functionalities related with Create, Read, Update and Delete (CRUD) operations.

**Table 3 – Functionalities of EMPATIA (Authentication) Component**

ID	Functionality	Associated Requirement
F39	Management of Users	FR17 – Users
F40	Authenticate with Credentials	FR18 – Login with Credentials
F41	Authenticate with QRCode	FR19 – Login with QRCode
F42	Authenticate with RFID	FR20 – Login with RFID cards
F43	Authenticate with Alphanumeric code	FR21 – Login with Alphanumeric code
F44	Login with Facebook	FR23 – Social Media Integration

F45	Retrieve users' details	FR26 – Get Users public details
F46	Expiration mechanisms of authentication (logout)	FR27 – expiration mechanisms of authentication
F47	Open standards for authorization & Authentication	FR28 - Support open standards for authorization
F48	Authorization policies per user role	FR29 – Support Authorization Policies
F49	Dual-Factor authentication	FR32 – Support dual-factor authentication
F50	Support renew of credentials	FR33 – Support policies to renew credentials
F51	Support Single-Sign-On (SSO)	FR34 – Support SSO
F52	Support One-time generated password	FR25 – Support One-time generated password
F53	User Levels (login levels)	FR29 – Support Authorization Policies OR5 – Support different roles and permissions for actors
F54	In-person registration	Required by pilot(s)
F55	Registration Stepper	Required by pilot(s)
F56	Recover account with SMS code	Required by pilot(s)
F57	Users XLS and PDF export	Required by pilot(s)
F58	User-profile (profile, messages, participation)	Required by pilot(s)

## PAD/CB

The EMPATIA component includes PAD sub-component, which is responsible for the functionalities that enable citizens' participation via diverse items, such as forums, discussion of ideas, voting processes, among others. The overall functionalities supported by this component are summarized in Table 4. The PAD component has replaced the initial Community Building (CB) component.

**Table 4 – Functionalities of EMPATIA (PAD) Component**

ID	Functionality	Associated Requirement
F59	Management of Comments	FR64 – Comments
F60	Block Posts	FR65 – Forums Moderation FR66 – Ideas Moderation FR67 – Discussions Moderation
F61	Management of Post Abuses	FR68 – Report Abuse
F62	List Post Abuse by Topic	FR65 – Forums Moderation
F63	List Post Abuse by PAD	FR65 – Forums Moderation
F64	Management of Moderators	FR65 – Forums Moderation FR66 – Ideas Moderation FR67 – Discussions Moderation
F65	List of PAD Moderators	FR80 – List of PAD moderators
F66	Management of Votes Sessions	FR70 – Voting Analysis
F67	Management of Vote Methods	FR70 – Voting Analysis
F68	Management of PADs	FR60 – Forums FR61 – Ideas FR62 – Proposals FR63 – Discussions



		FR64 – Comments
F69	Access Control	FR74 – Access Control
F70	Manage Topics Cooperators	FR75 – Cooperation between idea and proposals
F71	Block/Unblock PADs	FR81 – Block/Unblock PADs
F72	Manage Community Building and associated parameters	FR82 – Manage Community Building and associated parameters
F73	Version Control Posts	FR83 – Version Control of Posts
F74	Management of Participation	FR79 – Participation analysis
F75	Management of Ideas	FR76 – Ideas analysis
F76	Management of Issues	FR77 – Issues Analysis
F77	Support diverse consultation methods	FR72 – Public consultation FR73 – Thematic consultation
F78	Management of Proposals	FR71 – Proposal Analysis
F79	Support advanced search mechanisms	FR69 – Advanced Search mechanisms
F80	CB voting period management	Required by pilot(s)
F81	Topics multiple owners	Required by pilot(s)
F82	Create topics without registered users	Required by pilot(s)
F83	Thematic consultation specific notification	Required by pilot(s)
F84	CB Topics status	Required by pilot(s)
F85	Consultation Wizard	Required by pilot(s)
F86	Include technical analysis in export	Required by pilot(s)
F87	Support Alliances	Required by pilot(s)
F88	Support topic draft (status publish)	Required by pilot(s)
F89	CB translation management	Required by pilot(s)
F90	CB questionnaires management	Required by pilot(s)
F91	Create topic on behalf of	Required by pilot(s)
F92	Support Consultation Wizard	Required by pilot(s)
F93	Public topics list sorting options	Required by pilot(s)
F94	CB users levels & permissions	Required by pilot(s)

## Content Management

The Content Management (CM) sub-component, included in the EMPATIA component, allows to manage the diverse type of contents in the EMPATIA Platform, including videos, files and images. The overall functionalities supported by this component are summarized in Table 5.

**Table 5 – Functionalities of Content Management Component**

ID	Functionality	Associated Requirement
F95	Management of News	FR39 – News
F96	Get List of News	FR39 – News
F97	Get actual news	FR53 – Actual News
F98	Get Last News	FR54 – Last News

F99	Management of Events	FR40 – Events
F100	Get Last Events	FR55 – Last Events
F101	Management of Menus	FR41 – Menus
F102	Reorder Menus	FR56 – Reorder Menus
F103	Management of Text Content	FR42 – Text Content
F104	Add Files	FR43 – Image Content
F105	Management of Content	FR42 – Text Content FR43 – Image Content FR44 – Video Content
F106	Get First Files	FR43 – Image Content
F107	Management of File's Details	FR43 – Image content
F108	Order Files in lists	FR57 – Order Files in Lists
F109	Show version of pages	FR58 – Version control of pages, news and events
F110	Get list of page versions	FR58 – Version control of pages, news and events
F111	Image in jpeg format	FR43 – Image content
F112	Image in png format	FR43 – Image content
F113	Image in gif format	FR43 – Image content
F114	Image in pdf format	FR43 – Image content
F115	Video in MPEG4 format	FR44 – Video content
F116	Video in webM format	FR44 – Video content
F117	Video in Ogg format	FR44 – Video content
F118	Content in HTML5	FR45 – Content in HTML5 format
F119	Support WYSIWYG editor	FR46 – Edit pages, news and events content in a simple and intuitive way
F120	Publish/Unpublish Content	FR59 – Publish/Unpublish content
F121	Access Control	FR52 – Access Control
F122	Version control for pages, news and events	FR58 – Version control of pages, news and events
F123	Support home page popup	Required by pilot(s)
F124	Support FAQ	Required by pilot(s)
F125	Support articles	Required by pilot(s)
F126	Support Question & Answers	Required by pilot(s)
F127	Support splash screen	Required by pilot(s)
F128	Support Short links & static pages	Required by pilot(s)

## OpenData

The OpenData component allows the functionalities of exporting data to Open Data formats for the CKAN repository [7]. The overall functionalities are presented in Table 6.

**Table 6 – Functionalities of Open Data Component**

ID	Functionality	Associated Requirement
F129	Support export to CKAN	FR177 – Support CKAN APIs

F130	Support import from CKAN	FR177 – Support CKAN APIs
F131	High availability of data	FR178 – Support High Availability of data
F132	Support Dataset relationships	FR179 – Support dataset relationships

## Orchestrator

The EMPATIA component includes the Orchestrator sub-component that is responsible for managing the communication between the diverse components, and assures management functionalities for specific features, such as content management for a given entity. The overall functionalities supported by this component are summarized in Table 7.

**Table 7 – Functionalities of EMPATIA - Orchestrator Component**

ID	Functionality	Associated Requirement
F133	Management of Menus (per entity)	FR117 – Management of Menus
F134	Management of Authentication Methods (per entity)	FR118 – Management of Authentication Methods FR2 – Login with credentials FR3 – Login with QRCode FR4 – Login with RFID Cards FR5 – Login with Alphanumeric code via SMS FR6 – Login with Identity card FR7 – Social Media Integration
F135	Management of User Roles (per entity)	FR119 – Management of User Roles
F136	Management of PADs parameters templates (per entity)	FR125 – Managements of PADs Entities FR136 – Management of PADs parameters templates
F137	Management of Co-Construction (e.g. work in groups)	FR137 – Management of Co-Construction
F138	Management of Countries (per entity)	FR120 – Countries management
F139	Management of Currencies (per entity)	FR121 – Currencies management
F140	Management of discussions (per entity)	FR122 – Discussions
F141	Management of entities	FR123 – Entities management
F142	Management of languages (per entity)	FR124 – Languages management
F143	Management of layouts (per entity)	FR138 – Management of layouts
F144	Management of PAD Entities (e.g. to map PADs for each entity)	FR125 – Management of PADs Entities FR32 – Forums FR33 – Ideas FR34 – Proposals FR35 – Discussions
F145	Management of Forums (per entity)	FR126 – Forums
F146	Management of Geographic Areas	FR127 – Entities management
F147	Management of Home pages configurations	FR139 – Management of Home pages
F148	Management of Home pages types	FR139 – Management of Home pages
F149	Management of User Groups (e.g. departments)	FR128 – Management of User Groups
F150	Management of Ideas (per entity)	FR129 – Ideas

F151	Management of newsletter subscription	FR130 – Management of newsletter
F152	Management of permissions	FR131 – Management of permissions
F153	Management of proposals	FR132 – Management of proposals
F154	Management of public consultation (per entity)	FR133 – Management of public consultation
F155	Management of Thematic Consultation (per entity)	FR154 – Management of thematic consultation
F156	Management of roles (per entity)	FR134 – Management of roles
F157	Management of Time zones	FR135 – Management of time zones
F158	Management of PADs' Parameters	FR145 – Management of PADs' parameters
F159	Management of PADs' Parameters Options	FR146 – Management of PADs' parameters Options
F160	Management of PADs' Parameters Types (e.g. fields to apply to each PAD)	FR147 – Management of PADs' parameters types
F161	Management of User Parameters Options (per entity)	FR149 – Management of User parameters options
F162	Management of User Parameters (per entity)	FR148 – Management of User parameters
F163	Management of Vote methods (per entity)	FR156 – Management of vote methods
F164	Management of Kiosks (per entity)	FR140 – Management of Kiosks
F165	Management of Kiosks Types (per entity)	FR141 – Management of Kiosks types
F166	Management of Modules (e.g. association of new components)	FR142 – Management of Modules
F167	Management of Modules Types (e.g. options in menus and others)	FR143 – Management of Modules types
F168	Management of newsletter subscriptions (per entity)	FR130 – Management of Newsletter subscription
F169	Management of Site Configurations (per entity)	FR150 – Management of Site Configurations
F170	Management of Site Configuration groups (per entity)	FR151 – Management of Site Configurations groups
F171	Management of Translation Configurations (per entity)	FR153 – Management of Translations
F172	Management of Sites (per entity)	FR152 – Management of Sites
F173	Management of Users (per entity)	FR155 – Management of users

## Projects (2<sup>nd</sup> PB Cycle)

The 2<sup>nd</sup> PB Cycle component allows the management of the 2<sup>nd</sup> cycle of participatory budget projects. The supported functionalities are documented in Table 8.

**Table 8 – Functionalities of 2<sup>nd</sup> Cycle Component**

ID	Functionality	Associated Requirement
F174	Implementation monitoring: a) management of projects structured in subprojects b) management of preconfigured subproject, structured in Documents, Expenditures, Phases, News c) Dynamically creation of new elements in projects and subproject	FR180 – Implementation monitoring

F175	Support community building and co-implementation	FR181 – Community building and co-implementation
F176	Support management of evaluation	FR182 – Evaluation management

### 2.2.3 Files

The Files component is responsible to assure all the functionalities associated with files. The overall functionalities supported by this component are summarized in Table 9.

**Table 9 – Functionalities of Files Component**

ID	Functionality	Associated Requirement
F177	Download Files	FR101 – File Download
F178	Upload Files	FR100 – File Upload
F179	Get File list	FR103 – File list
F180	Index Images	FR104 – Index Images
F181	Generate upload Keys	FR100 – File Upload FR102 – Chunked Upload
F182	Search Files	FR105 – Search files
F183	Chunked upload	FR102 – Chunked upload
F184	Manage File usage	FR106 – Manage file usage and access rights
F185	Manage Access rights	FR106 – Manage file usage and access rights

### 2.2.4 Logs

The Logs component manages all the logging functionalities of the platform. The overall functionalities supported by this component are summarized in Table 10.

**Table 10 – Functionalities of Monitoring Component**

ID	Functionality	Associated Requirement
F186	Management of logs at Database	FR107 – Management of logs at Database
F187	Management of logs at Graylog	FR108 – Management of logs at Graylog
F188	Performance graphs of components	FR109 – Performance graphs of components
F189	Export performance data of components in JSON	FR110 – Export performance data
F190	Support multiple data sources	FR111 – Support multiple data sources of logs

### 2.2.5 Noty

The Noty component manages the participation model for the participation channels. The overall functionalities supported by this component are summarized in Table 11.

**Table 11 – Functionalities of Notifications Component**

ID	Functionality	Associated Requirement
F191	Management of Emails' Groups	FR112 – Emails Management
F192	Management of Email templates	FR112 – Emails Management

F193	Send Emails	FR112 – Emails Management FR113 – Notifications Management
F194	Time notifications (e.g. deadline of event approaching)	FR116 – Time notifications
F195	Support push notifications (SMS)	FR114 – Push notifications
F196	User subscribed notifications	FR115 – User subscribed notifications
F197	Support notifications for thematic consultation	Required by pilot(s)
F198	SMS management (receive/send)	Required by pilot(s)
F199	Platform notifications (users and managers)	Required by pilot(s)
F200	Associate notification to specific topic	Required by pilot(s)
F201	Real-time notifications	Required by pilot(s)
F202	Email newsletter	Required by pilot(s)
F203	SMS newsletter	Required by pilot(s)
F204	Send message to topic owners	Required by pilot(s)
F205	Support CB email template management	Required by pilot(s)

## 2.2.6 Q

The Q component assures the functionalities related with questionnaires. The overall functionalities supported by this component are summarized in Table 12.

**Table 12 – Functionalities of Questionnaires Component**

ID	Functionality	Associated Requirement
F206	Management of questionnaires	FR157 – Questionnaires
F207	Management of Question groups	FR158 – Question groups
F208	Management of Questions	FR159 – Questions
F209	Management of Questions Types	FR159 – Questions
F210	Management of Questions Options	FR159 – Questions
F211	Management of Forms	FR160 – Form builder
F212	Management of Form Configurations	FR160 – Form builder
F213	Management of Form Reply answers	FR160 – Form builder FR161 – Anonymous answers
F214	Anonymous Answers	FR161 – Anonymous answers
F215	Answers reports and analytics	FR162 – Answers reports and analytics
F216	Export answers to PDF	FR163 – Export answers
F217	Export answers to Excel	FR163 – Export answers
F218	Management of Icons	FR160 – Form builder
F219	Management of Event Schedules	FR160 – Form builder
F220	Management of Participants in Questionnaires	FR160 – Form builder
F221	Data Anonymization	FR164 – Data Anonymization
F222	Support Quick Questionnaires	Required by pilot(s)

## 2.2.7 Vote

The Voting component assures the functionalities related to voting processes. The overall functionalities supported by this component are summarized in Table 13.

**Table 13 – Functionalities of Voting Component**

ID	Functionality	Associated Requirement
F223	Management of Votes	FR166 – Vote Methods management FR165 – Votes sessions management
F224	List Votes	FR169 – List Votes
F225	Details of Votes	FR165 – Vote Methods management
F226	Timeline of Votes	FR166 – Vote Methods management FR165 – Votes sessions management
F227	Management of Votes Methods	FR166 – Vote Methods management
F228	Management of Votes Method Groups	FR166 – Vote Methods management
F229	Management of Events Votes	FR165 – Votes sessions management
F230	Submit votes	FR167 – Set/unset votes
F231	Statistics of Votes per Event	FR165 – Votes sessions management
F232	Votes Rules	FR165 – Votes sessions management FR166 – Vote Methods management
F233	Event Votes	FR165 – Votes sessions management
F234	Support anonymous voting	FR169 – Anonymous voting
F235	Support votes	Requested by pilot(s)
F236	Follow votes	Requested by pilot(s)
F237	In-Person vote	Requested by pilot(s)
F238	SMS vote	Requested by pilot(s)
F239	Paper blind vote	Requested by pilot(s)
F240	Voting receipt	Requested by pilot(s)
F241	Export user with votes and topics information	Requested by pilot(s)

## 2.2.8 WUI

The WUI component is responsible to receive all user requests and forwarding them to the right component. This component, according to the Model View Controller (MVC) paradigm, focus mainly on the view part, as detailed in section 3.1.

**Table 14 – Functionalities of WUI Component**

ID	Functionality	Associated Requirement
F242	Design template management	FR91 – Design Template FR136 – Management of PADs parameters templates
F243	Email template management	Requested by pilot(s)
F244	Translation management	FR153 – Management of Translations configurations per entity
F245	Visualization of information	FR14 – Participation analysis

F246	Support responsive technology	NFR4 – Usability NFR8 - Adaptability
F247	Support security mechanisms (e.g. mitigation of cross-site scripting attacks)	NFR3 – Security
F248	Support simple and flexible interfaces (easy to maintain)	NFR4 – Usability NFR7 – Flexible deployment
F249	Support configuration of entities	NFR6 – Configurability
F250	Support configuration of EMPATIA components	NFR6 – Configurability NFR7 – Flexible deployment

Another specific implementation of an WUI are the Kiosks developed in the project. These Kiosks are hardware components but include a software part that correspond to an WUI implementation. Table 15 describes the functionalities of the WUI component integrated in the Kiosks hardware. This component communicates with the required components to gather and update PADs and vote data.

**Table 15 – Functionalities of WUI (Kiosk) Component**

ID	Functionality	Associated Requirement
F251	Vote with Kiosks	FR174 – Define Channels for participation
F252	Login in Kiosks	FR172 – Support multiple authentication methods
F253	Logout in Kiosks	FR172 – Support multiple authentication methods FR173 – Support Authorization Policies
F254	Show/Select a proposal/Idea	FR175 – Show proposals
F255	Show multiple topics at the same time	FR174 – Define Channels for participation
F256	Support multiple types of kiosks (without and with screen)	FR174 – Define Channels for participation
F257	Support multiple languages	FR176 – Support multiple languages
F258	Support touch paradigm	Required by pilot(s)



## 3 EMPATIA Platform

This section describes the final prototype of the EMPATIA Platform at M27. Despite the challenges, the EMPATIA Platform successfully achieved all EMPATIA goals (c.f. section 6) by having a functional platform that was validated in several participation processes worldwide (more than 20, that range from national wide Participatory Budgeting to simple consultations processes).

The following sub-sections detail the most relevant EMPATIA Platform development aspects, including specific development choices, the interfaces, the EMPAVILLE role-playing game and the developed kiosks. In Section 4 are presented the events where EMPATIA Platform has been tested and validated. The evaluation of the EMPATIA Platform is documented in Deliverable D4.2 [41].

### 3.1 Development details

The EMPATIA Platform is developed in Laravel PHP framework [3], which allows the creation of applications according to the Model View Controller (MVC) paradigm. The following subsections provide details regarding the development status of each component in terms of:

- Database models
- Laravel core elements, such as routes, model, views and controllers

With the Laravel framework the routes correspond to the mapping of URLs to specific controller actions. In addition, these routes also make a distinction on the type of request that is performed, if it is a *get* or a *post* request.

#### 3.1.1 Database Models

The EMPATIA Platform consists of several databases, as described in Table 16. The EMPATIA component aggregates information from previous databases.

**Table 16 – Database models' details**

Database	Number of entities	Description
empatia_empatia	223	Database aggregating information from previous databases like the empatia_auth, empatia_pad, empatia_cm and empatia_orchestrator.
empatia_events	12	Database with the information of sessions, speakers, sponsors and events.
empatia_files	2	Information regarding files that have been uploaded.
empatia_monitor	9	Database with information regarding logs of components. This database has been updated to include more information (e.g. monitoring of projects).
empatia_notify	15	Database with notifications information and re respective configurations. This database has been updated to support additional notifications (e.g. SMS receive, SMS send).
empatia_q	24	Database with configurations of questionnaires, question types, among others.
empatia_vote	18	Database with configurations of voting sessions, types of votes, and allowed kiosks (for voting)

### 3.1.2 Components details

The final components details are summarized in the Table 17. Such details are presented considering the MVC paradigm and additional details of Laravel, such as the number of routes (define the forwarding of information between components, usually in the *app/Http/routes.php* file), model (represent database entities, usually under the *database* folder), controllers (controlling objects that include the component logic, usually under the *app/Http/Controllers* folder) and views (the visual representation of data and interaction with users, usually in the *resources/view* folder).

**Table 17 – Components development details**

Component	Routes	Model	Controllers	Views
Analytics	44	1	4	2
EMPATIA	662	1	118	0
Events	22	1	9	2
Files	9	2	2	3
Logs or Monitoring	20	1	3	2
Notifications	31	1	10	5
Questionnaires	56	1	11	2
Voting	50	1	9	2
WUI	1124	2	135	2420
Kiosk	12	1	3	0
Design	14	5	8	0

WUI is the component with the higher number of routes, since its core functionalities correspond to forward the requests to the diverse components. The high number of routes is also justified by the fact of WUI implementing additional interfaces, such as the APIs for voting. WUI acts as the main interface to the platform, thus explaining the high number of views.

The EMPATIA component, aggregating functionalities of diverse components (recall section 2) has a high number of controllers and routes, since it is orchestrating the requests between the diverse components and handling all the logic to assure the authentication and authorization policies, within the diverse spaces of the platform.

### 3.1.3 External Tools and Libraries

The EMPATIA Platform has a twofold goal: easy integration of external tools and libraries; to be easily integrated in external tools. This section presents the external tools and libraries integrated in the EMPATIA Platform.

External tool	Description
Graylog	<p>Graylog [9] is a monitoring platform to collect log data from several components. The main advantages rely in the integrated Elastic Search support, which allows a fast search of data (in the order of terabytes), and fully customized in performance dashboards.</p> <p>The EMPATIA Platform is designed to provide data to Graylog, regarding components performance and users' activity, which can be combined with the data from the servers where such components run (e.g. CPU usage, memory and other system metrics). The Graylog integration is complete and being used for several purposes, including performance analysis.</p>

Google Analytics	Google Analytics [23] is a tool that allows to collect insights regarding the usage of the EMPATIA platform in the diverse pilots. This tool allows to collect metrics allowing the analysis of type of clients accessing the diverse sites with the EMPATIA platform (e.g., User Agent, Operating System), the location of clients (i.e., Europe, EUA) among others.
Piwik/Matomo	The Matomo tool [24] allows also to gather analytics, but opposed to Google Analytics, this solution is deployed in the infrastructure where EMPATIA platform is also deployed. Google Analytics is hosted at google. Piwik provides flexibility and a finer control over the analytics regarding the usage of the EMPATIA platforms.
Google reCAPTCHA	Google reCAPTCHA [25] is employed in the components with forms for user input. In particular, reCAPTCHA provides protection against bots or other mechanisms to fill forms automatically in order to assure that real persons provide the input required in the form fields. A Citizen providing some details, for instance, required during the registration in the EMPATIA platform state that they are not robots, by selecting images under certain criteria required by the reCAPTCHA mechanism.
Google Maps	The tool of Google Maps [26] is employed to provide mapping services in the diverse EMPATIA components. For instance, to locate the project proposals some ideas or others. The EMPATIA platform uses the Google Maps API [27] to integrate the mapping services in the diverse User Interface elements of the components' pages.
OSM	The support for geolocation in the EMPATIA platform also includes the OpenStreetMap services [28], which include an open license. EMPATIA platform also uses the available OpenStreetMap APIs to plot the location of projects, ideas or other items.
Go4Mobility	The Go4Mobility [29] provides SMS services to allow the SMS channel in the EMPATIA platform. Such services include the bulk send of SMS messages, the management of security functions (such as password recovery with an SMS code) among others. The Go4Mobility was employed in the Lisbon pilot.
BulkSMS	The BulkSMS [66] provides SMS services to allow two-way communication services. This service was employed in the Wuppertal pilot.
Skebby Cloud SMS	The Skebby cloud SMS [30] provides functionalities to manage sending and receiving high volume of SMS messages. The functionalities provided and used by the EMPATIA platform are similar to the Go4Mobility solution. This tool was employed in the applications of BiPart (e.g., Monza, Pavia and others).
Lime Survey	The LimeSurvey tool [8] allows the elaboration of surveys with different functionalities than the ones supported by the questionnaires component. Indeed, through LimeSurvey, the questions of surveys can be based on files, instead of regular text, as commonly found. LimeSurvey was selected to integrate EMPATIA Platform external tools to complement the Questionnaires component for research specific surveys that would require significant changes and effort to the current component.
Apache Solr/Lucene	The Apache Solr/Lucene tool adds full-text search, hit highlighting, faceted search and real-time indexing to the EMPATIA platform to support the filtering and aggregation features.
CKAN	CKAN is an open source open data platform that is widely spread, specifically in Europe. The EMPATIA Platform open data feature has been tested and validated with this tool.
DKAN	DKAN is an open source open data platform that is widely spread, specifically in US (CKAN alternative). The EMPATIA Platform open data feature has been tested and validated with this tool.
MQTT	MQTT, Message Queuing Telemetry Transport, is an ISO standard publish-subscribe-based messaging protocol that works on top of the TCP/IP protocol.
Liberopinion	The Liberopinion tool [42] is a commercial digital platform to support the communication between municipalities and the citizens. This platform is used by Lisbon to support participatory budget processes.
myCascais	The myCascais tool [43] is the authentication system used by Cascais for the participatory platform, supporting the Single Sign On (SSO) functionality.

This section presents the external libraries integrated and used in the EMPATIA platform. These libraries have been employed for specific tasks, for instance to manage cookies, to handle HTTP requests more efficiently.

External library	Description
Annotator	Annotator [10] is a JavaScript library to promote collaborative editing of simple documents (e.g. for notes) since it supports track of comments made in text. Similar to the track-changes functionality found in Microsoft Word, the provided comments can be used to make the request to change or remove the text selected.
Laravel Facebook Sdk	The Laravel Facebook SDK [11] is a library for Laravel to make the interface with Facebook. This library simplifies the requests between EMPATIA websites and the Facebook API's.
Laravel Cookie Consent	The Laravel Cookie Consent [12] is a library to allow the management of the cookie consent pop-ups, as required in the Data Management Plan of EMPATIA.
Laravel Snappy PDF	The Laravel Snappy PDF [31] is library that implements additional functionalities to export the information from the EMPATIA Platform to a PDF file.
Agent	The Agent library can be used to make track of device accessing the EMPATIA Platform, allowing to handle a set of metadata that is relevant to statistics, such as the employed User Agent (i.e. Safari, Firefox, Chrome), operating system where User Agent is running.
Laravel Tiny MCE	The Laravel Tiny MCE [15] is a library that is used to support the WYSWYG (What you see what you get) paradigm, by enabling a text editor for HTML code. This tool is relevant in the configuration of pages, spaces by a given entity that may not have technical skilled persons.
Dotdotdot	The dotdotdot [16] is a JavaScript library that is used to hide the extra text in a define space.
Laravel Purifier	The Laravel Purifier [17] is a library that can be used to clean the texts from HTML injection.
Swagggervel	The Swagggervel [18] is a library for Laravel to make the documentation of APIs according to the Open API Initiative (OAI) [19]. The examples of the documentation produced with this tool are presented in D2.3 for the API of components [6].
Vinelab HttpClient	The Vinelab HttpClient [35] is a library in PHP that streamlines and simplifies HTTP requests to send and receive JSON data.
Yajra Laravel Datables	The Yajra Laravel Datables [36] integrates the DataTables Javascript library [37] in the Laravel framework simplifying the usage of AJAX requests to load and search data in the tables in WUI.
Tymon JWT-Auth	The Tymon JWT-Auth library [38] is an implementation of the JSON Web Tokens standard [39] that seamlessly integrates with the Laravel Framework.
Bootstrap	The Bootstrap library [44] allows to build responsive layouts and templates based on HTML, CSS and JavaScript. In particular the Bootstrap Datepicker and the Bootstrap ClockPicker are employed to format dates and time values correctly in different devices.
JQuery	The JQuery is a JavaScript library [45] that allows HTML document traversal and manipulation, event handling and animation across multiple browsers.
Sticky	Sticky [46] is a jQuery plugin that allows to manage the visibility of elements in HTML pages
Image Gallery	Library to manage the gallery of images.
Fontawsome	FontAwesome is an icon set and toolkit with vector icons and social logos, which are used in EMPATIA for the aesthetics of icons and logos.
Fonts	Framework with several available fonts.
AdminLTE 2	The AdminLTE 2 [53] tool include themes for dashboards and provides a control panel for menus and related actions.
AdminLTE Slim Control	This plugin [54] for AdminLTE 2 allows to customize AdminLTE 2 to enhance the aesthetics of scrollbars.

AdminLTE Fast Click	This plugin [55] for AdminLTE 2 allows to remove the delay in mobile devices between the touch and the click event.
Chart JS	The ChartJS [56] is employed in several components of EMPATIA, mainly analytics to enable visualization of data in graphics.
CodeSeven Toastr	This tool [57] allows to manage the JavaScript toast notifications (i.e. non-blocking) in the EMPATIA pages.
D3 Plus	This library [58] allows to produce data visualizations easier when compared with D3.
dbushell Nestable	This plugin [59] for jQuery allows to implement drag & drop functionalities in HTML documents.
Desandro Draggably	This plugin [60] for jQuery allows to implement drag & drop functionalities in HTML documents.
Navadiya Circular Countdown	This plugin [61] for jQuery implements circular countdown.
REDIPS	This plugin [62] for jQuery allows to implement drag & drop functionalities in HTML documents, especially for content in tables.
Select 2	This plugin [63] for jQuery allows to customize select boxes to support searching, tagging.
Socket.io	This library [64] is employed in EMPATIA for real-time analytics, instant messaging and chat.
Tether	This plugin [65] for jQuery is employed in EMPATIA to manage the position of elements more efficiently in a page.

### 3.1.4 Security mechanisms

The platform of EMPATIA includes diverse security mechanisms that aim to comply with the security requirements identified in D2.1 [1] and D2.3 [6]. The mechanisms implemented in the first version of the platform, as documented in D2.2 [21] have been kept, and no additional mechanisms have been added, since no pilot or application required additional security mechanisms rather than the ones already implemented. The following subsections summarize the main implemented mechanisms.

#### JSON Web Tokens

The JSON Web Tokens (JWT) are a standard to represent security between two parties and is specified in RFC7519 [4]. The jwt-auth library, a third-party library is integrated in the EMPATIA Platform to assure the JWT functionalities, according the specification of RFC7519.

The JWT tokens are generated on a successful authentication process, by the Auth component. The token is provided on each request. Upon reception, the token is validated to check if it is not expired and if corresponds to a valid token (i.e. triggered by a successful authentication process).

#### Secure access to data

The access to data is always performed according to the user role, that is to say that a regular user (i.e. citizen) cannot access to the restricted data, which only managers, super managers or admins can access. Such access restrictions are implemented through the orchestrator and other components.

#### Protection of formularies

Diverse techniques, applications are available in the Internet to automate the filling of the different fields in the forms. The EMPATIA platform uses in specific key features the re-CAPTCHA mechanism to assure that only humans are able to submit the information in formularies.

## **Strong Authentication mechanisms**

Strong authentication mechanisms are included in EMPATIA [49]. Besides the guarantee that certain resources are available upon successful authentication, login throttling mechanisms are also included. Specially to avoid brute force attacks on logins, where on several failed attempts to login, a user must wait a certain period.

## **Authorization Policies**

Through the use of several policy mechanisms it is possible to authorize users' actions against certain resources, through the use of policies that can be defined according to each entity. For instance, through this functionality it is possible to guarantee that only the authorized users can create or update posts.

## **Cross-site scripting protection**

Web attacks explore cross-site scripting (XSS) vulnerabilities, where client-side scripts are injected into web pages, so that authentication or policies controls can be overridden. EMPATIA provides protection for XSS vulnerabilities through escaping any HTML entity to secure variables used in the diverse elements of HTML pages.

## **Cross-site Request Forgery protection**

Cross-site Request Forgery attacks are employed to exploit flaws in the authentication process, to force updates on the users' profiles or have access to privileged information. EMPATIA employs CSRF tokens to assure that CSRF requests are not initiated.

## **SQL Injection protection**

This type of attack is performed by modifying the query intent, for instance, to return all the records of the users table. EMPATIA uses parameter binding to assure that the query's intent is not modified. Such protection is performed by quoting the diverse parameters in the query's data.

## **Encryption**

Sensitive information, like passwords is encrypted using AES-256 encryption mechanisms [50], which are available in OpenSSL library. Laravel's also signs the encrypted values using Message Authentication Code (MAC) to assure that the underlying value cannot be modified once encrypted.

## **Advanced Logging and Monitoring**

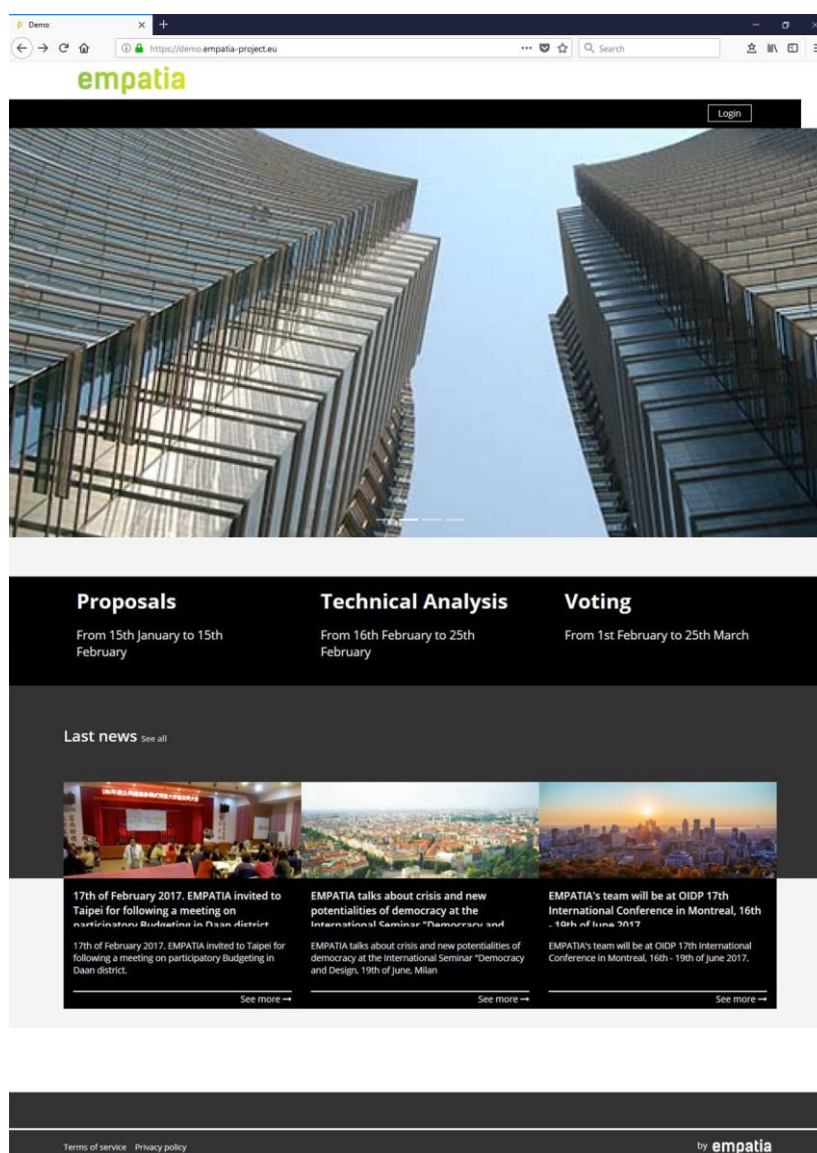
As per the recommendations of OWASP [51], EMPATIA employs logging mechanisms and monitoring mechanisms to allow the detection of any suspicious activity. Such detection can rely on Intrusion Detection and Prevention Systems, which require probes (information) to perform the analysis of security related events.

## **3.2 User Interfaces**

As described in Deliverable D2.1 the EMPATIA Platform architecture is composed of several components. Each component has its own purpose and manages all related features. The overall EMPATIA components features culminate in the WUI component where an EMPATIA web interface demonstrates all functionalities of the platform. The platform considers three types of spaces: Admin, Manager and User.

Figure 3 presents EMPATIA Platform default home page available at <https://demo.empatia-project.eu/>.





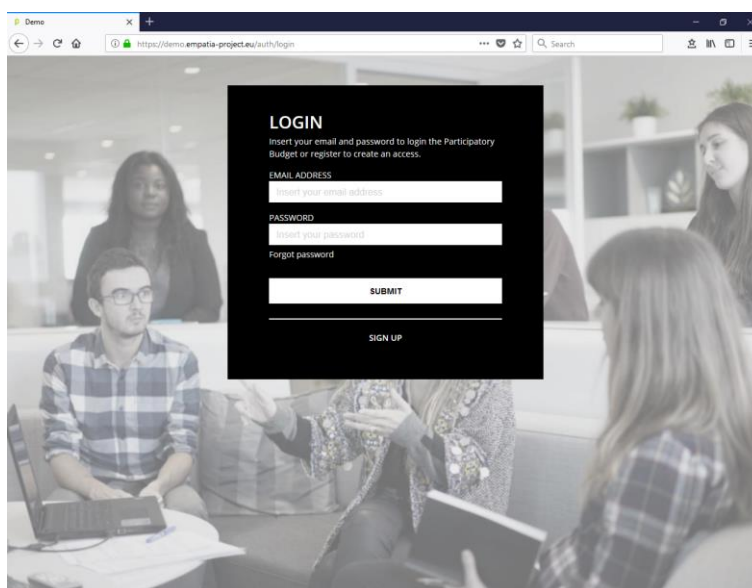
**Figure 3 – Home screen example**

In this figure, it is possible to identify several main aspects that are managed by the EMPATIA Platform:

- Languages
- Login/registration
- Menus
- Home page with dynamic content
- EU Cookies notification

All public available information is managed by the EMPATIA Platform backend, and the participation tools available (ex.: forums, discussions, ideas, voting) can be available to all visitants or only to authenticated users (depending on their configuration).

Accessing the “Login” option in the home page, Figure 4, the user is presented with the option to perform the login by introducing the email and password. This specific deployment is configured to support registration and social networks login.



**Figure 4 – Login screen**

A successful login can redirect the user to one of the following areas: if an administrator or a manager, to the EMPATIA Platform backend; if a user, to the home page.

Next sections present some example screen of the three user spaces available in EMPATIA Platform.

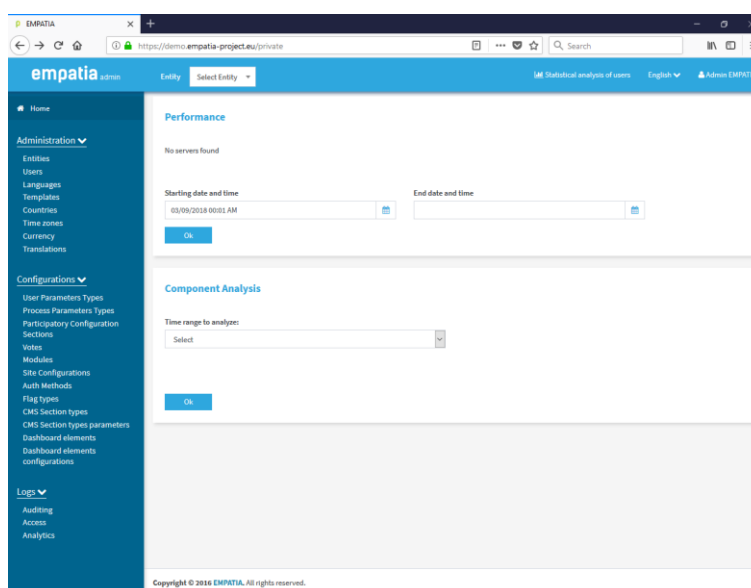
### 3.2.1 Administrator space

The Administrator space is where the administrator has access to every component in the platform, its role is to monitor all the entities and to perform general configurations. As such, the admin is able to manage entities and their configurations, the languages, the time zones, the countries, the type of votes, the customization of PADs, the authentication methods and management of layouts, among other features.

The administrator is able to manage all entities in the system. A user with this access can, for each entity, access the entity manager space as described in the next section.

After login, an EMPATIA Platform administrator is presented with the backend home screen, Figure 5. In this screen, it is available the admin menu that allows the administrator to perform all the administration tasks.





**Figure 5 – Administrator home screen**

The Administrator menu has the following options:

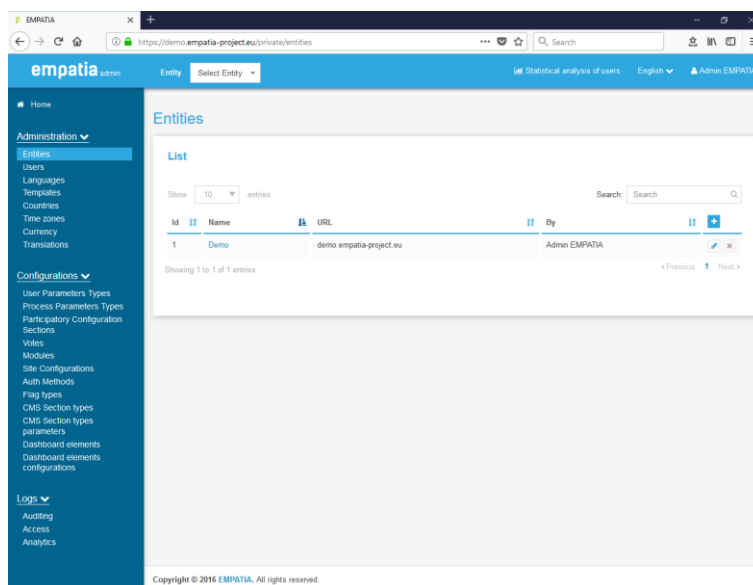
- Administration
  - Entities
  - Users
  - Languages
  - Templates
  - Countries
  - Time zones
  - Currency
  - Translations
- Configurations
  - Users Parameters types
  - Process Parameters types
  - Participatory Configuration sections
  - Votes
  - Modules
  - Site configurations
  - Auth methods
  - Flag types
  - CMS Section types
  - CMS Section types parameters
  - Dashboard elements
  - Dashboard elements configurations
- Audit
  - Auditing
  - Access
  - Analytics

The next sub-sections detail the most relevant functionalities available to the administrator. Many of the configurations available to the Administrator are directly mapped to specific features available in the platform code. This dynamic configuration of options facilitates the incorporation and deployment of new features.

## Entities

This area allows the administrator to manage all entities in the platform. Each EMPATIA Platform can manage an unlimited number of entities, each with their own specificities.

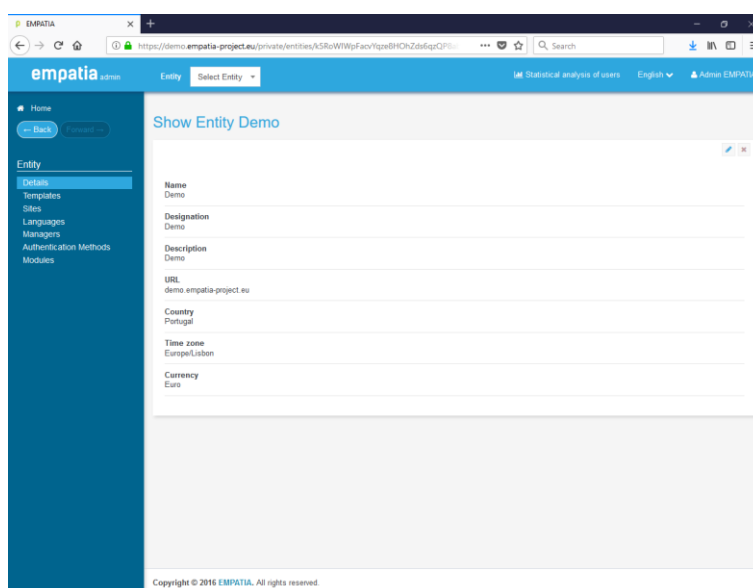
Figure 6 presents the entities list screen. This screen allows the user to visualize all the configured entities, view its details, remove entities or add a new entity.



**Figure 6 – Entities list**

The entity details screen presents all the relevant details of the entity, starting by the generic entity details like the name, description, URL. Figure 7 presents the entity configured template, sites, languages, managers and authentication.

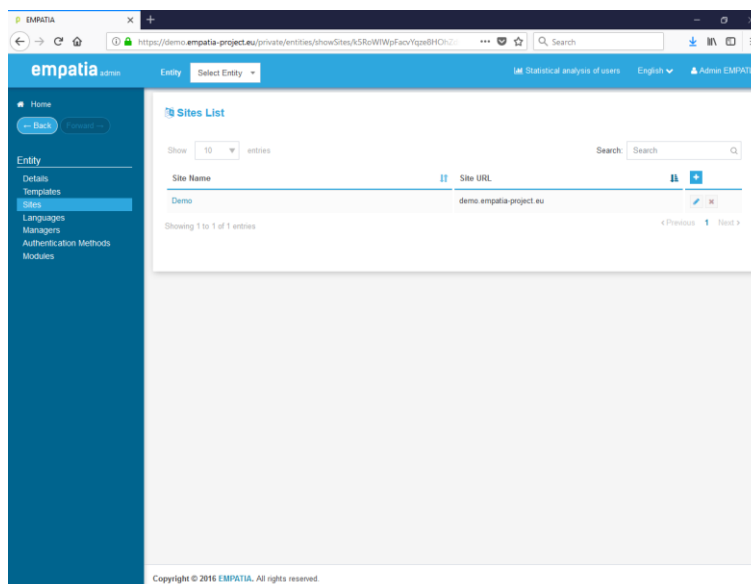
The template represents the graphical design views of the public EMPATIA pages, composed of HTML, JavaScript and minor PHP code. Each template must implement all EMPATIA required views (ex.: home, pages, ideas, forums, discussion). These templates are similar to template features in some of the most known CMS (ex.: Drupal, Joomla, WordPress). One entity can have several templates configured, either due to historical reasons, or different layouts for different sites.



**Figure 7 – Entity configuration screen**

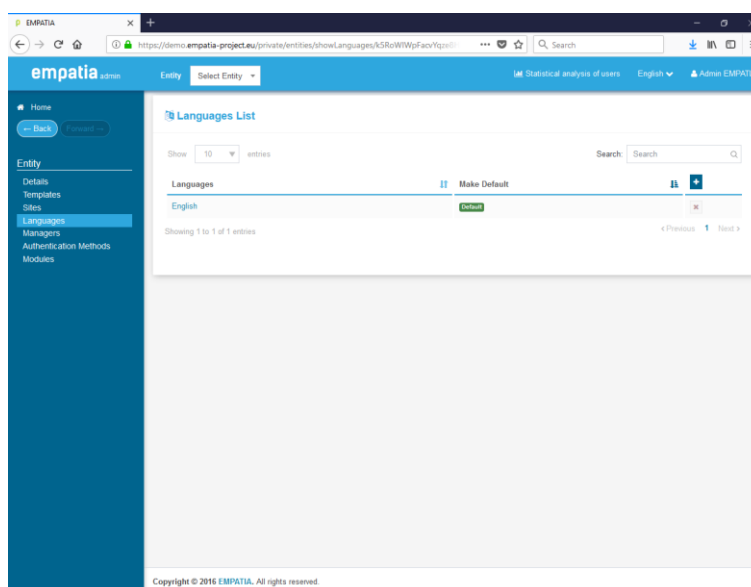
One site represents a specific URL and configuration of the EMPATIA Platform. An entity can have several sites, as depicted in Figure 8, to address different participation requirements, like, one site for

the PB process and another for a continuous participation process composed of ideas and discussions. By default, these sites are independent, sharing only the users' database, some notifications configurations and management backend.



**Figure 8 – Entity site list**

In the language section, Figure 9, it is possible to configure the entity supported languages and the default language.



**Figure 9 – Entity language configuration**

The managers section, allows the administrator to view, remove or add a manager of the entity. The managers are the users that are able to configure the entity. The administrator can associate an existing user, or create a new user, as a manager.

Finally, the administrator can configure the supported authentication methods available in the entity. The available options are: EMPATIA auth, LDAP, Facebook, Google, myCascais. Other authentication options (ex.: proprietary authenticators) can be added by creating a specific authentication driver.

## Languages

This menu option, Figure 10, allows the administrator to manage the system languages. Each language configured must implement all translations required by the EMPATIA Platform (public and private). The system languages include Czech, English, German, Italian and Portuguese.

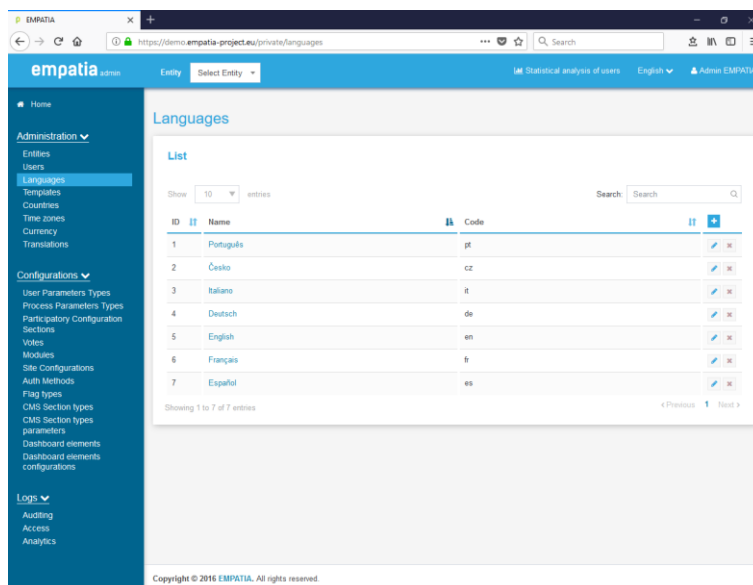


Figure 10 – Languages configuration

## Templates

This menu option allows the administrator to view and manage the different Templates that are available in the deployment of the platform. The Templates here defined are the ones that can be added to each of the entities created in the platform. The template code corresponds to the specific folder in the templates folder in the EMPATIA WUI file structure.

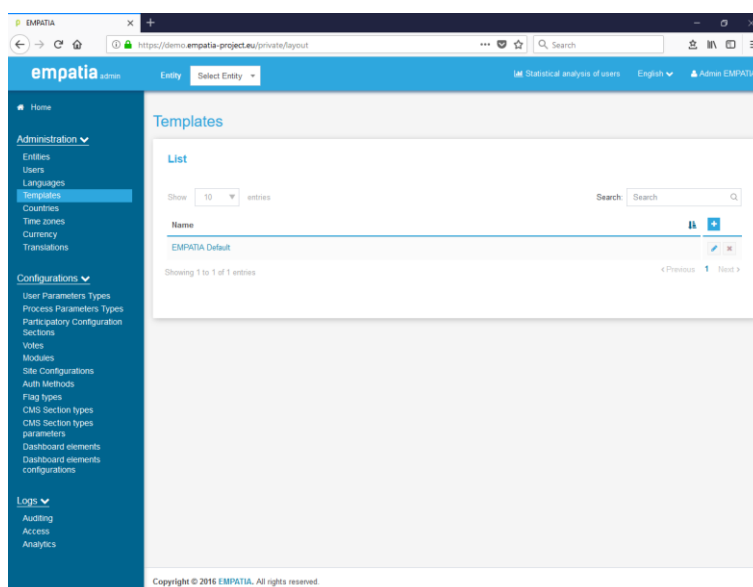


Figure 11 - Templates configuration

## Countries

This menu options allows the administrator to manage the countries available in the system.

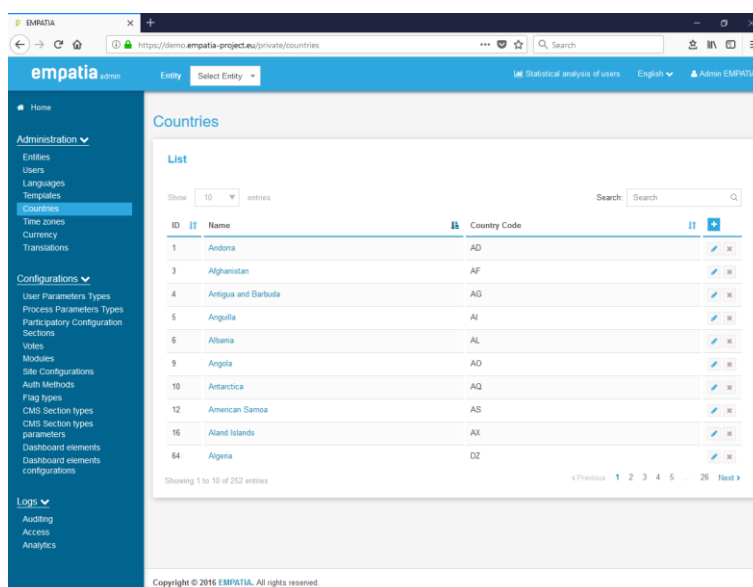


Figure 12 - Countries management

## Time zones

This menu option allows the administrator to manage the time zones available in the platform.

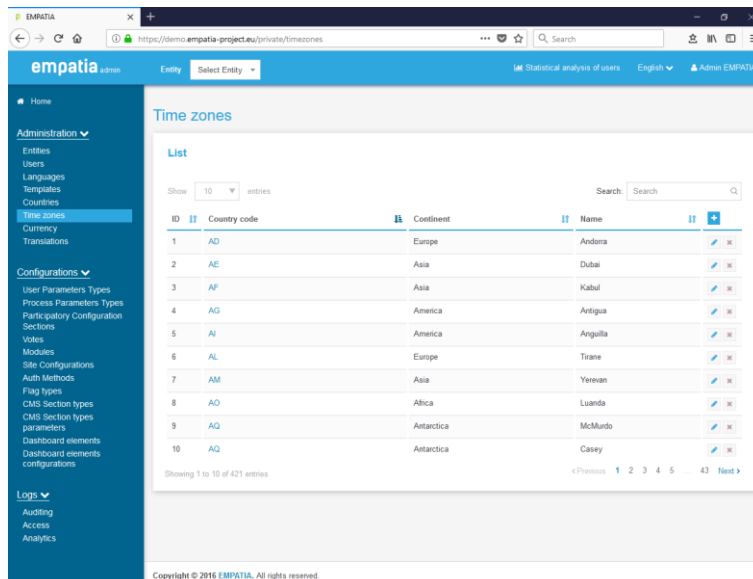


Figure 13 - Time zones management

## Currency

This menu option allows the administrator to manage the currencies available in the platform.

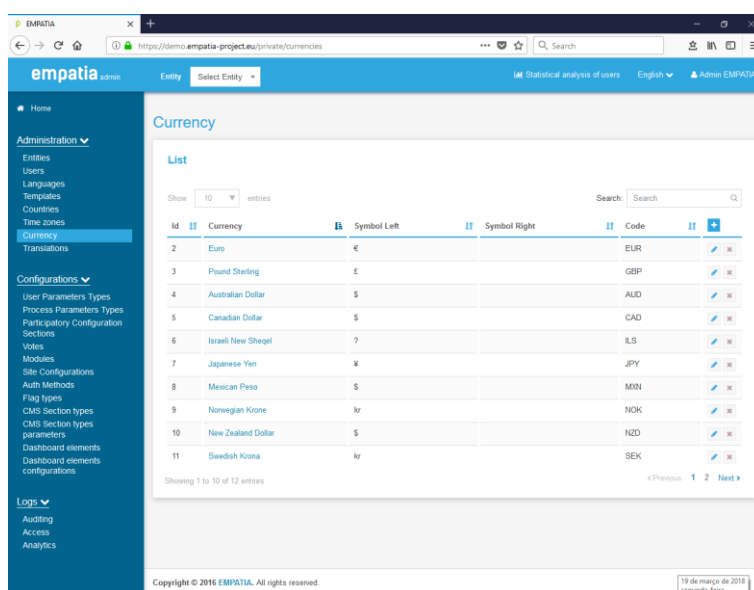


Figure 14 - Currencies management

## Translations

This menu option allows the administrator to manage the backend translations. These are the static and common translations of the platform, while the translations of the public templates, which can be different from website to website, are managed by the manager in its area.

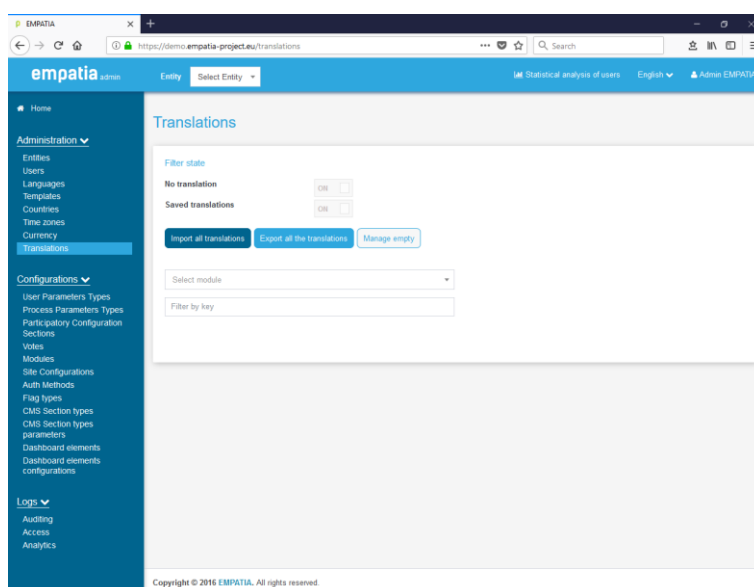


Figure 15 - Translations management

## User Parameters Types

This menu option allows the administrator to manage the type of parameters that are available for user, such as, text, checkboxes, radio buttons, etc.

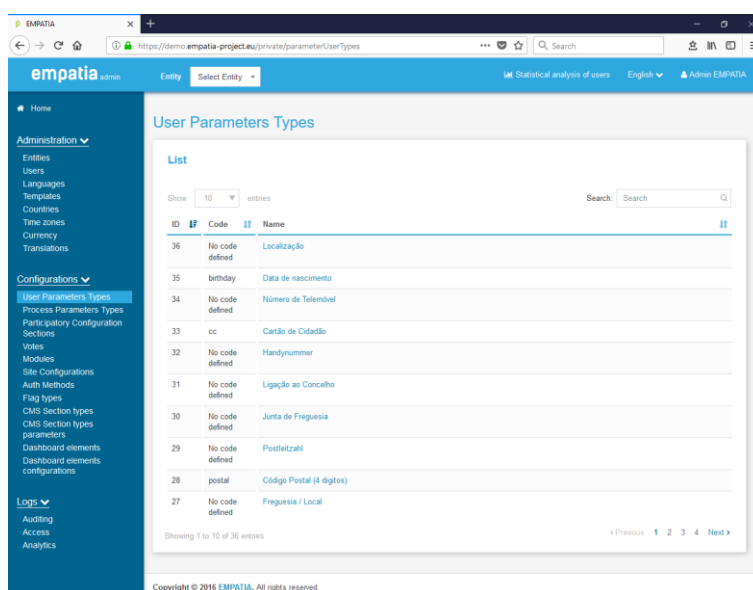


Figure 16 – User Parameter types management

## Process Parameters Types

This menu option allows the administrator to manage the type of parameters that are available in the platform, such as, text, checkboxes, radio buttons, etc.

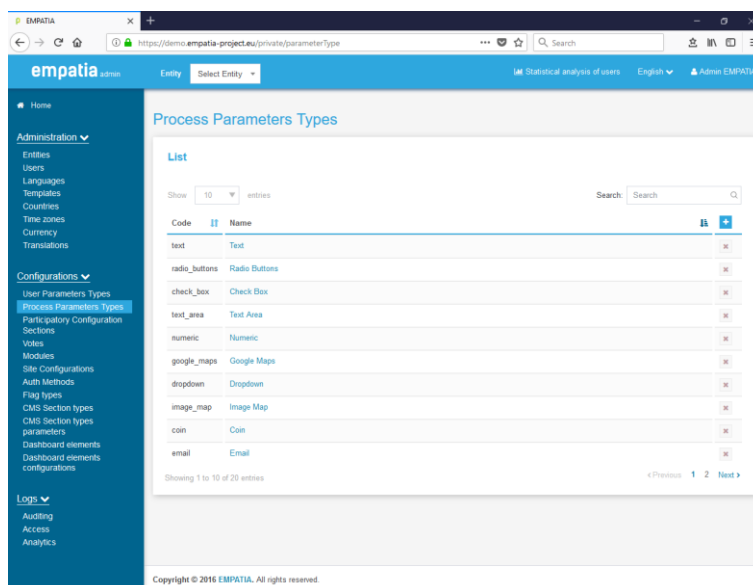


Figure 17 – Process Parameter types management

## Participatory Configuration Sections

This section allows the administrator to manage the Participatory configurations sections and the configurations themselves. The sections are used to better organise the configurations, which are divided in logical sections, such as, Security, Topics Options, Notifications, etc.

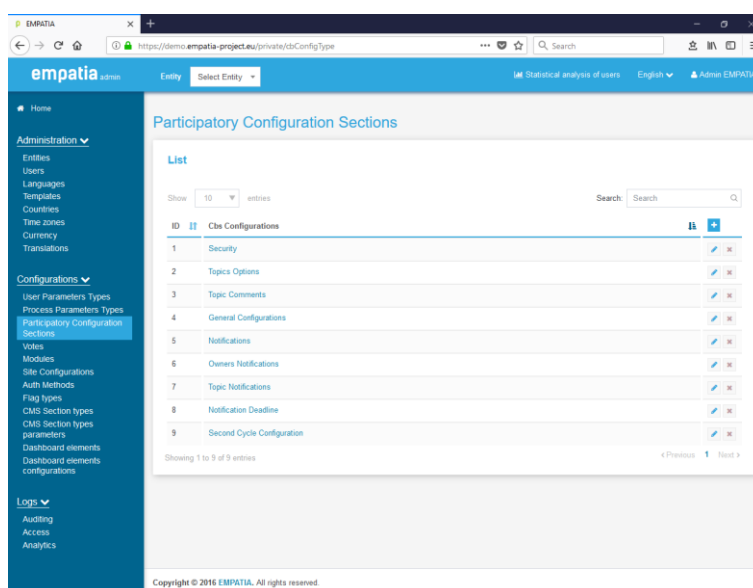


Figure 18 - Participatory Configurations management

## Votes

This menu option allows the administrator to manage the system voting methods and configurations. After deploying a new vote method in EMPATIA Platform file structure, the method needs to be configured in this section to be then enabled for each entity entitled to use it.

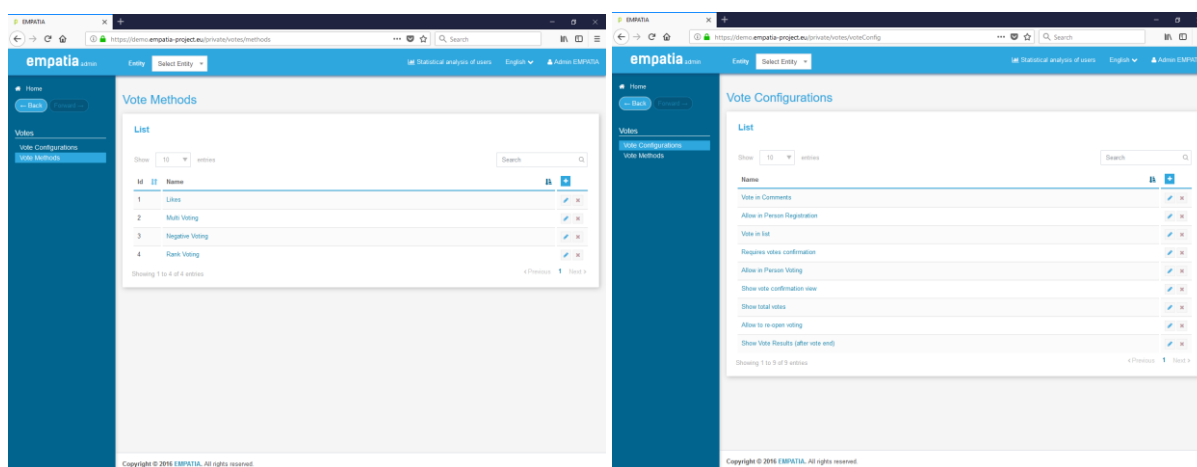


Figure 19 – Voting methods configuration

## Modules

This menu option allows the administrator to configure the available modules in the current deployment of the platform and the functionalities available per module.



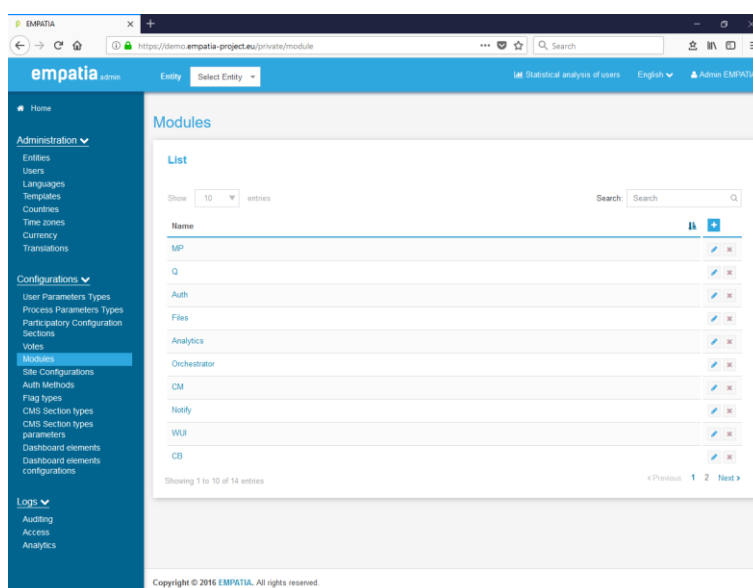


Figure 20 - Modules configuration

## Site Configurations

This menu option allows the administrator to manage the available site configurations. Like the Participatory Configuration Sections, these configurations are organised in multiple sections, such as, Generic Footer Configurations, Generic Design Configurations, Google Analytics, among others.

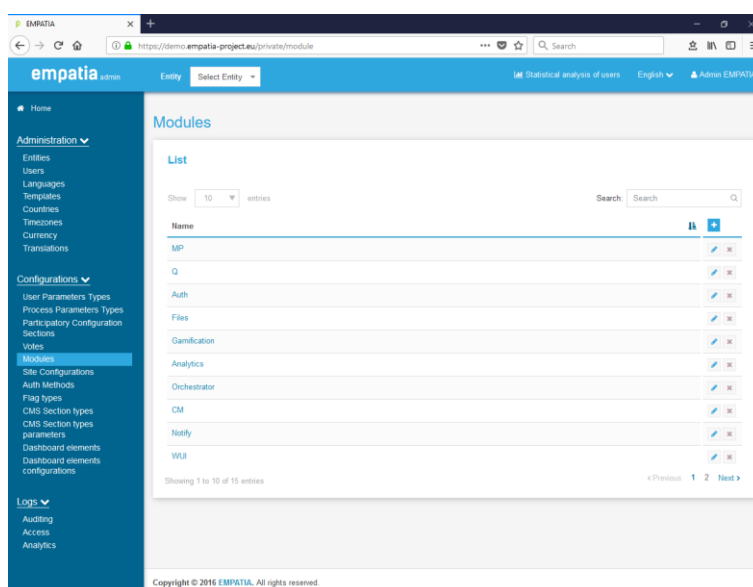


Figure 21 - Site Configurations

## Auth Methods

This menu option allows the administrator to manage the available authentication methods. When a new authentication driver is added to the platform it must also be added here so that it can then be associated with the entities which may use it.

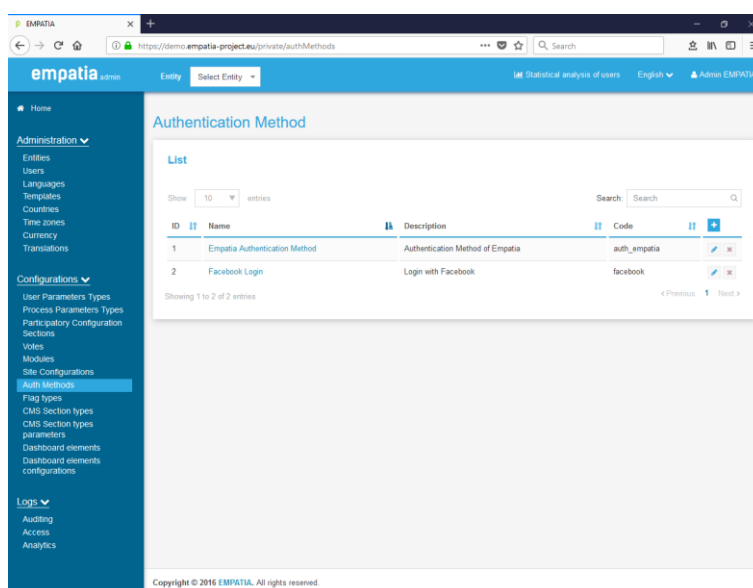


Figure 22 - Auth Methods management

## Flag Types

This menu option allows the administrator to manage the types of Flags existent in the platform. These types are, for example, Topics, Posts and allows to have different groups of flags available to associate to specific points.

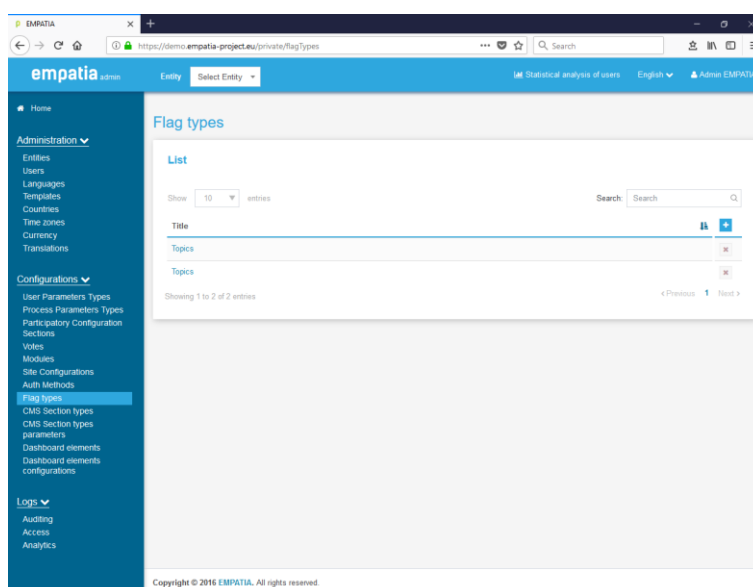


Figure 23 - Flag Types management

## CMS Section Types

This menu option allows the administrator to manage the CMS Section Types. These sections map to specific parts of the Template so when new sections are created here, they should also be added to the template, otherwise it will fail. Each Section has its own set of associated Section Type Parameters.

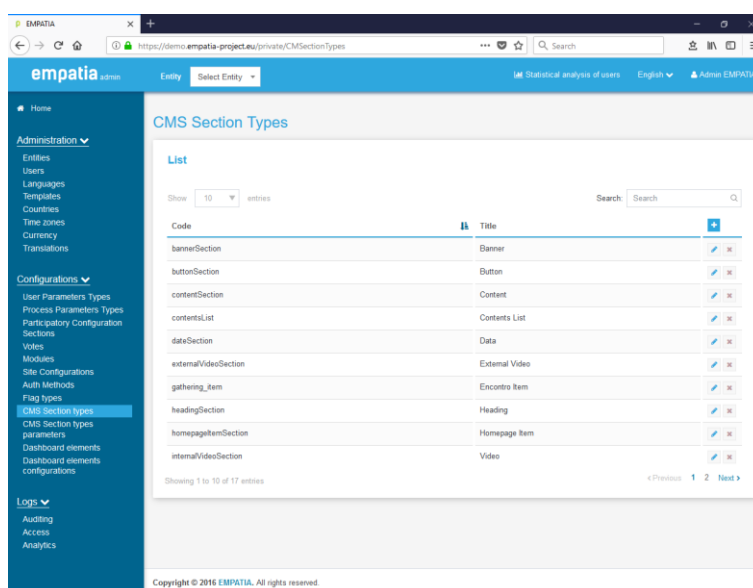


Figure 24 - CMS Section Types management

## CMS Section Types Parameters

This menu option allows the administrator to manage the CMS Section Types parameters. Each parameter reflects a mandatory or optional element of each CMS Section, such as the colour of the element, or the link it sends to.

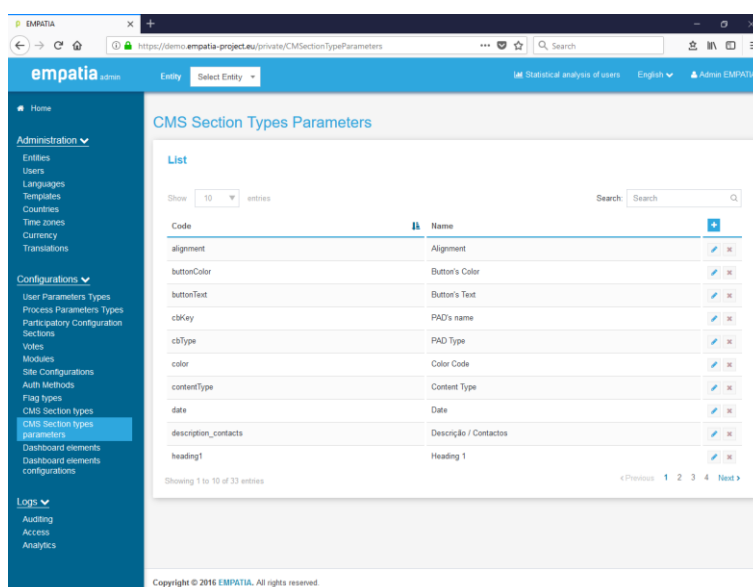


Figure 25 - CMS Section Type Parameters management

## Dashboard Elements

This menu option allows the administrator to configure the available dashboards. The available ones can later be selected by the managers of each entity to display relevant information on the entity homepage. Each Dashboard Element has a set of configurations associated to it that are configured when the element is added to an entity dashboard.

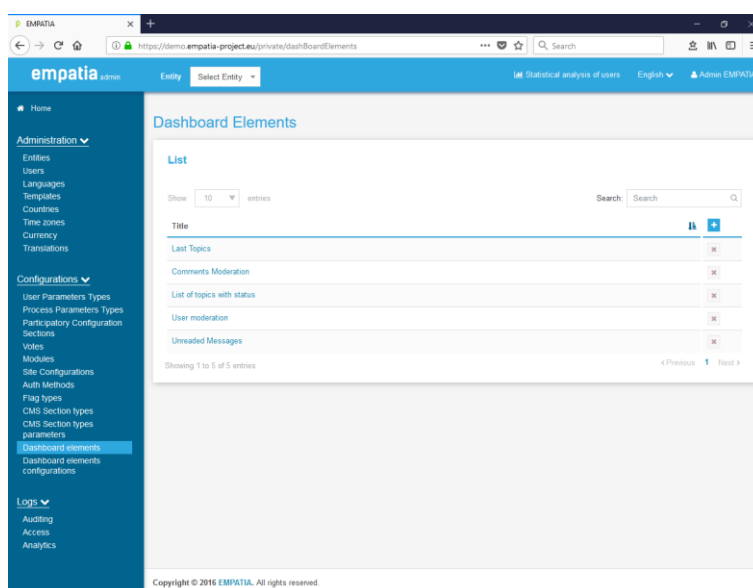


Figure 26 - Dashboard Elements management

## Dashboard Element Configurations

This menu option allows the administrator to manage the Dashboard Element configurations. These configurations are, for example, Sort Order, PAD key, Element Title, etc.

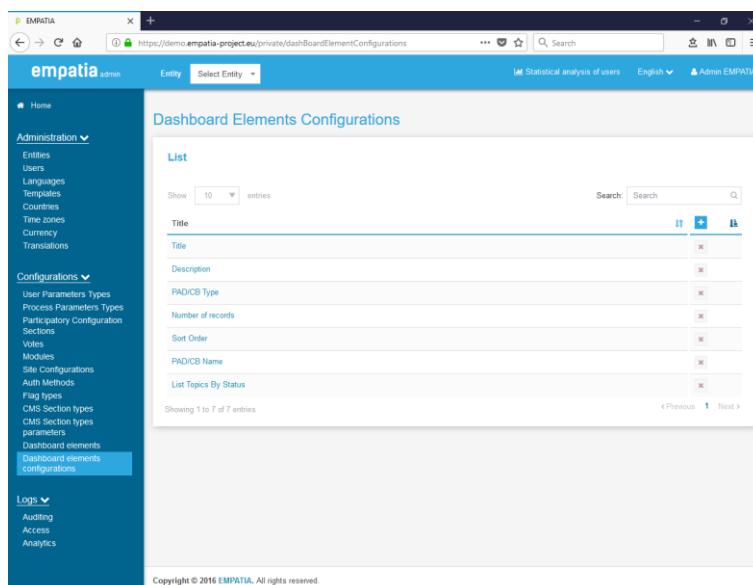


Figure 27 - Dashboard Element Configurations management

## Logs

This option allows the administrator to visualize the different logging available. The auditing logs corresponds to a very detailed logging of all accesses and interactions between the users and the platform. The access logs record specific actions of users (identified as most relevant) to provide advanced details to entities managers on users' actions and issues (e.g. registration and login successes and failures; topics creation successes and issues; vote successes and issues). Finally, the analytics feature presents some graphs with the distribution of success and issues in several users' interactions in time.

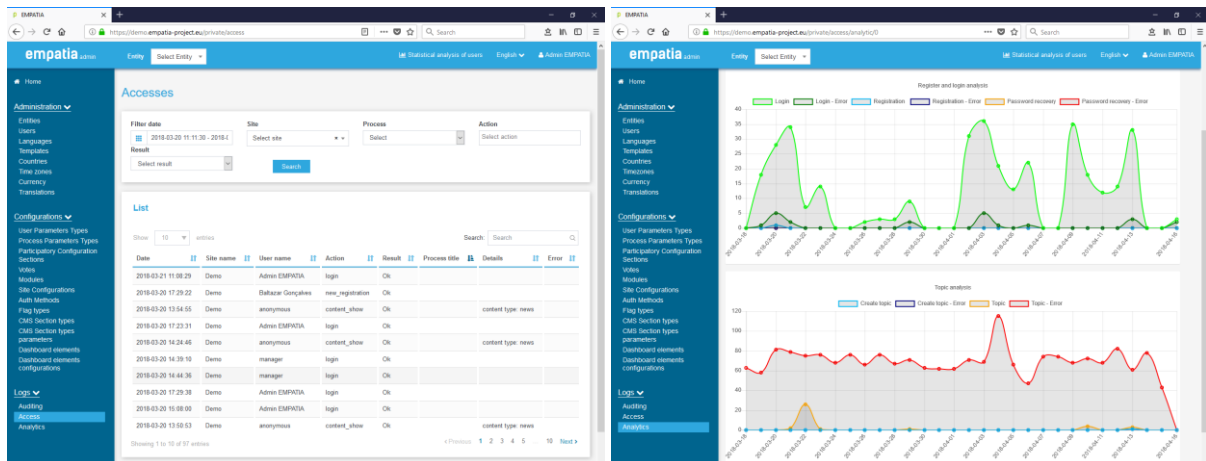


Figure 28 – Administrator Logs features

## 3.2.2 Manager space

The Manager space allows managers to manage an entity and all their content and participation processes. Thus, the manager is able to access the backend of the platform and, depending on the configurations activated by the admin to the entity, the manager can perform the management of participation tools including PADs, Polls and Kiosks; manage the content associated with the entity such as sites, menus, news, events and pages; as well as the users that are associated with an entity.

After login, an entity manager is presented with the backend home page. In this screen, it is available the entity menu that allows the manager to perform all related tasks.

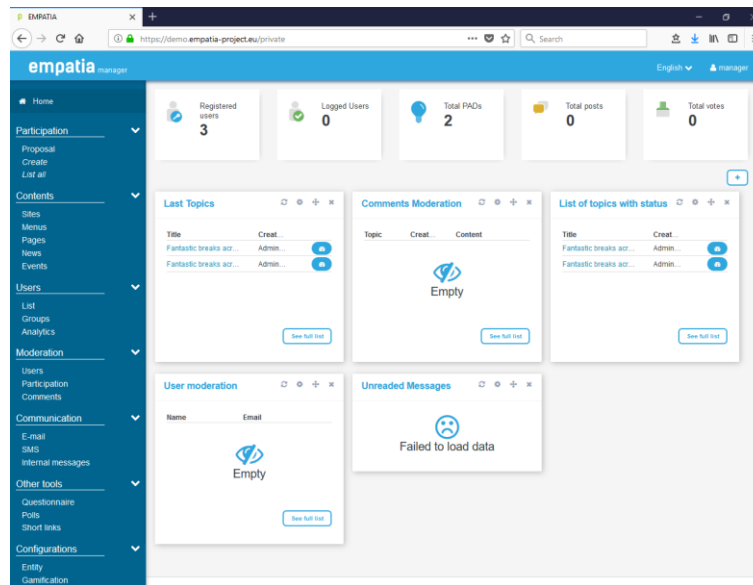


Figure 29 – Manager home screen

The Manager menu has the following options:

- Participation
  - <dynamic list of PAD/CB>
  - Create
  - List all
- Content
  - Sites
  - Menus

- o Pages
  - o <dynamic list of content types, e.g. News, Events>
- Users
  - o List
  - o Groups
- Moderation
  - o Users
  - o Participation
  - o Comments
- Communication
  - o Email
  - o SMS
  - o Internal messages
- Other tools
  - o Questionnaires
  - o Pools
  - o Short links
- Configurations
  - o Entity
  - o User parameters
  - o Gamification
  - o Kiosks
  - o OpenData

Next, we describe the most relevant functionalities available to an entity manager. These features may or not be available depending on the entity managers' permissions configuration.

## PAD/CB

After building a micro-site, the manager can create multiple participation actions by creating any type of community building tools (PAD/CB). These PADs can then be configured in the menu and in a page using the previously described content management section.

A PAD is composed of a hierarchical structure composed of topics and posts. One PAD can have multiple topics, and each topic can have multiple posts. Traditionally, this dynamic structure and processes independent can be mapped to project/comments, where each project is a topic and each comment in a project is a post. Additional optional relations exist between topics of different PADs, between CB and content, and between topics and content.

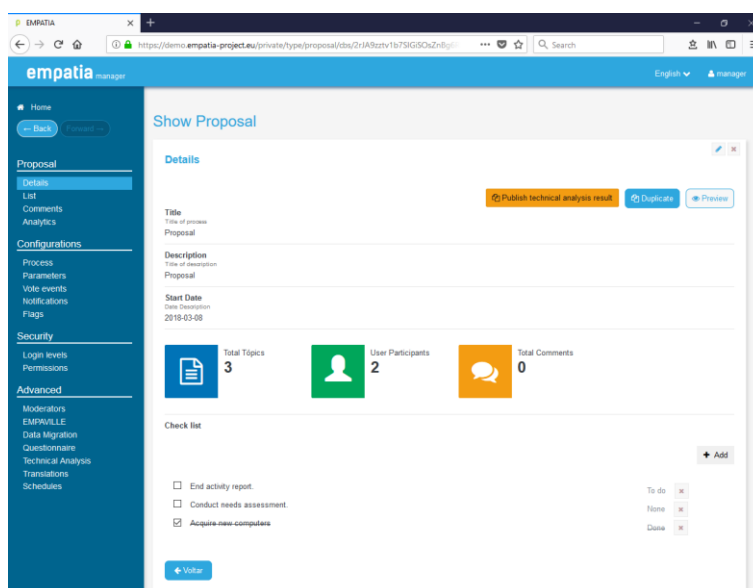


Figure 30 – PAD details

The PAD section has a sub-menu with the following options:

- <Title of PAD>
  - Details
  - List
  - Comments
  - Analytics
- Configurations
  - Process
  - Parameters
  - Vote events
  - Notifications
  - Flags
- Security
  - Login levels
  - Permissions
- Advanced
  - Moderators
  - EMPAVILLE
  - Data Migration
  - Questionnaire
  - Technical Analysis
  - Translations
  - Schedules

Next, we present some of the main characteristics of a PAD.

## *PAD details*

The main menu options of a PAD include its details, the list of topics, the list of posts (usually comments of a topic) and the analytics.

In the PAD details it is possible to configure the generic PAD information like name, description (only used internally in the backend), tag, PAD template (this allows the usage of different design options for each PAD), start date and end date of the process. It is also possible to duplicate the configuration of the current PAD to a new PAD (to facilitate the duplication of processes).

The “List” section takes the manager to the list of all topics of the process (usually refer to ideas, projects, proposals). This list includes several filtering and search options that are important during the management of a process. This list presents several important information related to each topic, from where we highlight the topic status, the author, the creation date, the status of the technical analysis and flags. Two options to create topics from the backend are also available: on behalf of, that allows the manager to create a topic and identify in text the name of the author of the topic (name displayed publicly by default); registration and creation, that allows the manager in the same screen register a new user and create the topic (attached to the user registered).

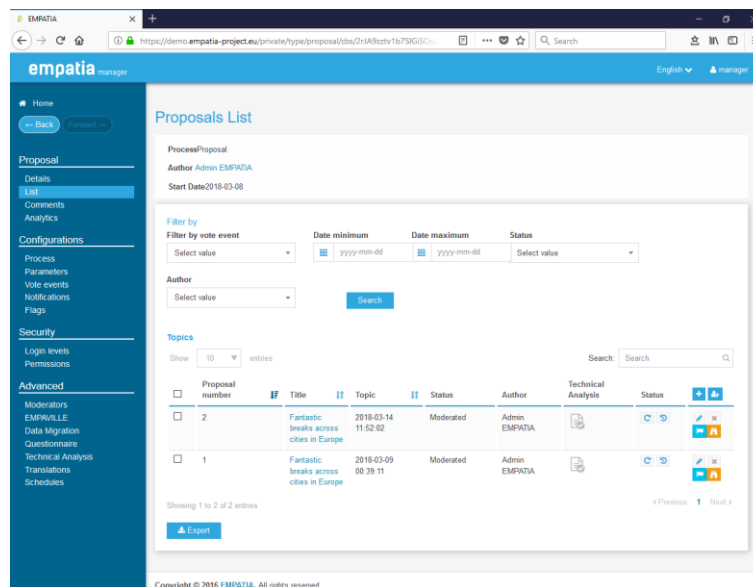


Figure 31 – Topics list

A topic status represents where the topic is currently, and by drilling the status history it is possible to track the flow of each topic. The platform has specific predefined and fixed status that map to specific platform features like “No status”, “Moderated”, “Accepted” and “Rejected”, but for each PAD new status can be created and mapped to the PAD template (allowing more dynamic visualisation options).

The technical analysis (TA) shows the status of a specific topic TA and can have the following status (and respective colour): no TA (grey), in analysis (blue), passed (green) and did not pass (red).

The flags are notes that can be associated with each topic (or post) that extend the status feature. For instance, there are flags that identify if anyone from the municipality staff has validated the content of a topic (for post publish moderation).

This list also allows the manager to view the details of a topic. In this details section all topic details are presented and can be edited. Details of the main author are displayed, including direct access to the messaging feature. It is possible to manage the co-operators (additional authors) of the topic, identifying their level of access (read/write). A topic also includes a versioning (with active) feature that allows the tracking of all changes to a topic.

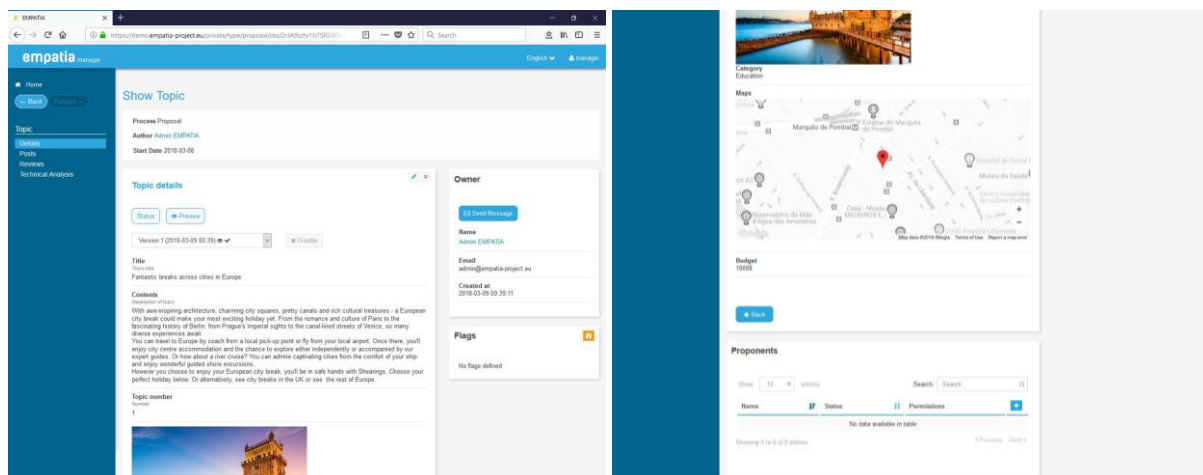


Figure 32 – Topic details



In this section of the details of a topic it is also accessible the list of posts of the topic (which include moderation and report abuse features), a review process cycle, and the technical analysis section (with all versions of the TA).

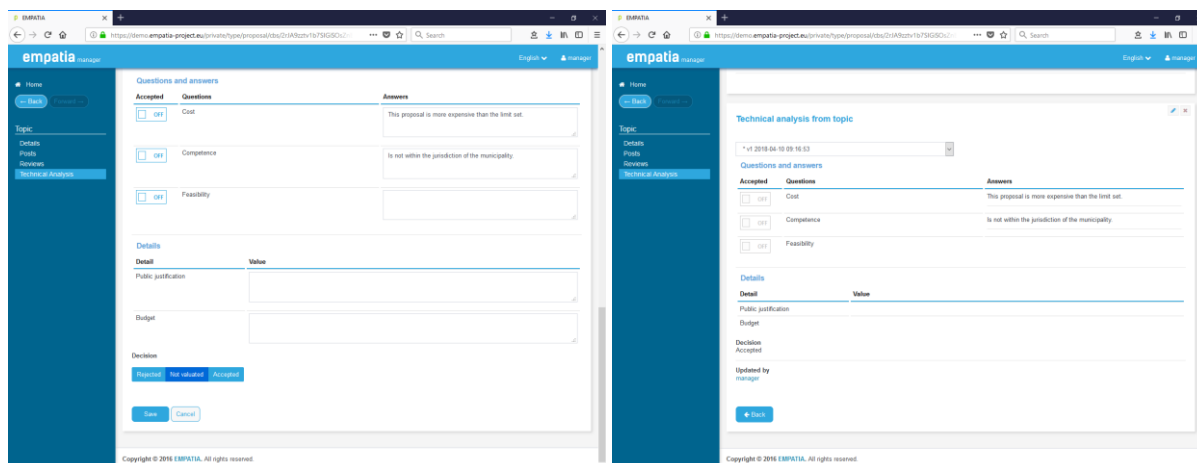


Figure 33 – Topic technical analysis

The “Comments” option is an aggregator of all posts of the CB that allows the managers to moderate and review all posts (from all topics) in one section. In this section it is also available the feature of flags.

The “Analytics” option provides summary and detailed analytics (indicators, tables, graphs) about the PAD and its vote events. An extensive array of analytics is provided that not only depend on dates and hours, but also on the dynamic characteristics of a PAD/topic. Additionally, the manager is able to produce custom analytics (tables and graphs) based on the available data. Next we present several figures that provide an overview of the analytics available.

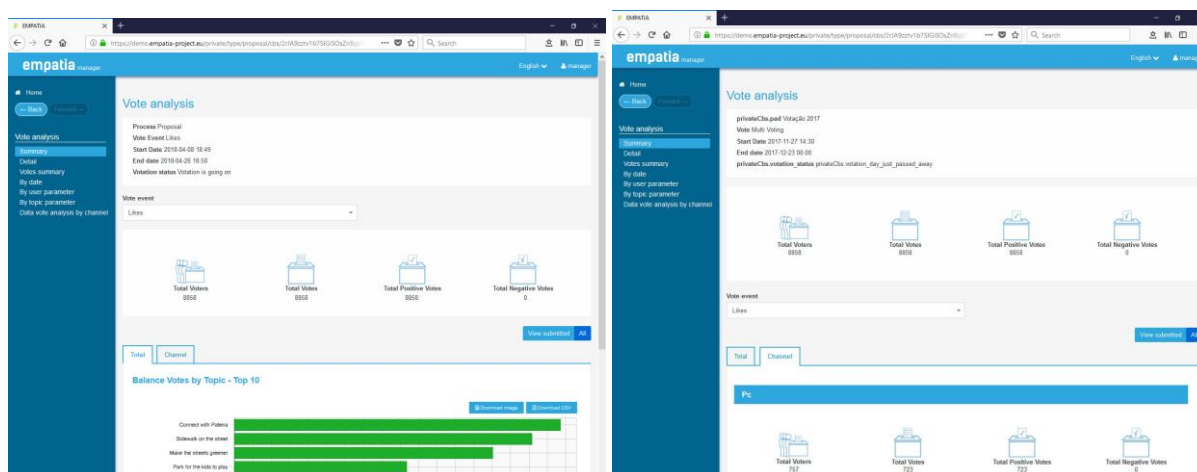
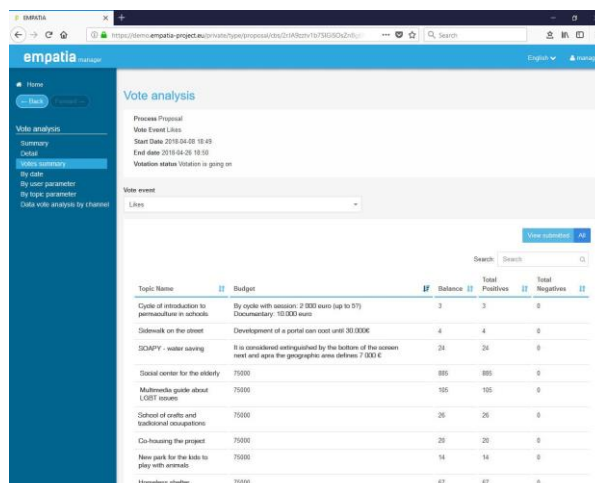
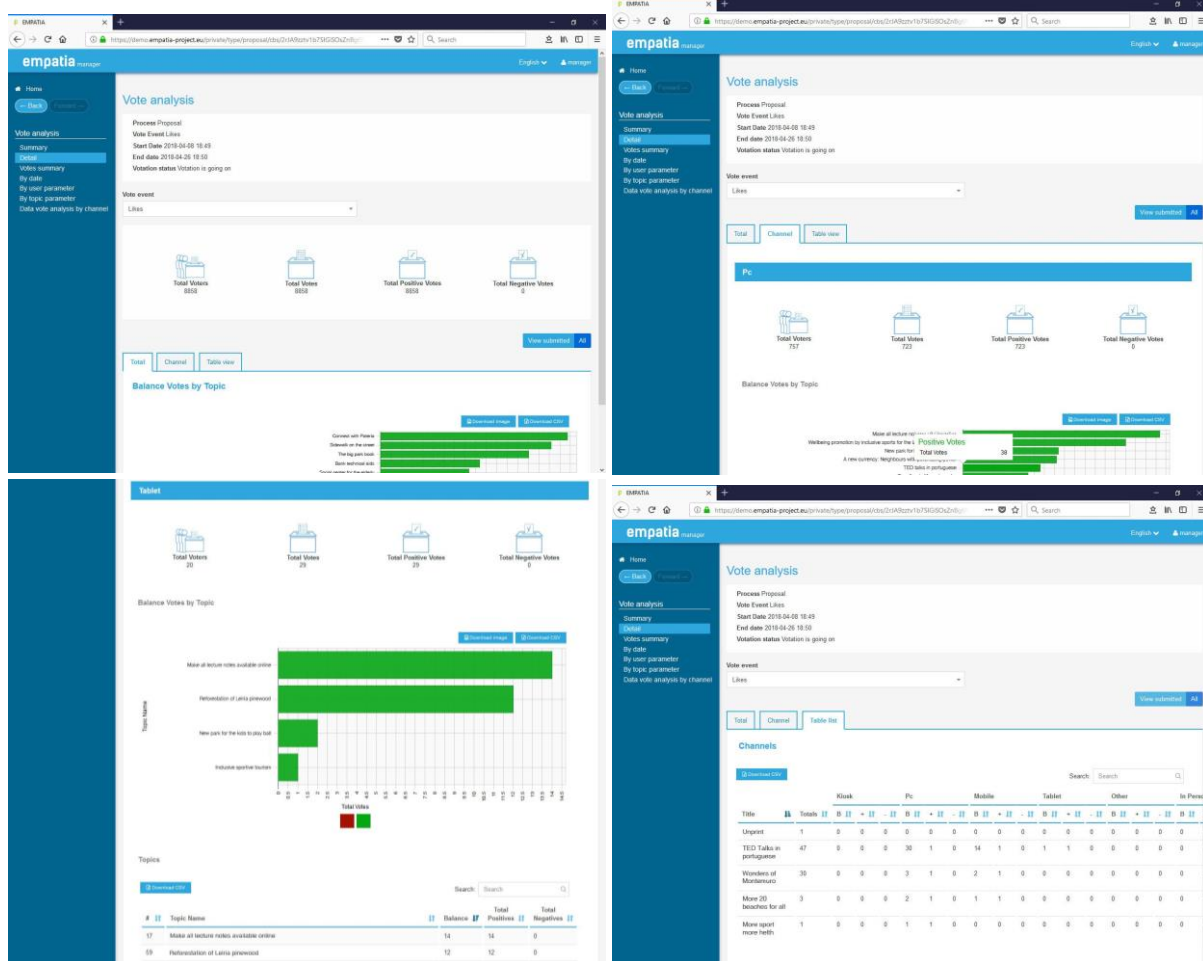


Figure 34 – Analytics summary (total, channel)



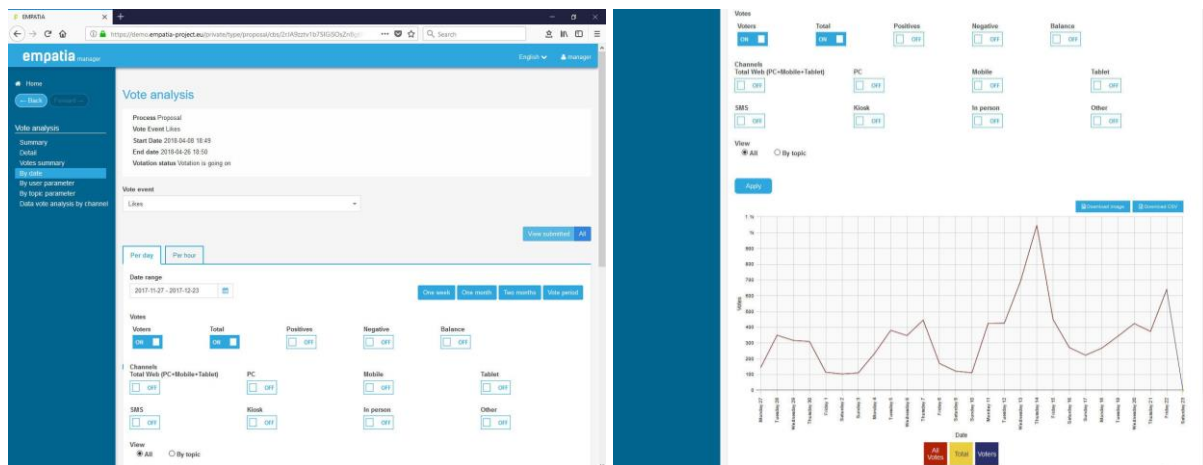


Figure 37 – Analytics by date - day

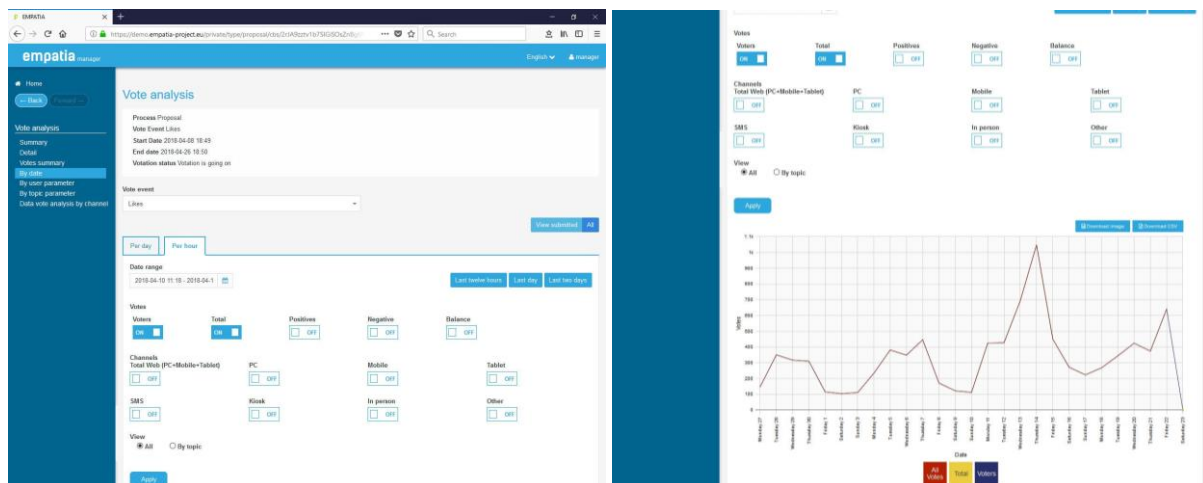


Figure 38 – Analytics by date - hour

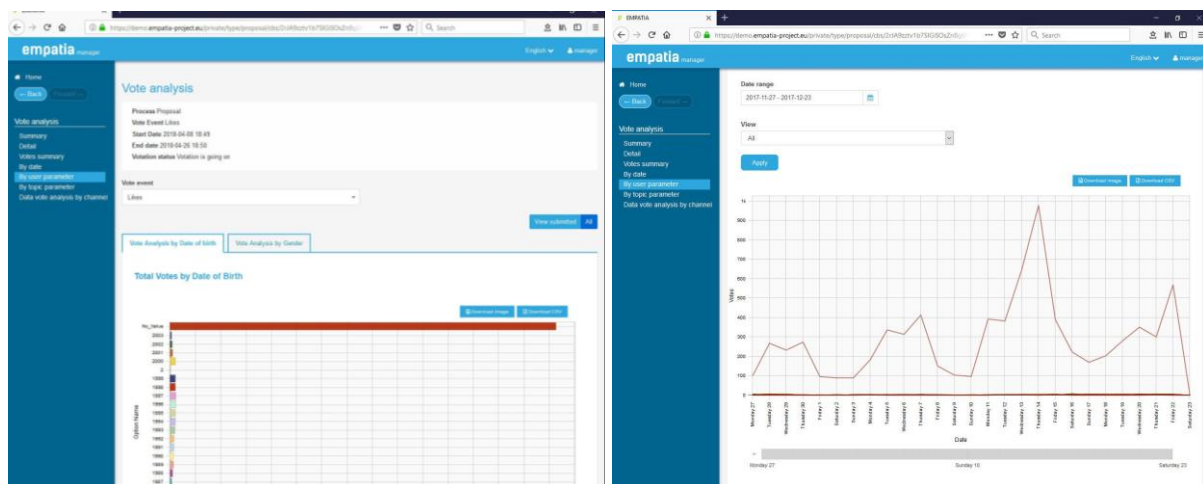


Figure 39 – Analytics by user parameter – Birth date

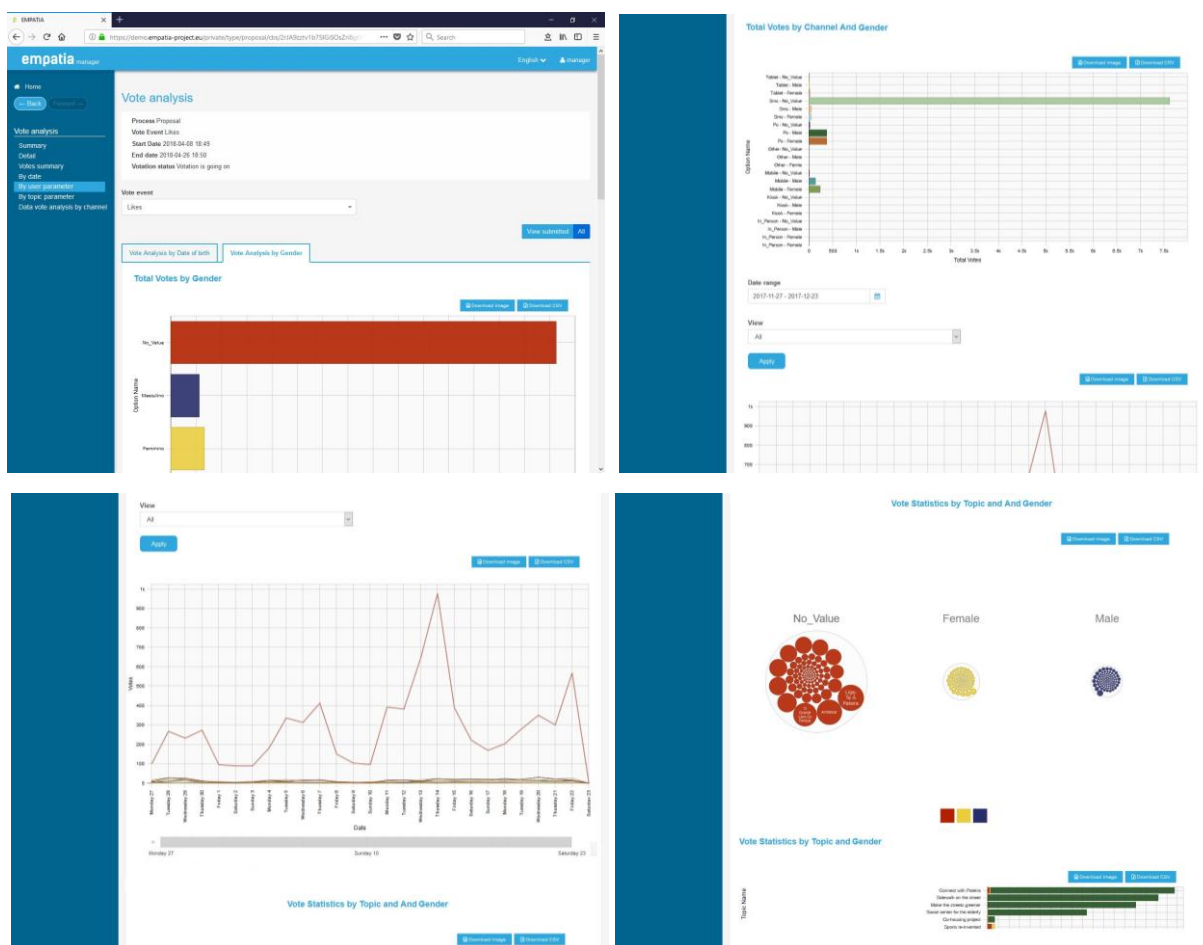
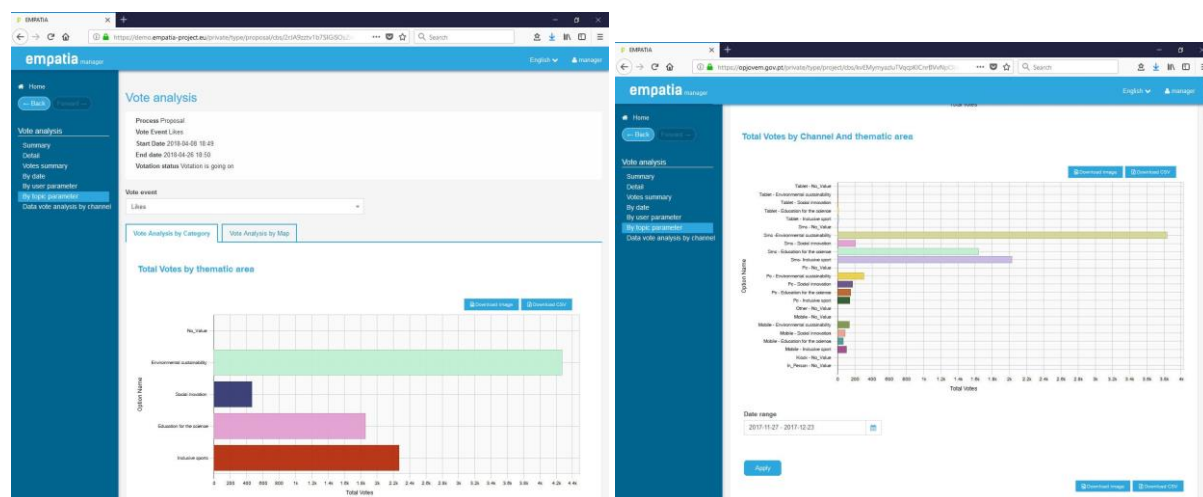


Figure 40 – Analytics by user parameter - Gender



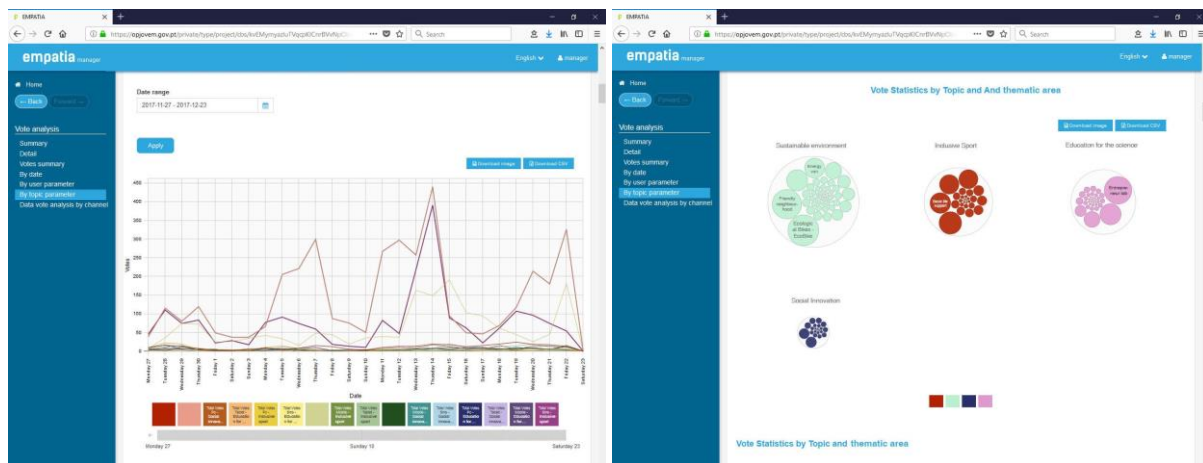


Figure 41 – Analytics by topic parameter

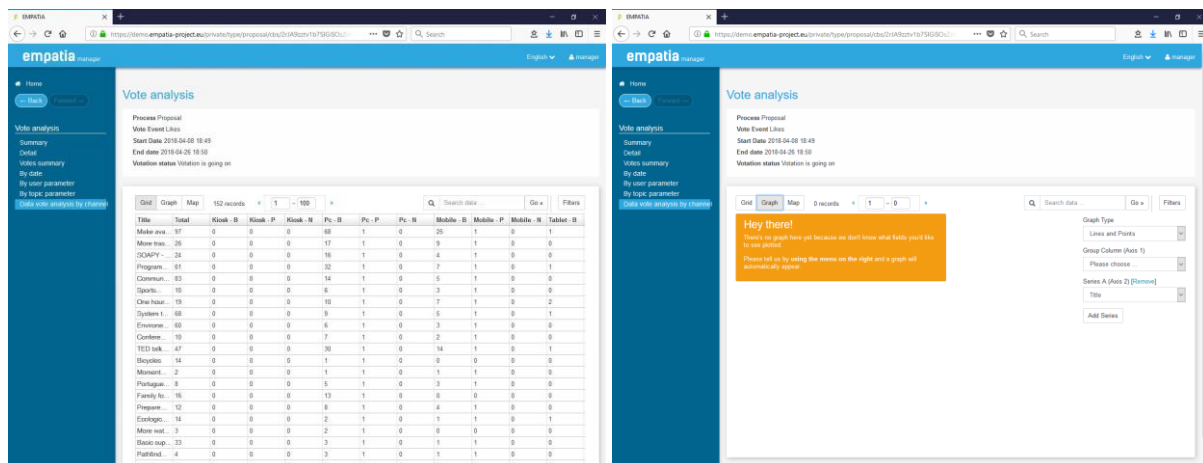
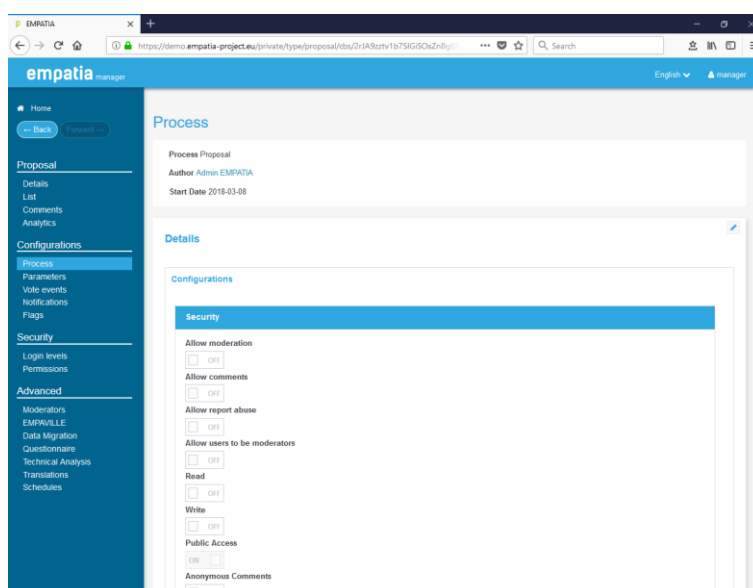


Figure 42 – Advanced analytics

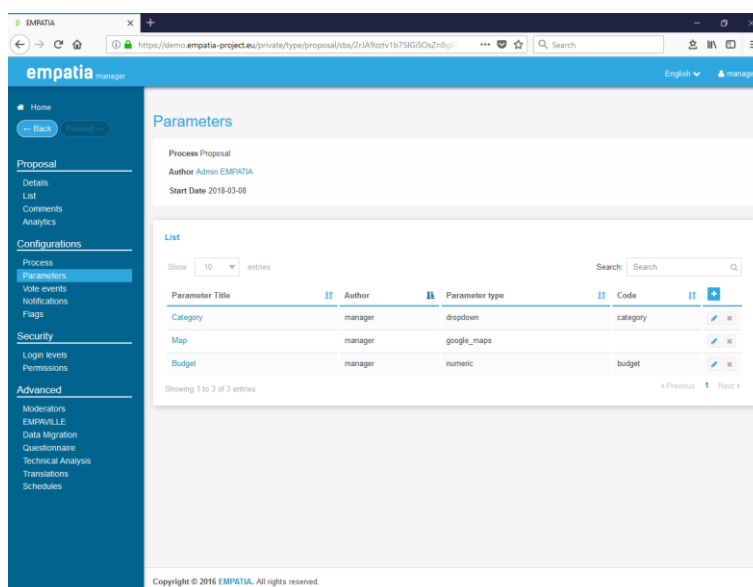
### Configurations

In this section the manager is able to perform the most relevant configurations of a PAD. This section starts with the PAD configurations that define the behaviour of many aspects of the PAD like access, moderation, comments, etc.



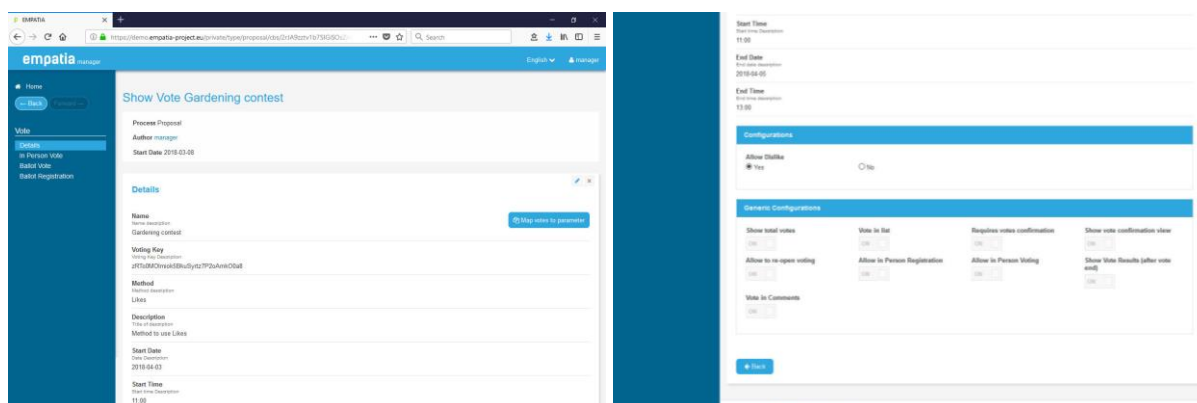
**Figure 43 – PAD process configurations**

The “Parameters” option allows the configuration of the fields that compose a topic. A topic can be composed by different types of fields that range from text, text area, numeric, geolocation, files, image, images gallery, dropdown lists, checkbox, radio buttons, phone number and currency. Each parameter has common fixed options (mandatory, visible in topic details, visible in topics list, to be used in topics list filter, is private, code and is blocked – only managers can modify parameter) and has its own specific configuration options (e.g. min/max value, acceptable options, currency).



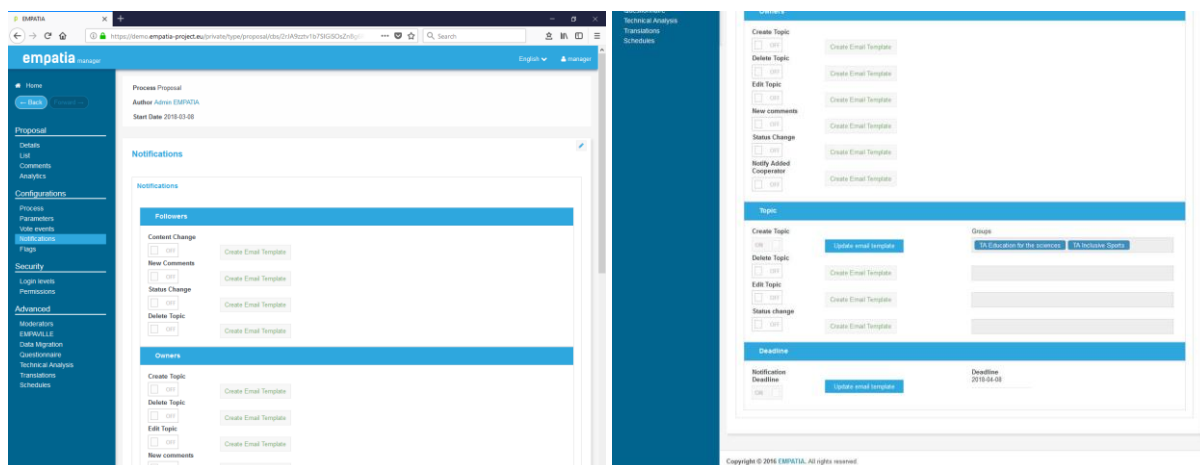
**Figure 44 – PAD parameter configuration**

The “Vote events” option allows the manager to create and manage PAD vote events. Each vote event has his own specific characteristics that range from the vote type (e.g. support, like, multiple vote, negative vote), the method (e.g. SMS, web, kiosk) and several other vote type and method specific characteristics. The vote events are associated with the topics or posts.

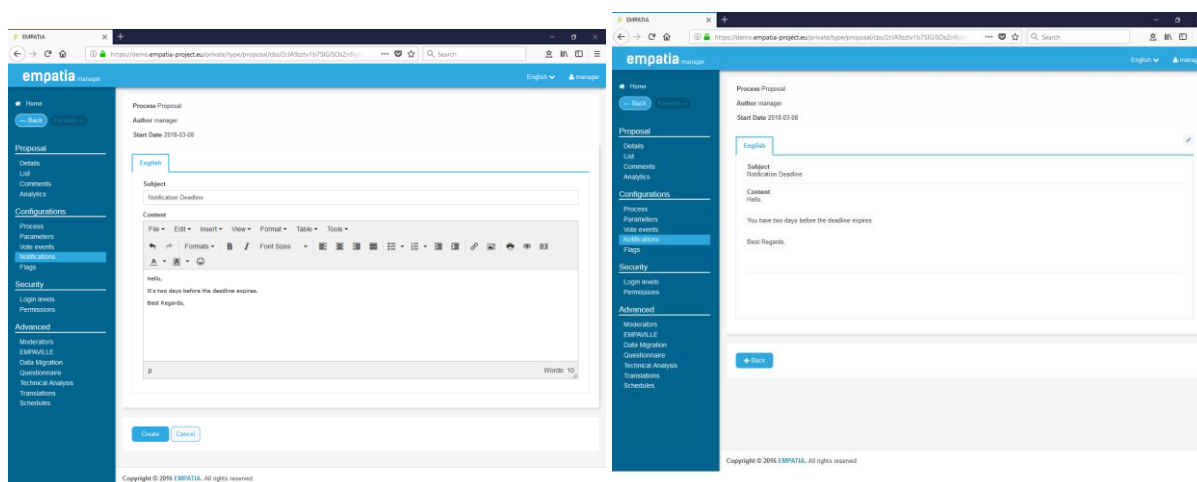


**Figure 45 – Vote event configuration**

The “Notifications” option allows the configuration of users and managers notifications based on different PAD triggers available. For each trigger it is possible to enable/disable the notification and define the email template for each language that is sent every time the trigger is activated. Like all other notifications templates the manager can use available codes in the email text that will be replaced by the corresponding dynamic value (e.g. title of a topic, name of the author). The existing triggers are split in four groups: followers, owners, managers and deadline. The followers’ notifications correspond to the notifications of all users enabling the follow of a topic and can be notified of: changes to the topic, news posts/comments, changes in the status of the topic and if the topic is deleted. The owners’ notifications correspond to the notifications of all topic authors and can be notified of: creation of topic, changes to the topic, news posts/comments, changes in the status of the topic and if the topic is deleted. The managers notifications correspond to the notification of specific managers (by selecting specific users or groups) about: creation of topic, changes to the topic, news posts/comments, changes in the status of the topic and if the topic is deleted. The deadline group of notification refers to the automatic notification of authors based on a pre-configured date.





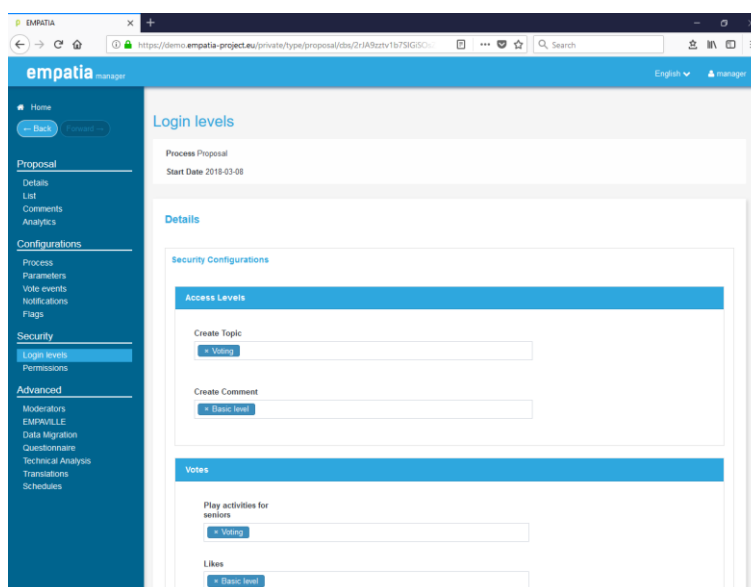


**Figure 46 – Notifications configuration**

The “Flags” option allows the configuration of different type of flags to use in the topics and posts. These flags have no specific implementation in the platform but support different dynamic management methodologies.

## Security

In this section the manager defines two security aspects related to the PAD (besides general security configurations available in the “Process” configuration): Login Levels, where it is identified the actions allowed for each user login level in this PAD; and the Permissions, where it is identified the permissions each manager or group of managers are allowed in this PAD, including detailed permissions per topic parameter option (e.g. the permission to only allow a group of managers to perform technical analysis, and only to a specific topic category).



**Figure 47 – PAD Login Levels security**

## Advanced

In this section the manager can use several EMPATIA Platform advanced PAD features like data migration, technical analysis, PAD specific translations and schedules.



The first option available is “Moderators”, which allows the configuration users to moderate several of PAD moderation options (e.g. topics, posts/comments, authors). An example of the usage of this option is the ambassador or delegate model commonly used in the US, where these key community users are selected to be part of the process and support the participation official team.

The “EMPAVILLE” option allows the manager to use specific EMPAVILLE role-paying game features, including the access to the EMPAVILLE online presentation.

The “Data Migration” option allows the manager to copy (and link) the process topics to another existing PAD. This feature, for example, in a Participatory Budgeting process with two phases, Proposals and Project. The Projects are all the Proposals that passed the technical analysis (or that were most voted in an intermediate vote event) and that need to be copied between the two processes (from Proposals to Projects). Here it is possible to select the destination PAD and map the parameters (and options) of the source and destination PADs, filter topics by vote number, and select manually the topics to copy. The copied topics (destination PAD) keep a connection with the source topic to allow the public presentation of dependency/flow of the process.

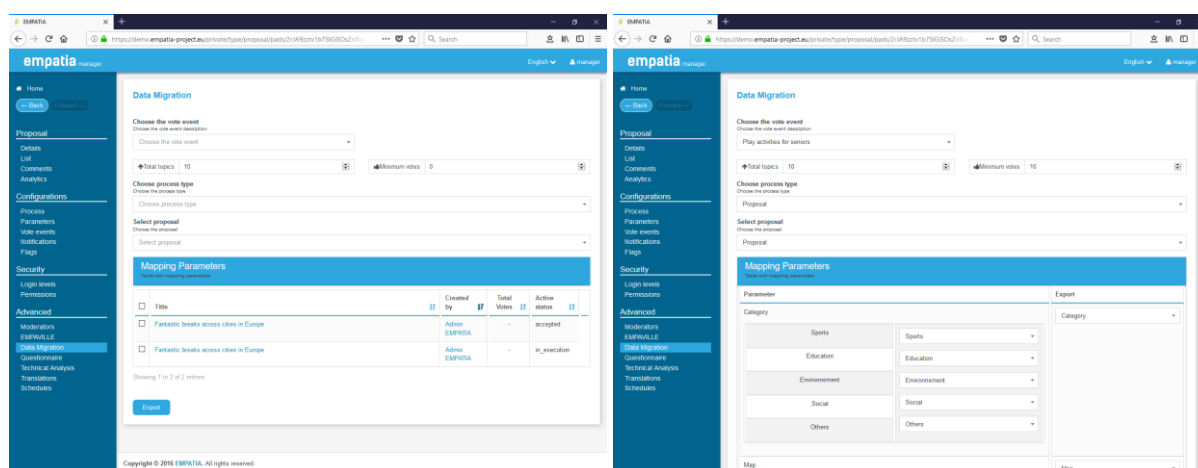
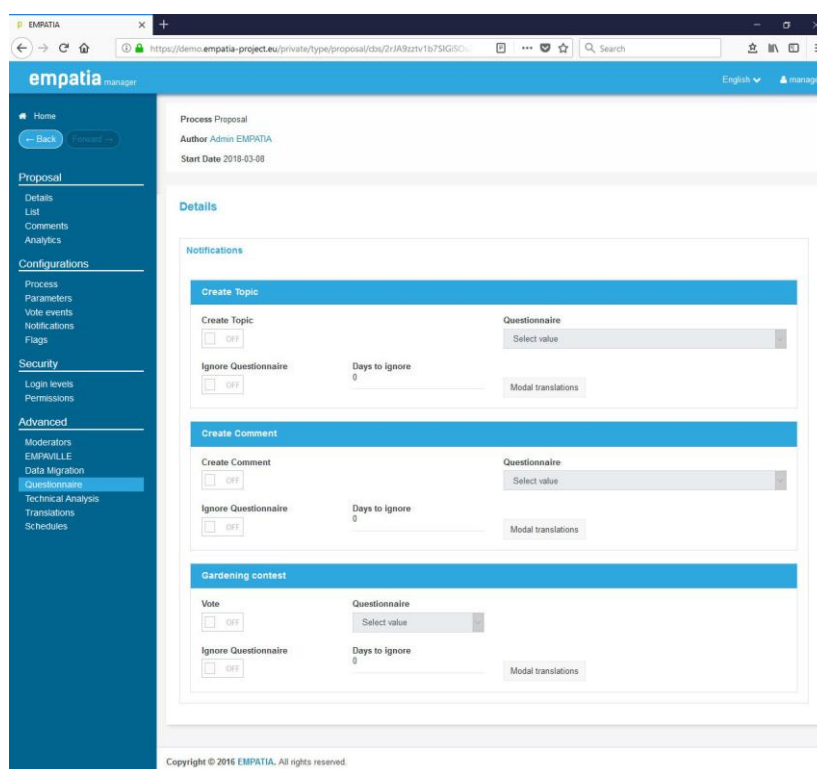


Figure 48 – PAD Data Migration feature

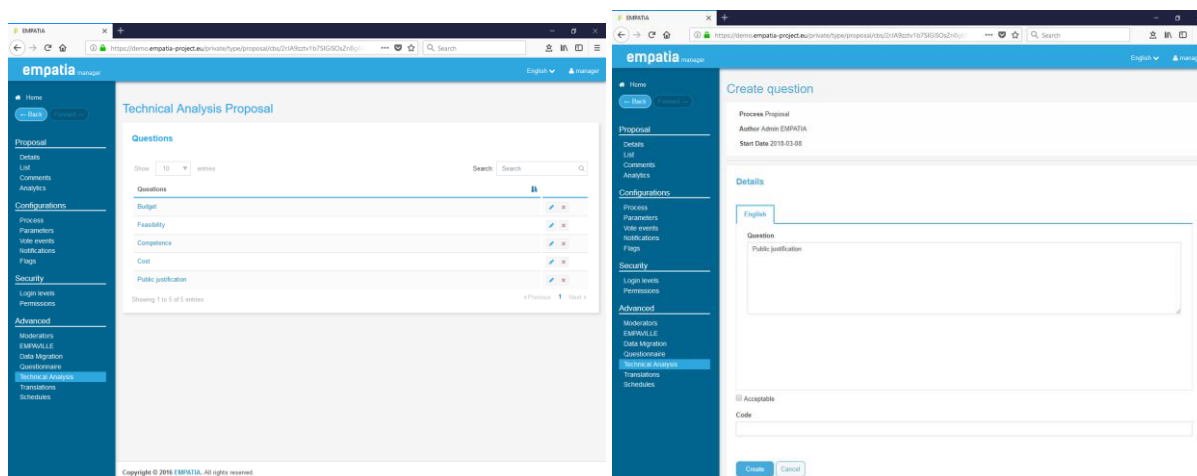
The “Questionnaire” option allows the configuration of automatic requests to participate in questionnaires to users after creating a topic or creating a post/comment. For each action it is possible to configure the questionnaire to present (from the list of existing questionnaires), if it is possible to ignore the questionnaire (and if yes, for how many days the user is not notified again in the same action), and the translations of the text that is presented to the user to request its participation.



**Figure 49 – PAD Questionnaire configuration**

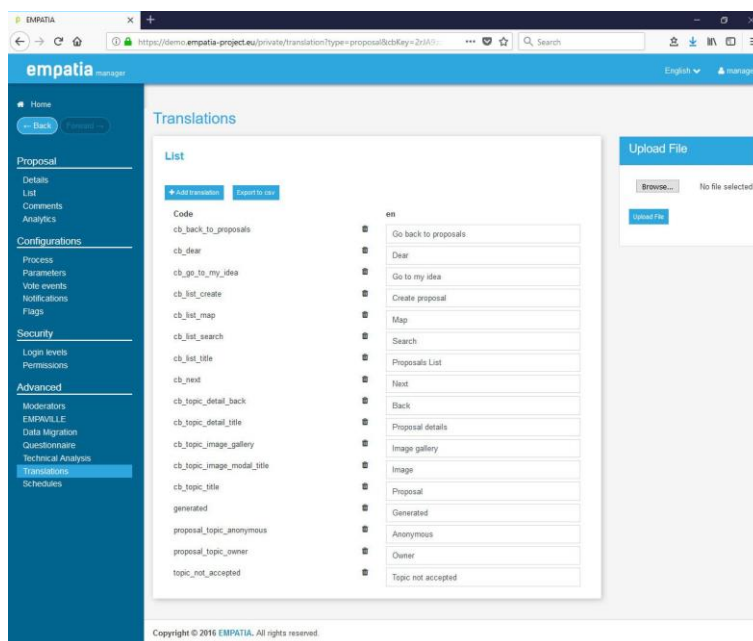
The “Technical Analysis” options allows the manager of the process to define the technical analysis (TA) questions. These are the questions that the users performing topics TA need to provide answer to. The questions are of two types: YES/NO question that will be presented to the user as an ON/OFF button and a justification field; and an open text field.

Additionally, in this option it is possible to publish the results of the TA, creating a new version of all topics with new status and new data in some parameters. This feature requests from the manager the identification of the status for a topic that passes the TA, and the status if it does not pass the TA. Also, it is possible to copy text from questions in the text field of the TA to text topic parameters, allowing the public release of TA justifications.



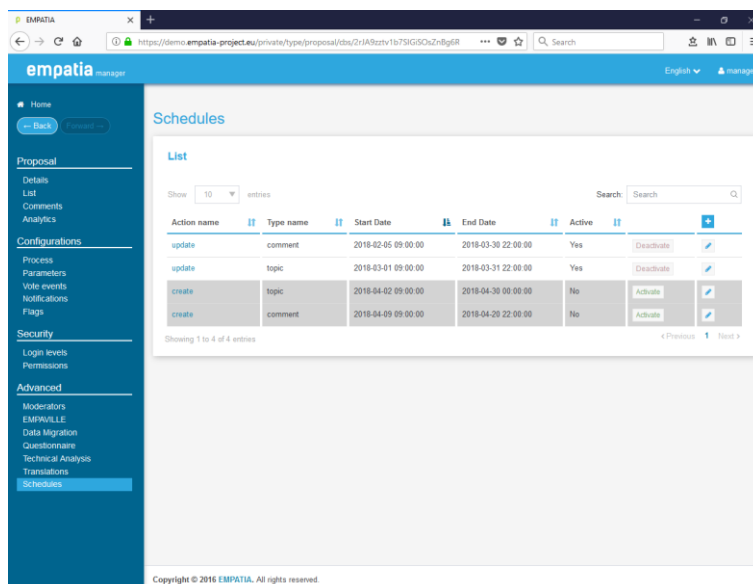
**Figure 50 – PAD Technical Analysis configuration**

The “Translations” option allows the translation of CB specific template translations. Also, import and export features are available to allow easy and quick copy of translations between PADs.



**Figure 51 – PAD translations**

The “Schedules” option allows the manager to define automatic schedules. A schedule is composed of an action and type code, the start and end date&hour, and a status (active/inactive). For any schedule to be performed it is required to have the respective action implemented in the template or controllers of the platform. Examples of schedules are the enabling or disabling of features like making available or not comments in topics, receive topics complaints after a TA and allow the editing of topics.



**Figure 52 – PAD schedules configuration**

Also, for each PAD/CB it can be configured the integration with Apache Solr/Lucene tool to enable the topics filtering/aggregation. Figure 53 presents an example of the Solr query to existing content.

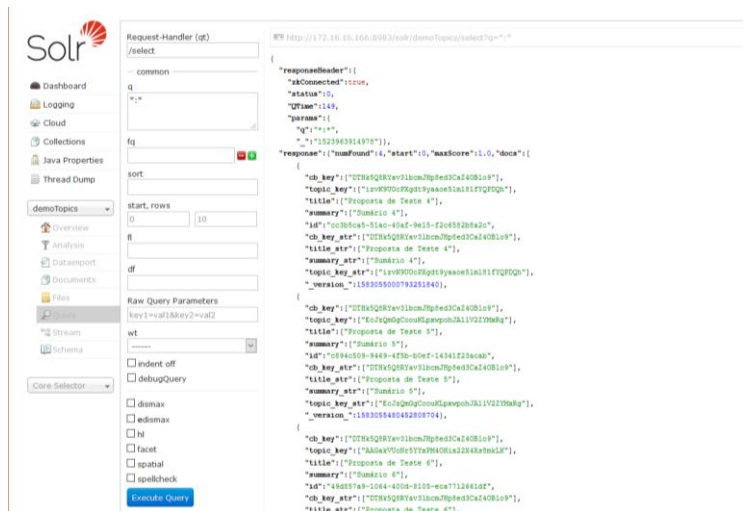


Figure 53 – PAD Apache Solr configuration

### Create PAD/CB

To create a PAD/CB there are two options available: one is the full detailed configuration of a PAD that goes through all the options available; and another that is based on wizards that allow the creation of pre-defined participation processes models.

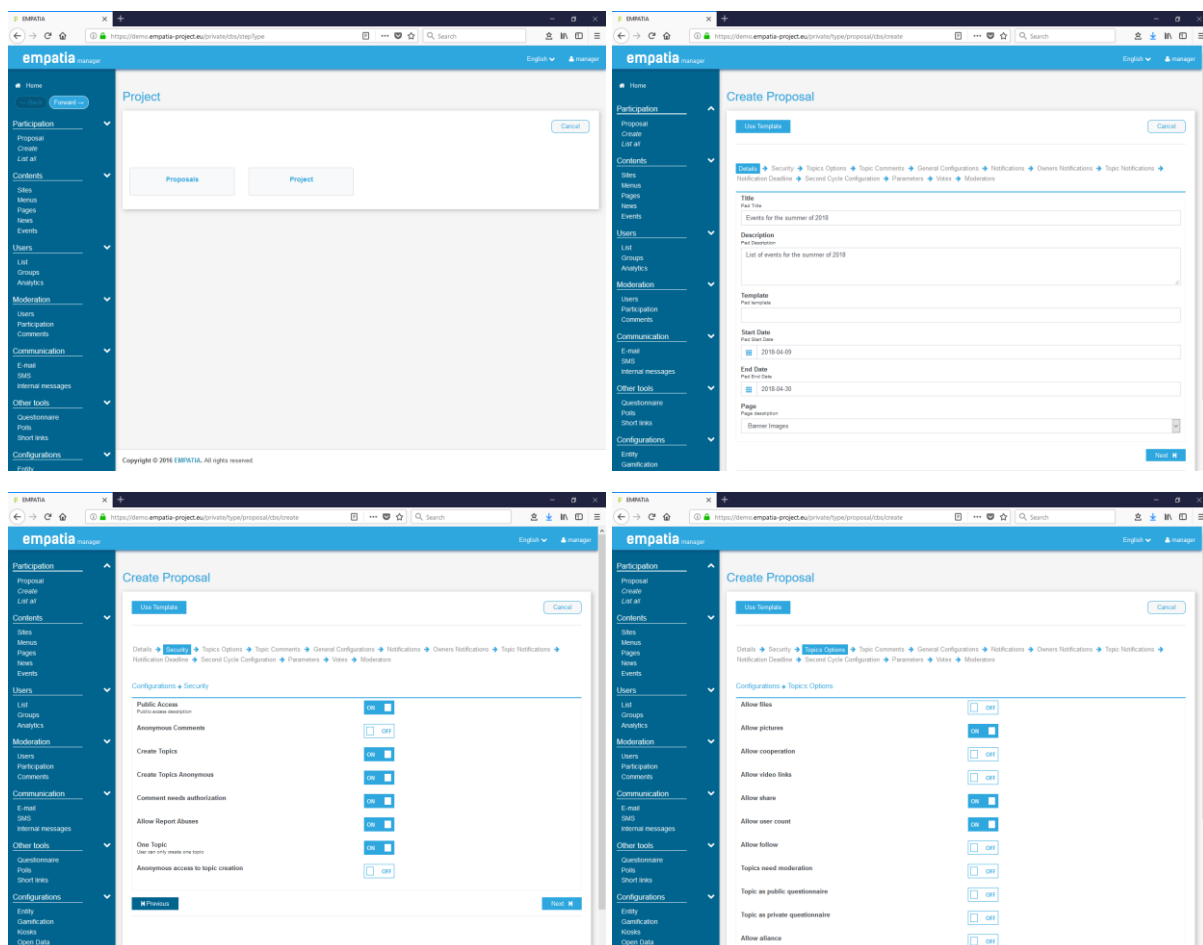


Figure 54 – PAD creation

### Second Cycle

This section allows the configuration of projects to be implemented in the second cycle of participatory budget process. Each project has subprojects that contain sections of information. In the default configuration, sections are: progress stages, documents, news and expenditures, but it's possible to add new sections through the management interface. It is also possible to edit the default configuration adding, editing or deleting sections. In terms of EMPATIA components each section is a PAD with all the configuration options described above.

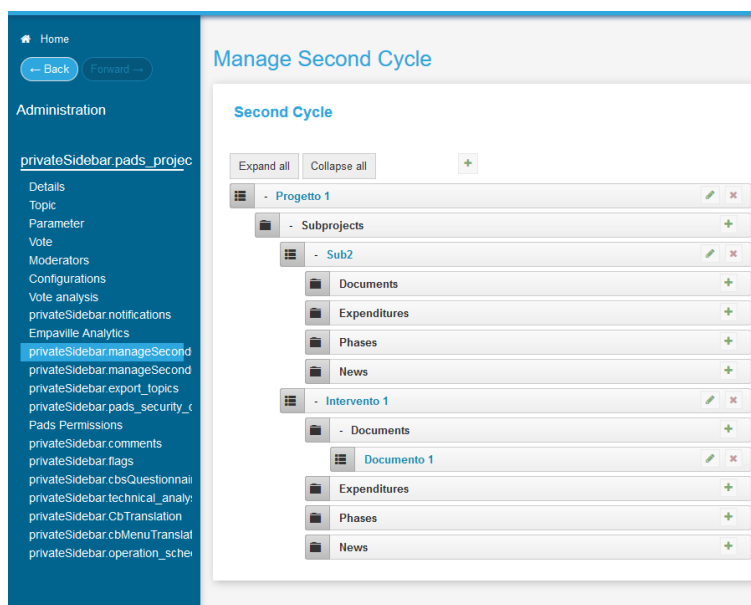


Figure 55 – Second Cycle configuration

## Content

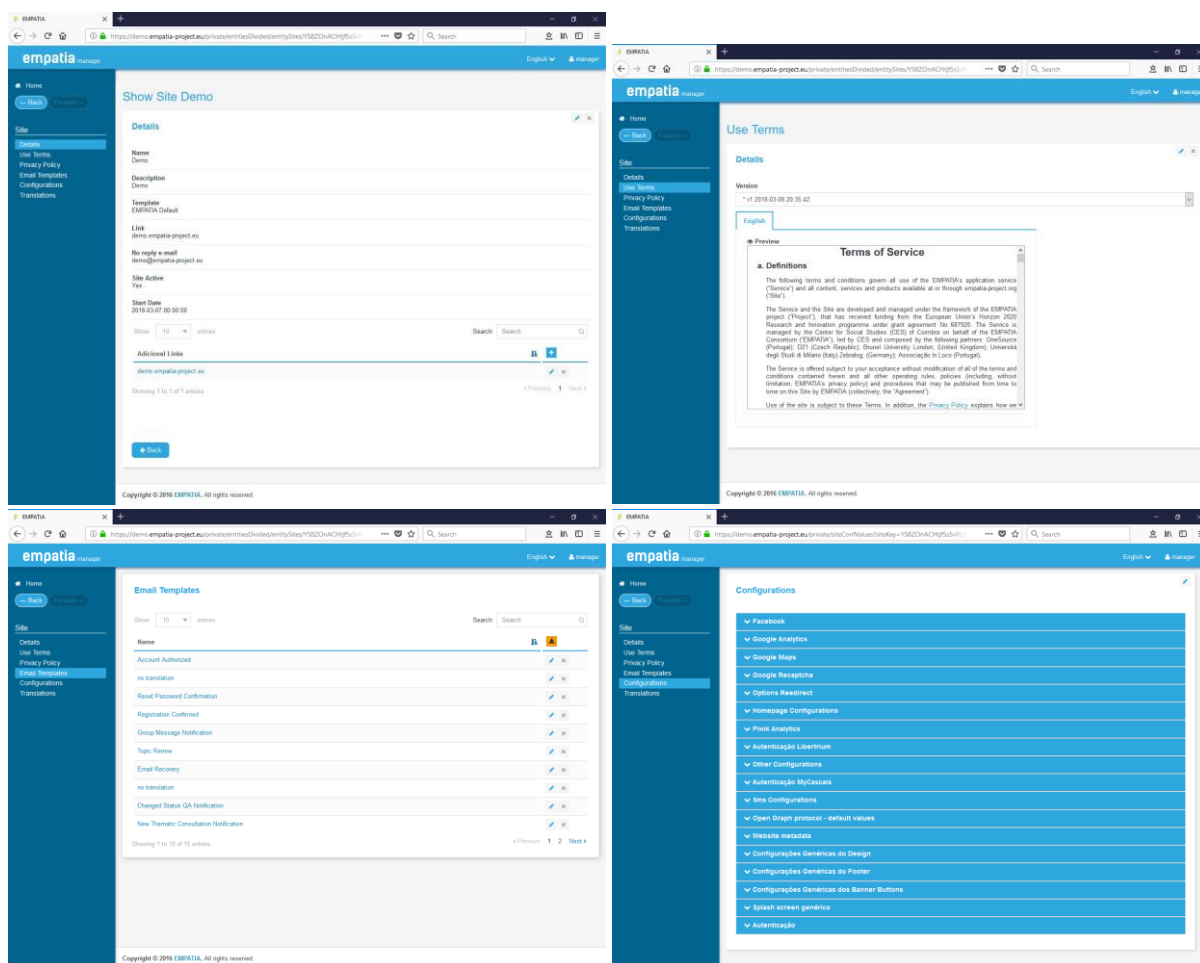
This section allows a manager to configure the entity micro-sites. Each site is composed of menus, content (e.g. pages, news) and participation processes (PAD/CB).

### Site

This section allows a manager to configure the entity micro-sites. The Site section has a sub-menu with the following options:

- Details
- Use Terms
- Privacy Policy
- Email Templates
- Configurations
- Translations

In this section, the manager can add and configure the entity sites, which can be more than one. Each site has its own details, such as name, description and template, URLs (which can be multiple per site), Use Terms and Privacy Policy. It is also here that a manager configures the Email templates (site specific automatic emails to users and managers), as well as the Site Configurations, such as Google Analytics, and the Site Template Translations (which are the translation required/dependent by the public site template).

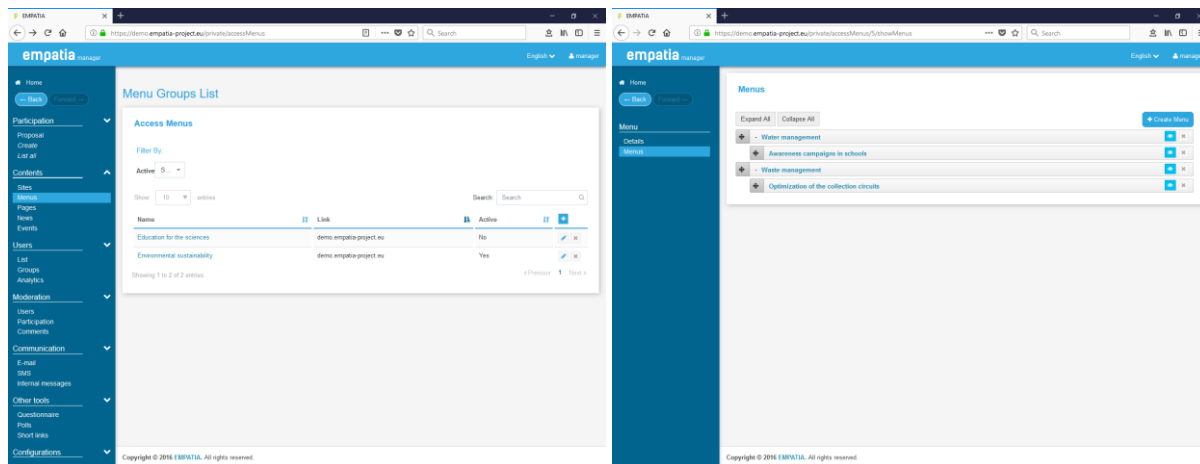


**Figure 56 - Site management screens**

### Menu

In the menu section the manager configures for each site the required menus. Each menu is composed of a hierarchical menu structure, where each menu entry can be configured to connect to: web address; content; PAD/CB; questionnaire; and polls.

For each selection, a different set of options is available, allowing the manager to configure the link of the menu, as described in Figure 57.



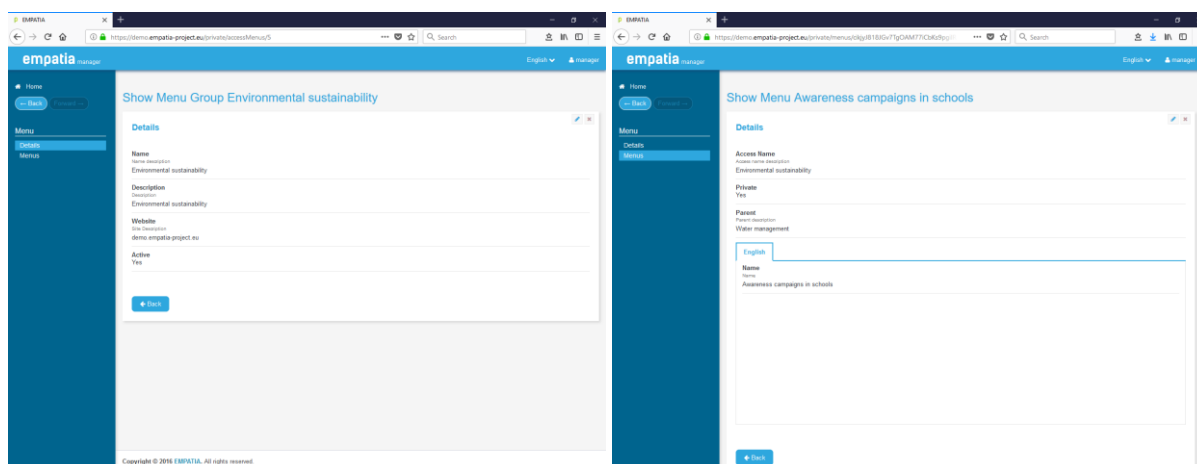


Figure 57 – Menu configuration

### Content pages

Content is a generic page that can contain several different types of content (e.g. text, titles, images, files), and can be categorized by type (e.g. pages, news, events) and sub-types. A content is identified by a title (private internal descriptor), a code (private internal identifier), can be restricted to one or more sites, includes a versioning history and a publishing status. Additionally, any content can include different types of content like: title, text (using a WYSIWYG tool), files, image, image gallery, etc.

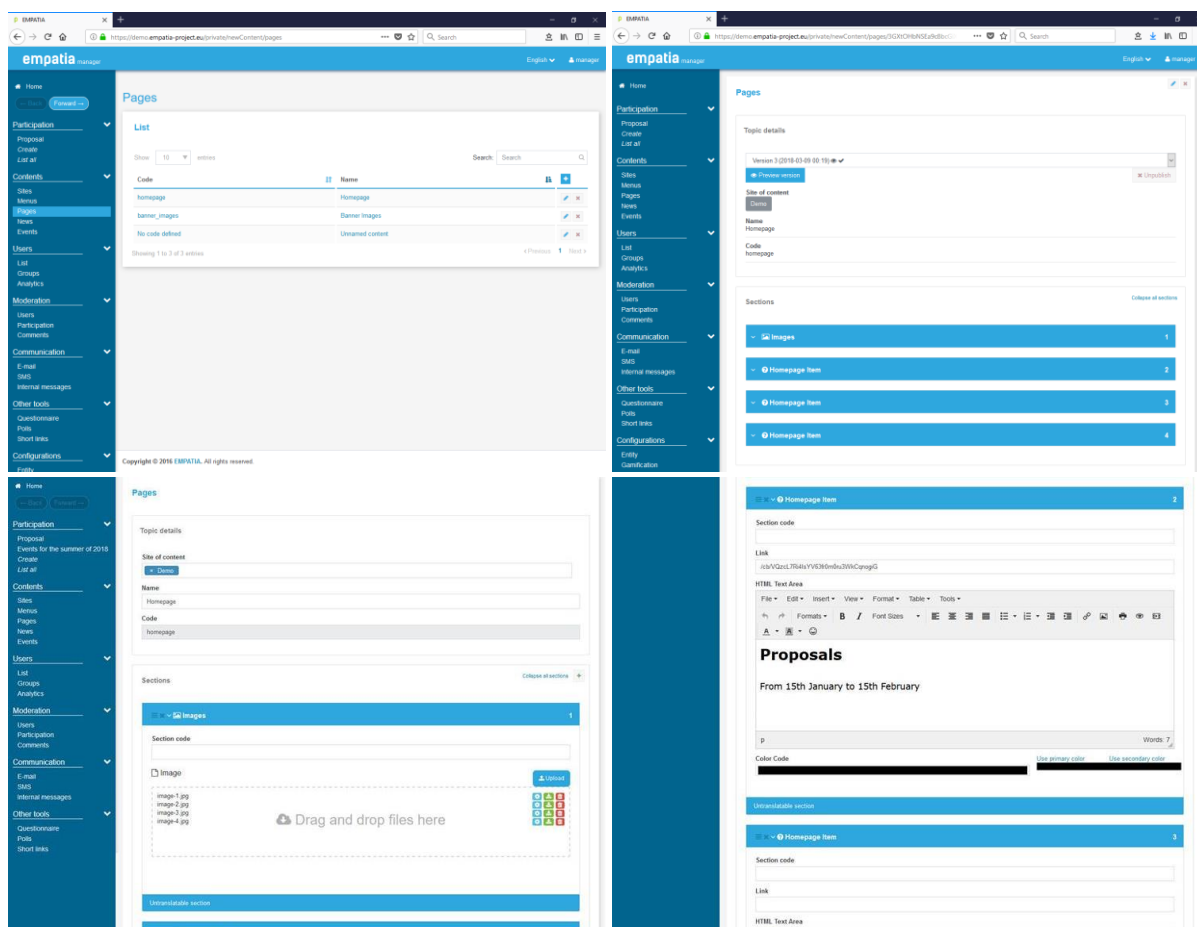


Figure 58 – Pages configuration

## Users

This section allows a moderator to manage users, managers, and group of managers. Any user can become a manager, being the only distinct characteristic the user type. The characteristic of a user depends on the entity users' parameters configured. Besides the user name, email and status, all other user details are dynamic and entity dependent.

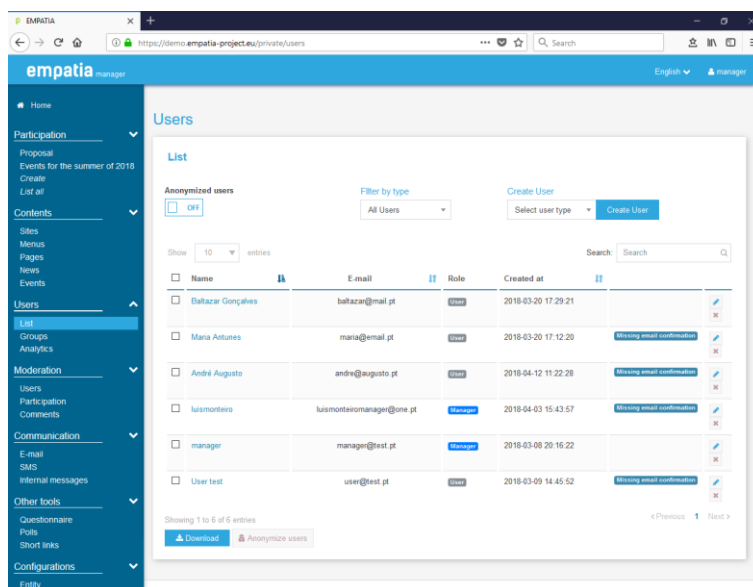
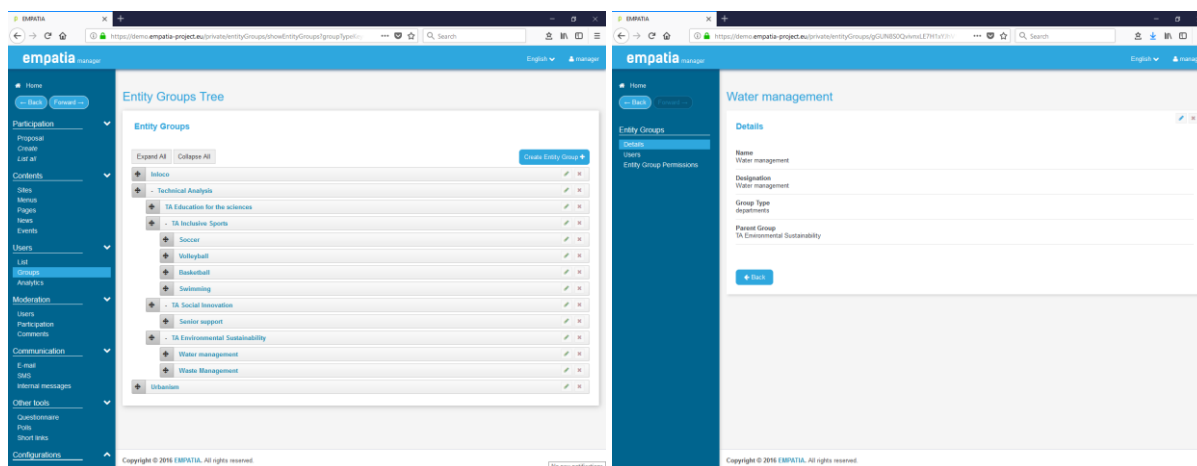
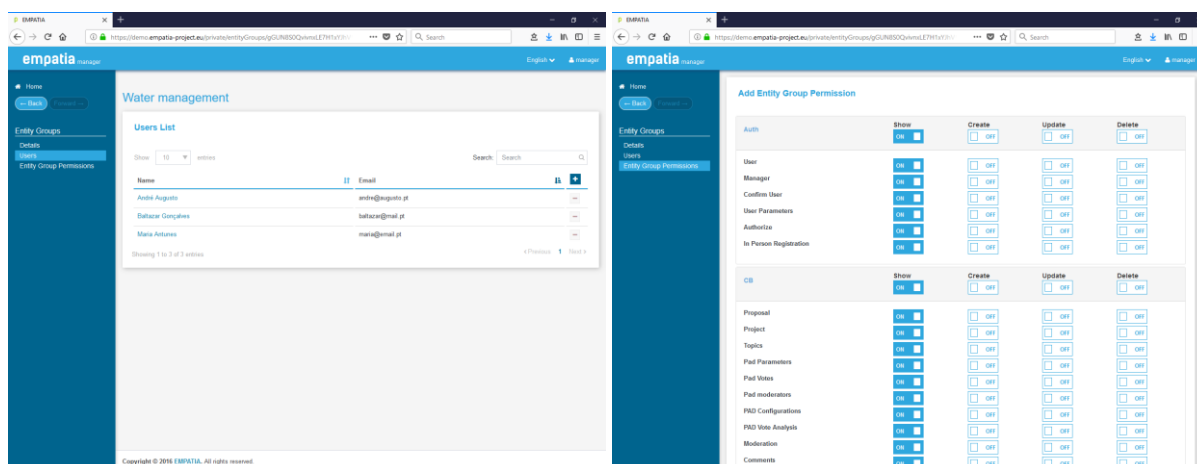


Figure 59 – Users list

Manager are all users that have access to the backend. A manager access is determined by its permissions. A manager can also be part of one or more managers group, inheriting the sum of all permissions. Each group is composed of managers and has defined its' own set of permissions. The managers groups are a hierarchical structure of group of users that inherit the permissions of each parent group, they can be associated with the entity and configure their group and specific user permissions. The group feature allows a user to inherit each department permissions.



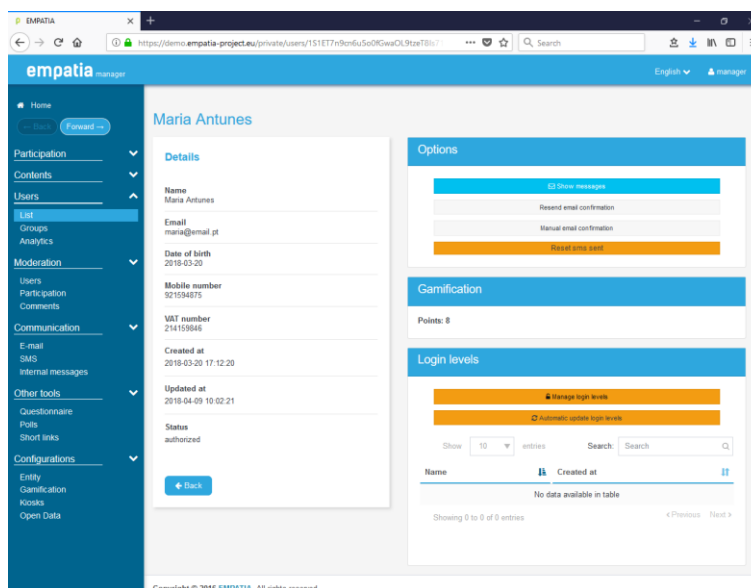




**Figure 60 – Managers groups**

The “Users” menu displays the list of all entity users allowing the filtering and searching of users. In this section it is also possible to select one user and go to its’ details. In the details of a user it is possible to see all the information related to the user (name, email and parameters), the user login levels and the status of the user (moderated or not). Other relevant options are available, depending on the user status, like resend confirmation email, manually confirm user email, manually manage user login levels, check user login levels, resend pin SMS (if registration SMS verification is configured). Also, a gamification section is presented, if enabled, to show the current user points.

Additionally, the manager can access the internal platform messaging area of the user, visualizing the messages history and allowing to send a new message to the user (and with or without an email notification).



**Figure 61 – User details**

An anonymization feature is also available in the Users section that allows the anonymization of users Personally Identifiable Information (PII) data (based on users’ parameters configuration). This option can be performed to all users, or to selected users. The anonymized users can be displayed in the user list if selected the respective option.

Furthermore, a users' analytics section is available that provides the manager with important details regarding users' login, registration, different problems and topics users visualization (anonymous and authenticated). The detailed information is available in the auditing section.

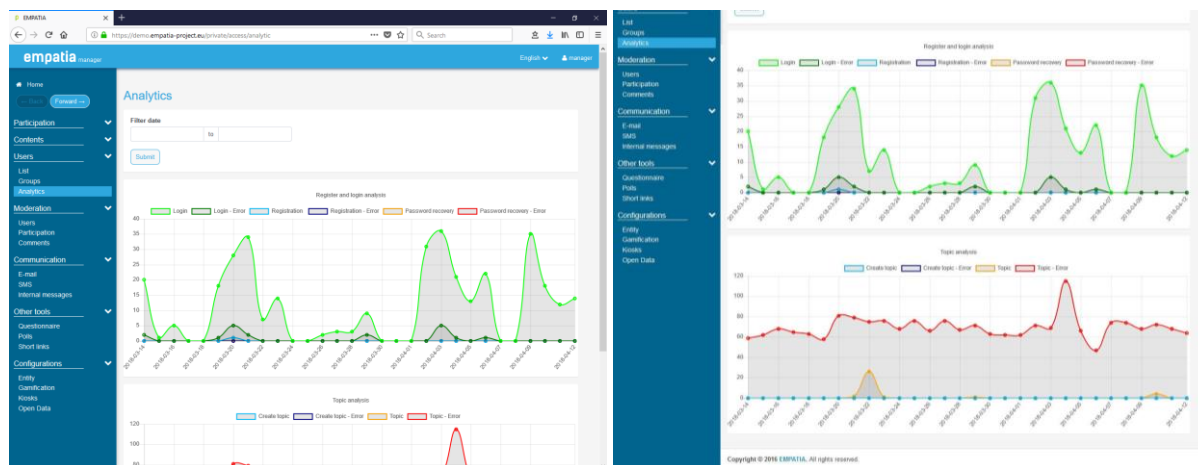


Figure 62 – Users analytics

## Moderation

This section allows managers to moderate users, topics and pads/comments from an integrated area.

The “Users” moderation allows a manager to manually moderate a user. This moderation check is one of the Users Login Levels option to restrict users' actions in participation processes.

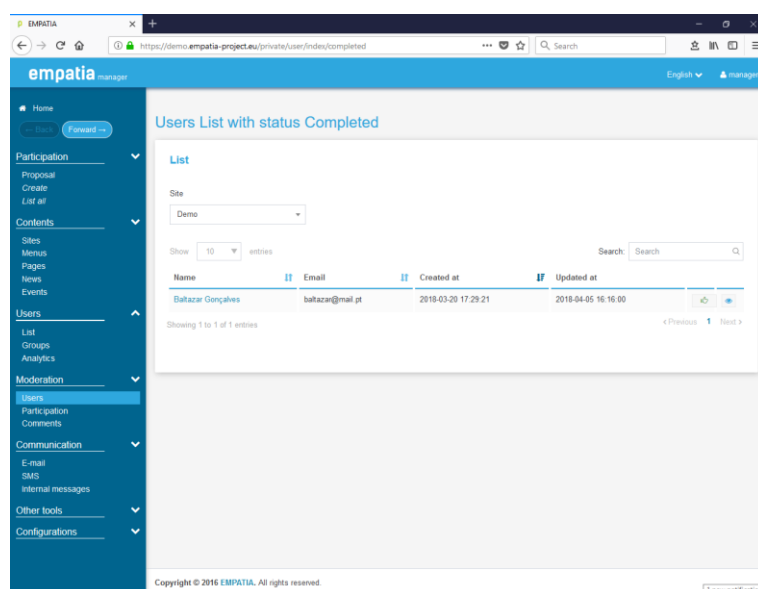
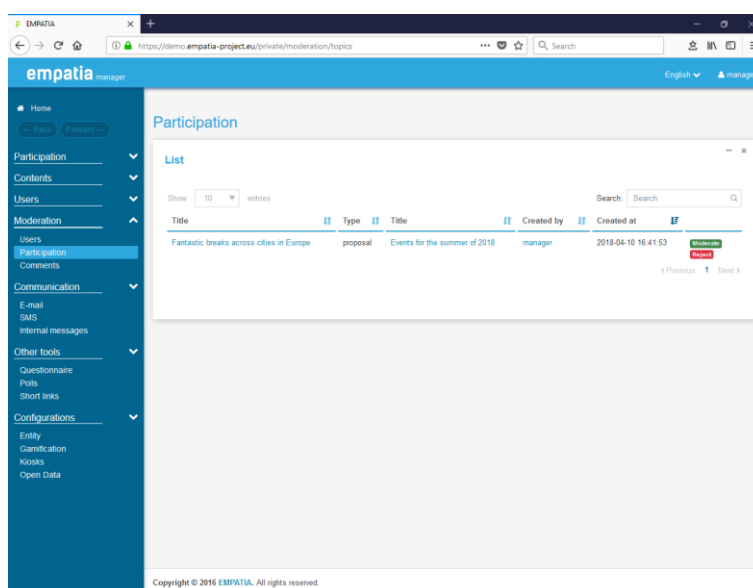


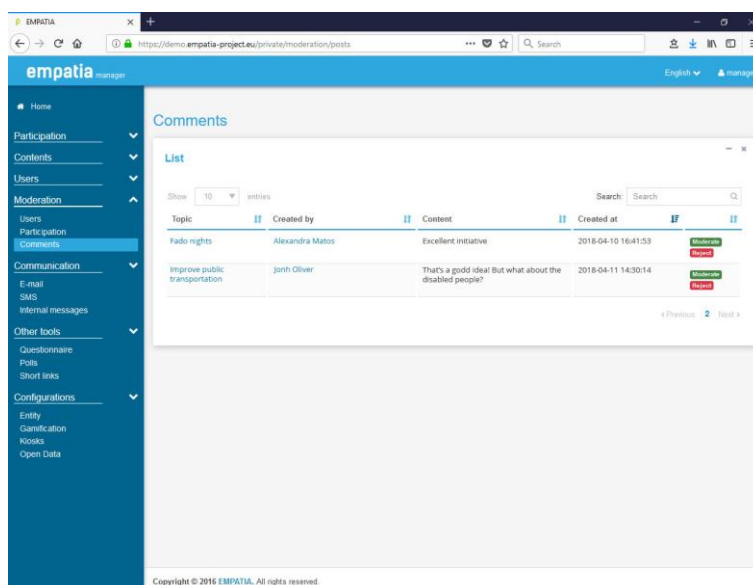
Figure 63 – Users moderation

The “Participation” moderation allows a manager to manually moderate a topic created by a user. This moderation, if enabled in a PAD configuration, is required to make available the created topic to the users in the public topics list and topic details. This feature is similar to the moderation available in a PAD section, but here integrates the topics not moderated from all PADs.



**Figure 64 – Participation moderation**

The “Comments” moderation allows a manager to manually moderate a post created by a user in a specific topic. This moderation, if enabled in the PAD configuration, is required to make available the created post to the users in the public topic details. This feature is similar to the moderation available in a PAD section, but here integrates the not moderated posts from all topics and PADs.



**Figure 65 – Comments moderation**

## Communication

This section includes the management and visualization of all communication options available in EMPATIA Platform: email, SMS and internal platform messages.

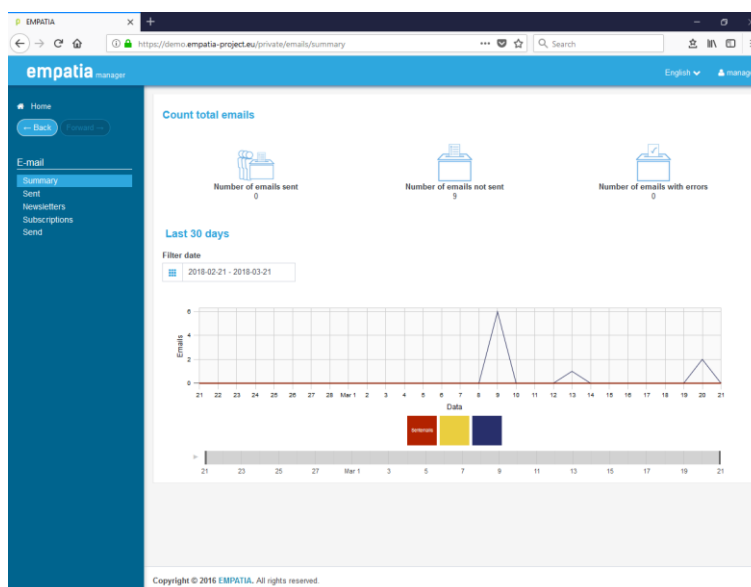
### Email

The email section has a sub-menu with the following options:

- Summary
- Sent

- Newsletter
- Subscriptions
- Send

The “Summary” option takes the manager to an overview analytics screen that presents the total of emails sent, the number of emails not yet sent (still in the queue to be sent), the number of emails with errors. Also, a daily graph with the number of emails is presented, allowing the manager to have an overview of the communication with users per day. It is also possible to select the range of dates to display in the graph.



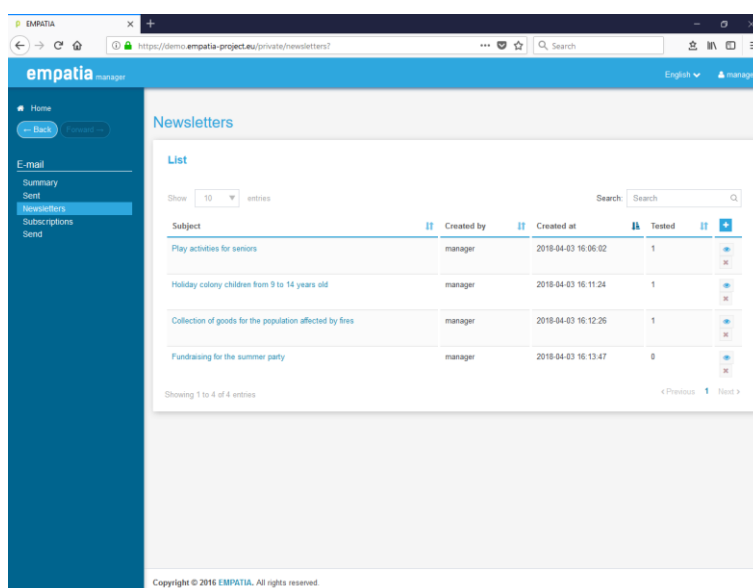
**Figure 66 – Emails summary**

The “Sent” option allows the manager to browse or search for all emails, and view their details, including the creation date of the email, and when it was effectively sent to the user.

Recipient	Subject	Sender	Created At	Sent at
user@test.pt	Registration Confirmation	demo@empatia-project.eu	2018-03-09 14:45:54	Not sent
user@test.pt	Registration Confirmation	demo@empatia-project.eu	2018-03-09 15:04:01	Not sent
user@test.pt	Registration Confirmation	demo@empatia-project.eu	2018-03-09 15:05:04	Not sent
user@test.pt	Registration Confirmation	demo@empatia-project.eu	2018-03-09 15:08:57	Not sent
user@test.pt	Registration Confirmation	demo@empatia-project.eu	2018-03-09 15:09:51	Not sent
user@test.pt	Registration Confirmation	demo@empatia-project.eu	2018-03-09 15:10:13	Not sent
manager@test.pt	Registration Confirmation	demo@empatia-project.eu	2018-03-13 15:14:41	Not sent
user@test.pt	Registration Confirmed	demo@empatia-project.eu	2018-03-20 16:48:26	Not sent

**Figure 67 – Emails list and details**

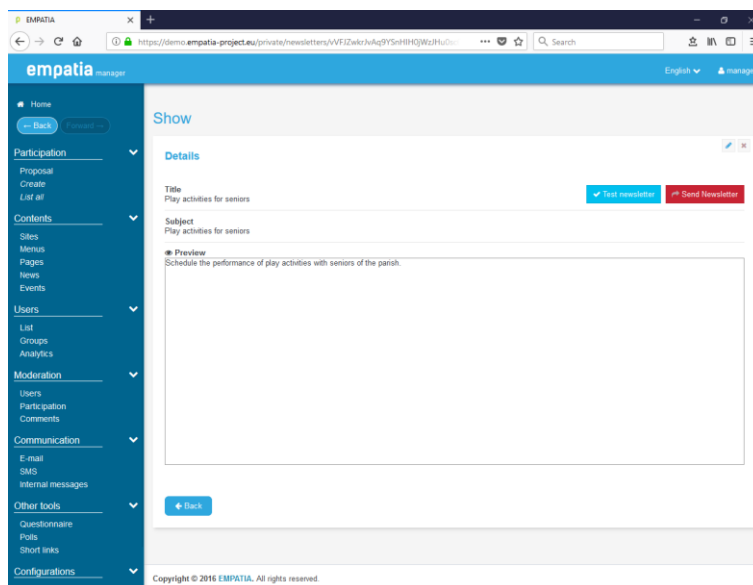
The “Newsletter” option allows a manager to create and send mass emails to all entity registered users. The newsletter list displays all created newsletters and allows the manager to enter to each newsletter details.



**Figure 68 – Newsletter list**

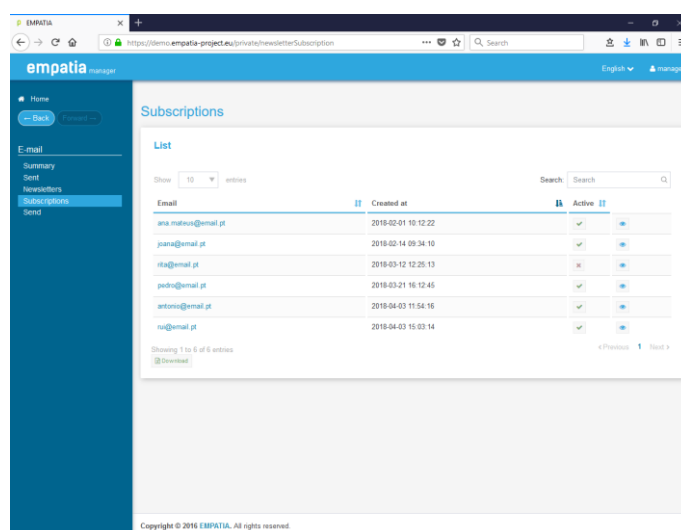
A newsletter is composed by an internal title, a subject and the email content. After its creation (or any editing) the manager is required to send a testing email (automatically sends it to email address of the logged in manager) so no newsletter is send without previous verification.

After testing the newsletter, the manager is able to send the newsletter to all users.



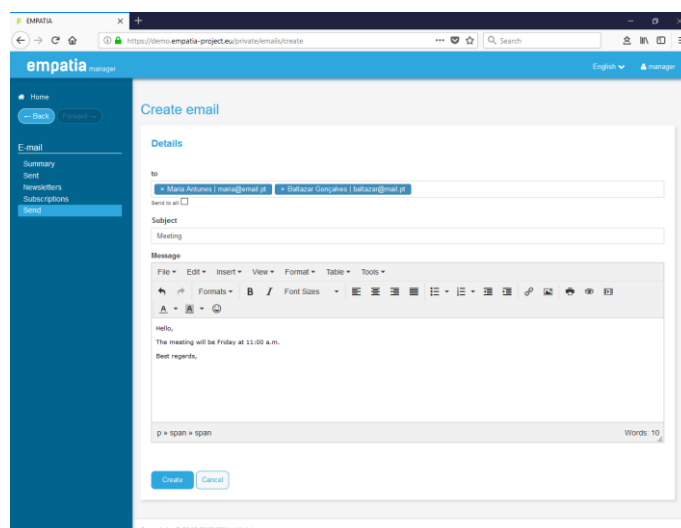
**Figure 69 – Newsletter details**

The “Subscriptions” option displays the email addresses that visitors of the website have submitted in the “Newsletter subscription” option.



**Figure 70 – Subscriptions list**

The “Send” option allows any manager to send an email to any entity user (manager or user) by filling in the list of recipients, subject and content of the email. An option to send to all users is also available but the newsletter feature should be preferred.



**Figure 71 – Send email**

## SMS

The EMPATIA Platform allows the configuration of several SMS providers and is easily extendible to support further providers. To enable this feature the manager needs to configure the SMS section in the Site configuration (this feature is site dependent, allowing each site to use a different SMS provider). Despite several SMS providers can be configured in the same Entity, this section aggregates the data from all providers.

The SMS section has a sub-menu with the following options:

- Summary
- Sent
- Received
- Analytics
- Send

The “Summary” option takes the manager to an overview analytics screen that presents the total of SMSs sent, received, votes and vote errors. Also, a 48-hour (per hour detail) graph and a 30-day (per day) graph displays the SMS numbers allowing managers to have a quick overview of the recent trends.

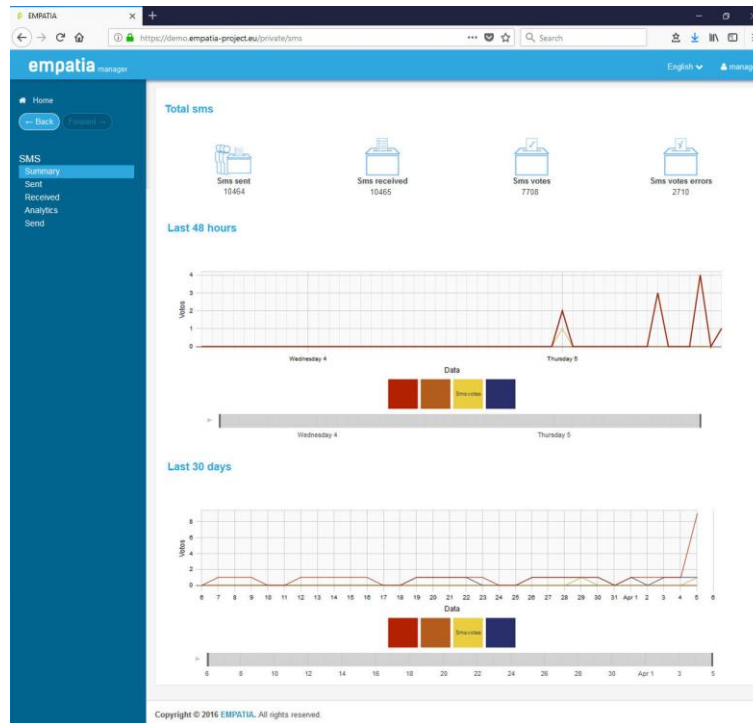


Figure 72 – SMSs summary

The “Sent” option allows the manager to browse or search for all SMSs sent, and view their details. It is also presented an overview analytics of the sent SMS and filter the sent SMS by a date and hour range period.

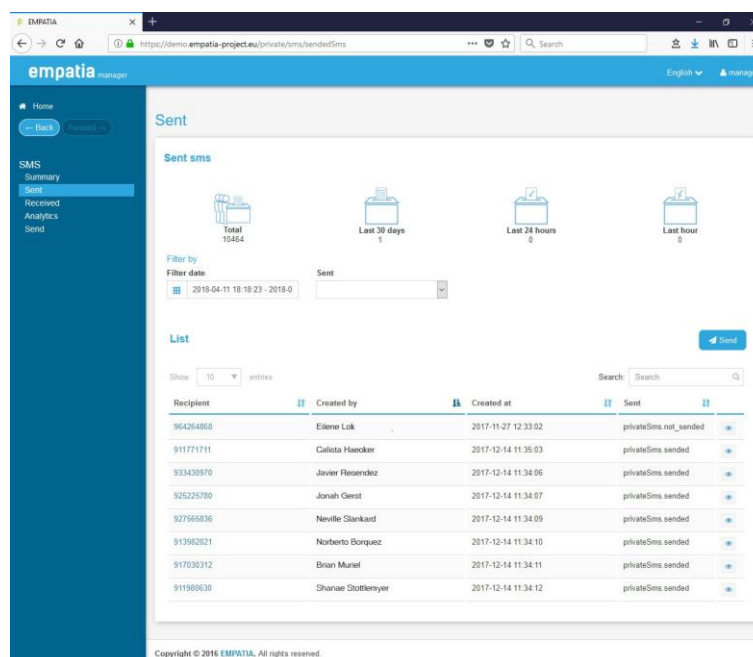
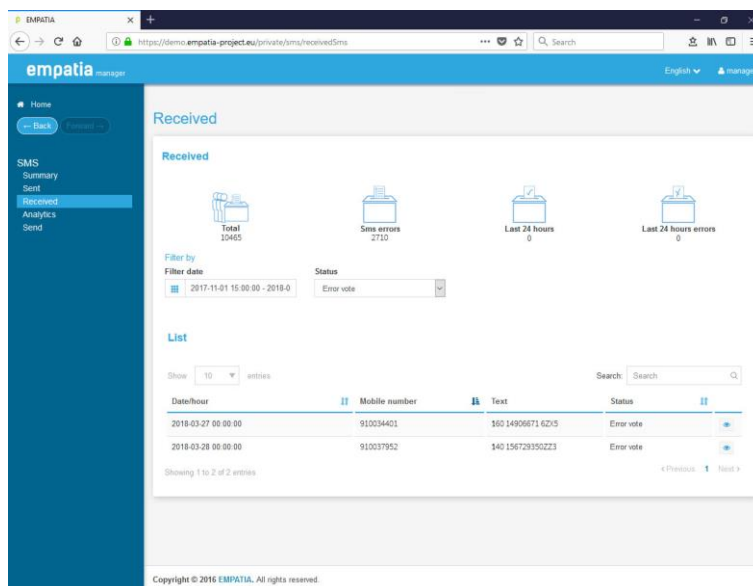


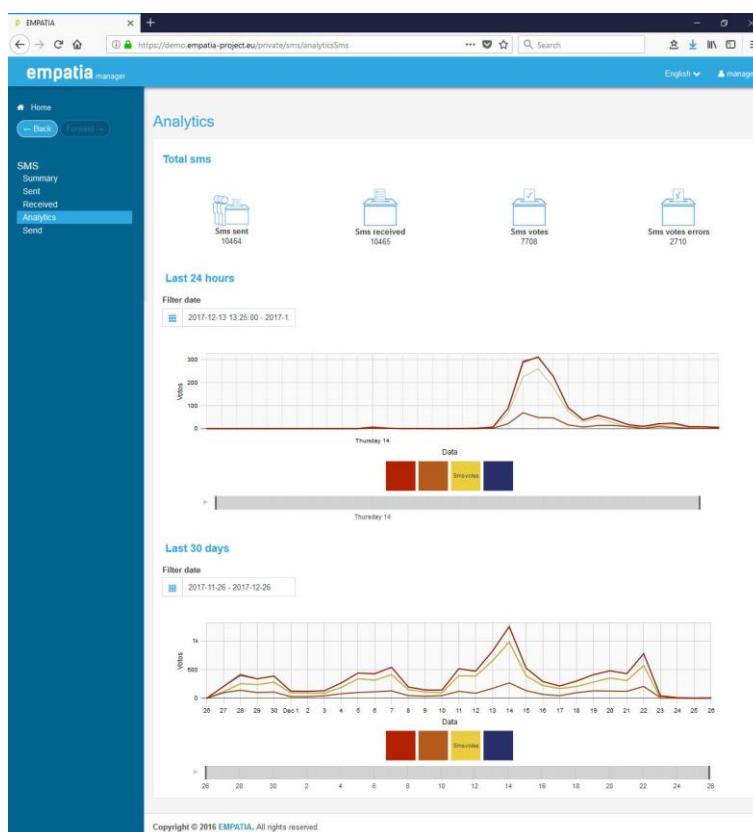
Figure 73 – SMS sent list

The “Received” option allows the manager to browse or search for all SMSs received, and view their details, including the processing result and errors. It is also presented an overview analytics of the received SMS and filter the received SMS by a date and hour range period.



**Figure 74 – SMS received list**

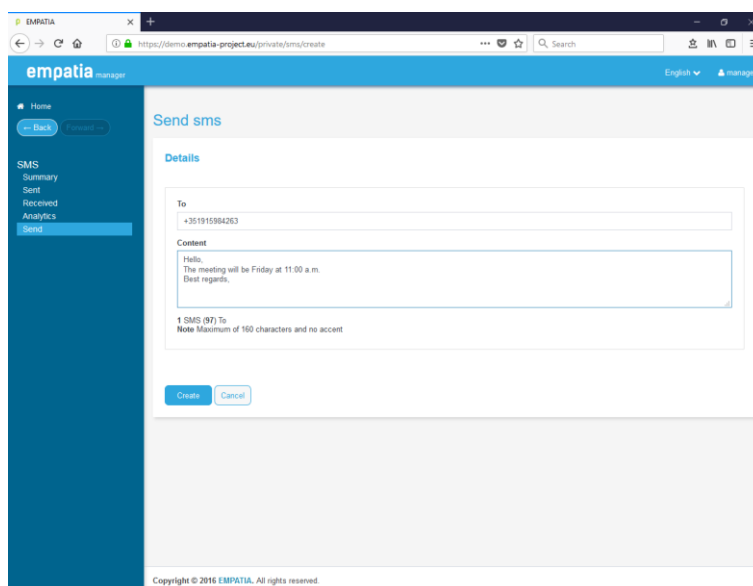
The “Analytics” option allows the manager drill down the SMS sent and received information in a graphical way, allowing the visualization of the per hour and per day information in specific date ranges.



**Figure 75 – SMS analytics**

The “Send” option allows any manager to send an SMS using the SMS configured infrastructure.

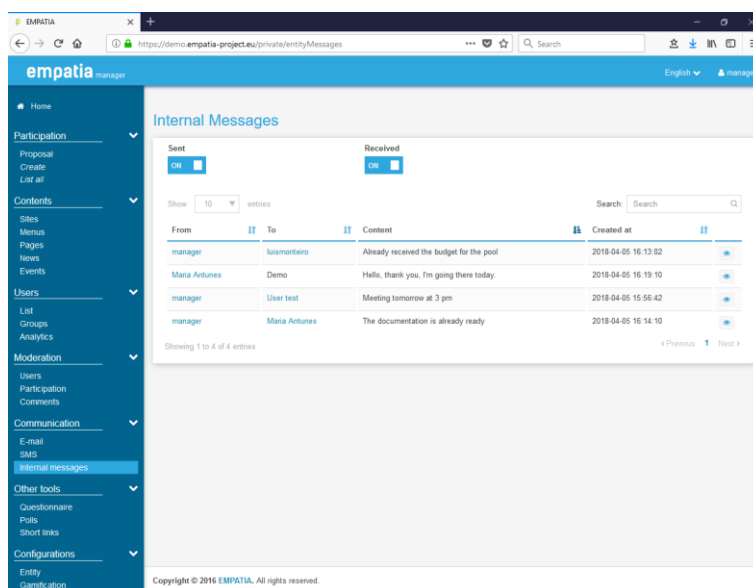




**Figure 76 – Send SMS**

## *Internal messages*

This section allows managers to visualize all sent and received messages between users and managers, in an integrated area.



**Figure 77 – Internal messages list**

By selecting one user the manager is directed to the details of the user, where he can visualize the full history of internal messages and send a message to that user (associated or not to a topic created by the user).

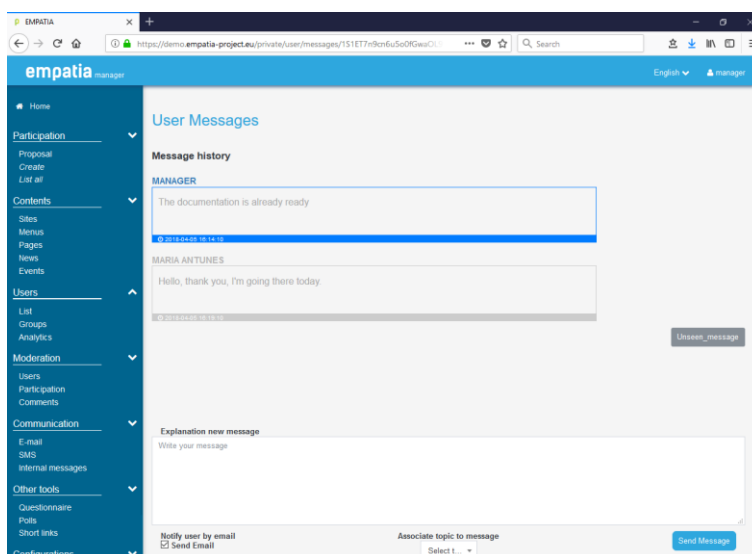


Figure 78 – User internal message history

## Other tools

This section presents a couple of other tools which complement the participation actions. These tools are the Polls, Questionnaires and Short Links.

### Polls

This feature allows managers to create two types of quick polls: date and free text. The date polls' main purpose is to support the organization of entity internal meetings (private) or public assemblies (public) by identifying possible time periods and allowing users (registered or not) to submit their availability. The free text polls purpose is to support a quick vote, privately or publicly, on a specific question.

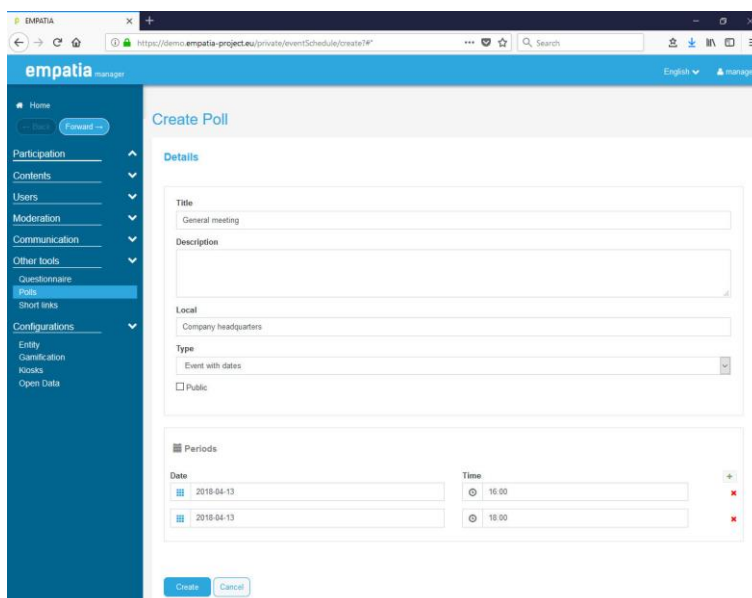


Figure 79 – Polls configuration

## Short links

This feature allows the managers to create short links for a given URL. This is particularly useful when an entity wants to send a newsletter through the SMS system, where the number of characters is limited, or to simply have easier links that people can easily remember.

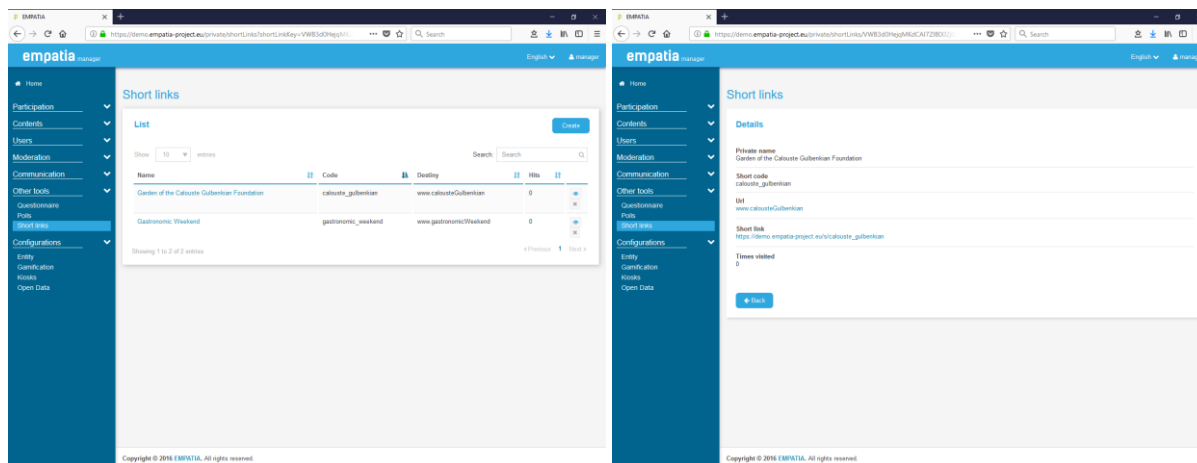


Figure 80 - Short Links configuration

## Questionnaires

This option allows managers to create questionnaires and analyse their results. Each questionnaire is composed by questions groups, and each group contains questions. The questions can be text, radio buttons, checkbox or text area. The type of specific questions is available to simplify the process of creating questions (ex.: Yes/No; 1 to 5).

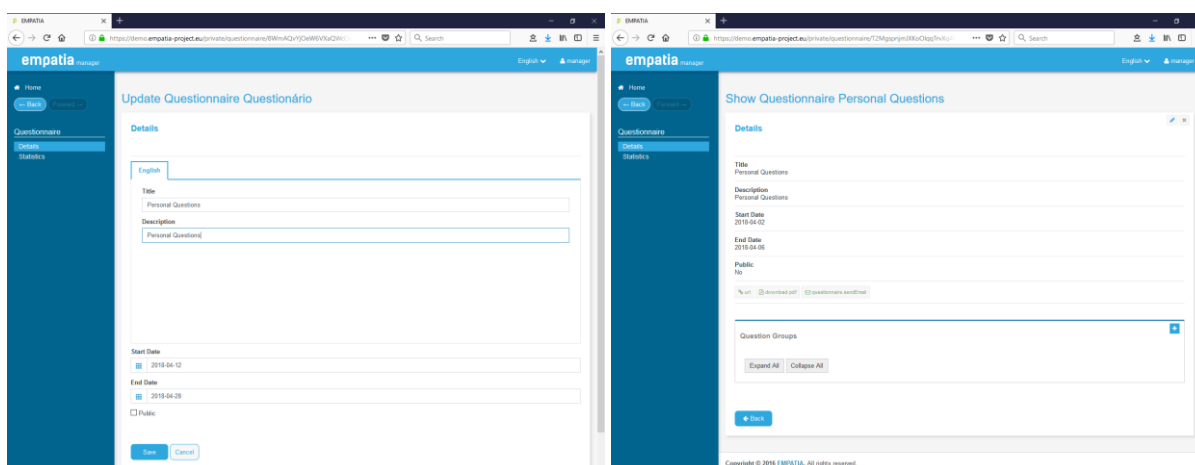


Figure 81 – Questionnaire configuration

## Configurations

This section includes several entity wide configuration features like the management of the Entity, user parameter, kiosks and open data.

### Entity

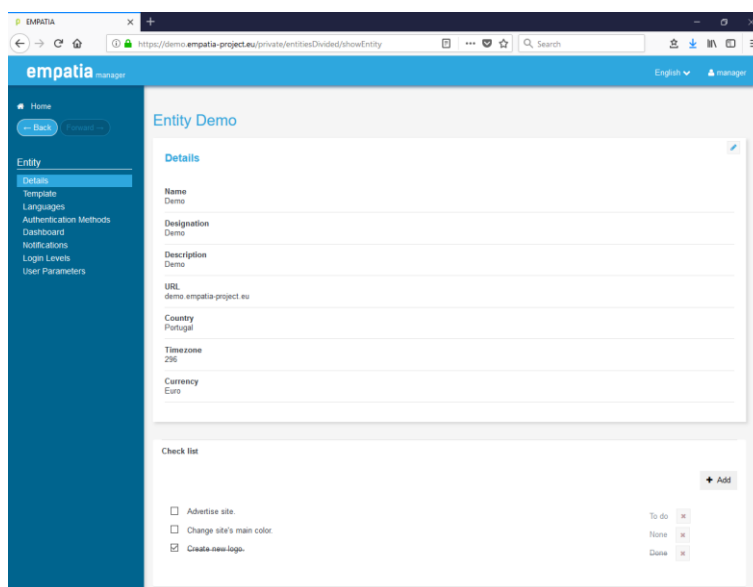
This option allows a manager to change the entity configurations. These features are similar to the ones available to the Administrator (c.f. 3.2.1 – Entities).

The Entity section has a sub-menu with the following options:

- Details
- Templates
- Languages
- Authentication
- Dashboards
- Notifications
- Login Levels

In this section a manager can configure most of the entity elements. A manager can edit the entity details, configure templates, languages and authentication methods available for this entity sites. Also, in the section the manager also configures the dashboards available for the backend homepage, the entity notifications and the users' login levels.

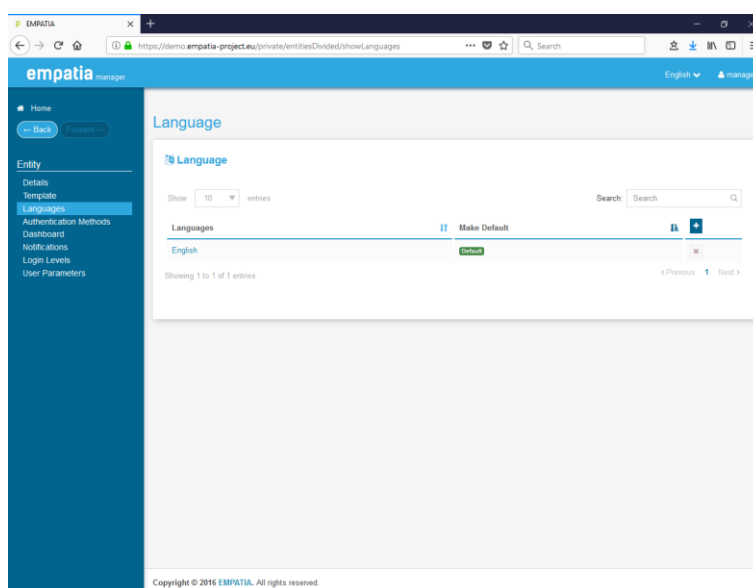
The “Details” option, like in the administration space allows the manager to edit generic details of the entity like the entity name and description, the entity main URL, and the default country, time zone and currency.



**Figure 82 - Entity details**

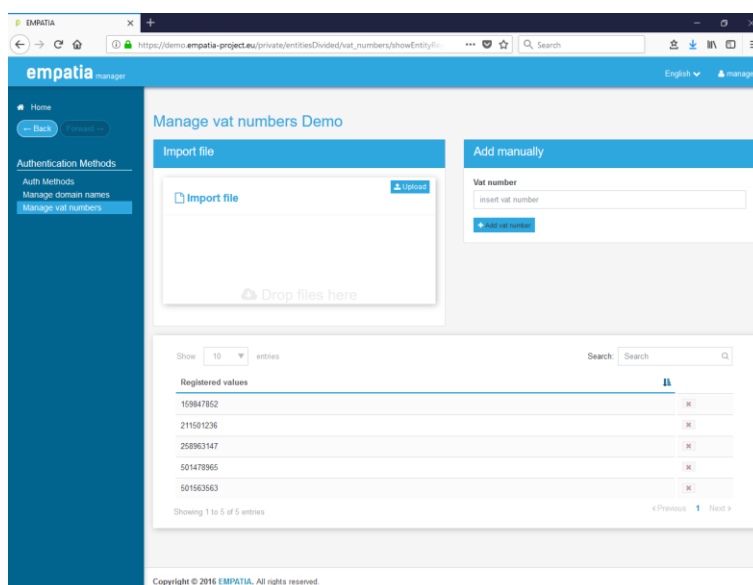
The “Template” option allows the manager to add additional templates to be available for the sites based on the Administrator configurations.

The “Languages” option allows the manager to define all languages of the entity (then available to be selected in the Sites configuration) and set the entity default language.



**Figure 83 - Entity languages**

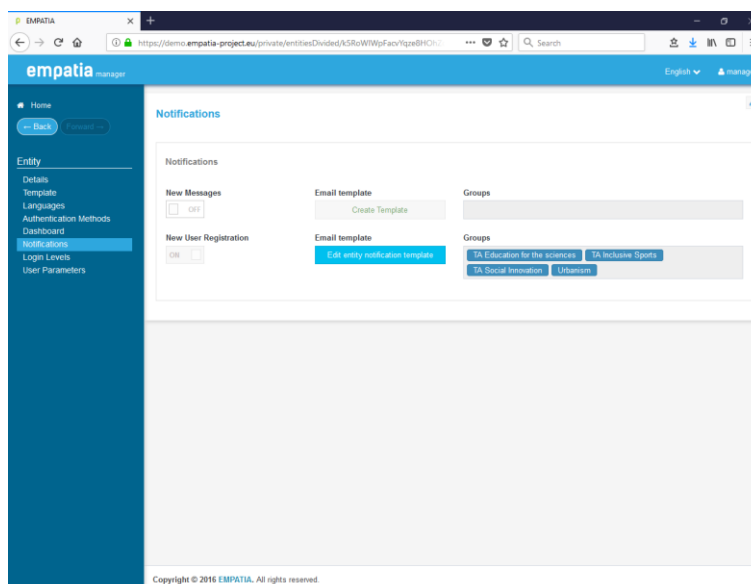
The “Authentication” option allows the manager to define several aspects related to the authentication and registration of users in the entity: methods available, authentication domain names, and VAT numbers. The “Methods” section allows the manager to add additional authentication methods for the user to login into the platform. Currently the available methods available are: EMPATIA Auth, Facebook, Google, myCascais (proprietary Cascais Municipality SSO) and Libertrium (proprietary commercial platform SSO – used in Lisbon). The “Email domains” section allows the manager to configure authorized email domains that can be integrated in the Login Level configurations as a verification option. Similar, the “VAT numbers” allows the manager to configure pre-authorized VAT numbers that can be integrated in the Login Level configurations as a verification option.



**Figure 84 – Authentication VAT numbers**

The “Dashboards” option allows the manager to define automatically created dashboard items for all managers. If enabled, the first time a manager accesses the backend the respective dashboards items will be generated. The user can then parameterise its own dashboard screen by configuring, removing or adding dashboard elements.

The “Notifications” option, and the described notifications sections (e.g. sites and PAD/CB) allow the manager to define the email templates for generic entity messages: user registration and internal messages. It is possible to enable/disable the notification and define the email template for each language that is sent every time the trigger is activated. Like all other notifications templates the manager can use available codes in the email text that will be replaced by the corresponding dynamic value (e.g. user name, message content).



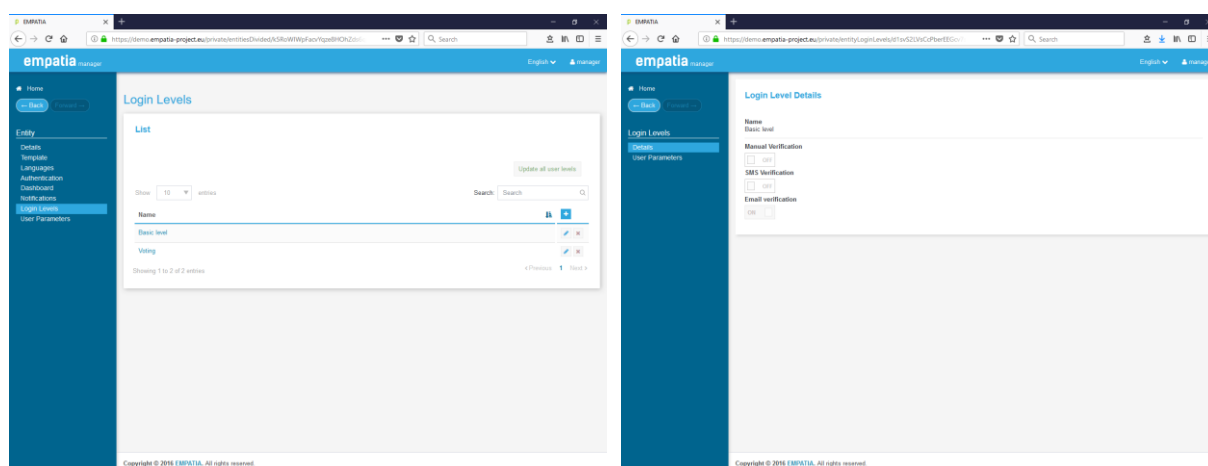
**Figure 85 – Entity notifications**

The “Login Levels” option is where a manager defines all user login levels. A login level is an authorization badge that is given to a user based on its characteristics. These login levels can then be used to restrict users access to specific platform features (e.g. create topics or vote).

One login level is composed of “Details” that include the level name, dependencies of other login levels, and a set of options that interact with other features: manual verification, to have this login level a user must have been manually verified (c.f. Moderation section); SMS verification, to have this login level the user must have to have verified its mobile phone number introducing a verification code (c.f. Users section); Email verification, to have this login level the user must have an email address domain that is configured in the “Authentication Domains”; VAT number verification, to have this login level the user must have an VAT number that is configured in the “Authentication VAT Numbers”.

Additionally, one login level can require specific user parameters (mandatory or optional), enforcing that these are filled in by the used to be able to have the login level.

The EMPATIA *default* template checks the user login levels before the user tries to perform specific participation actions, and if the required login levels are not met, the user is recommended to complete the profile.



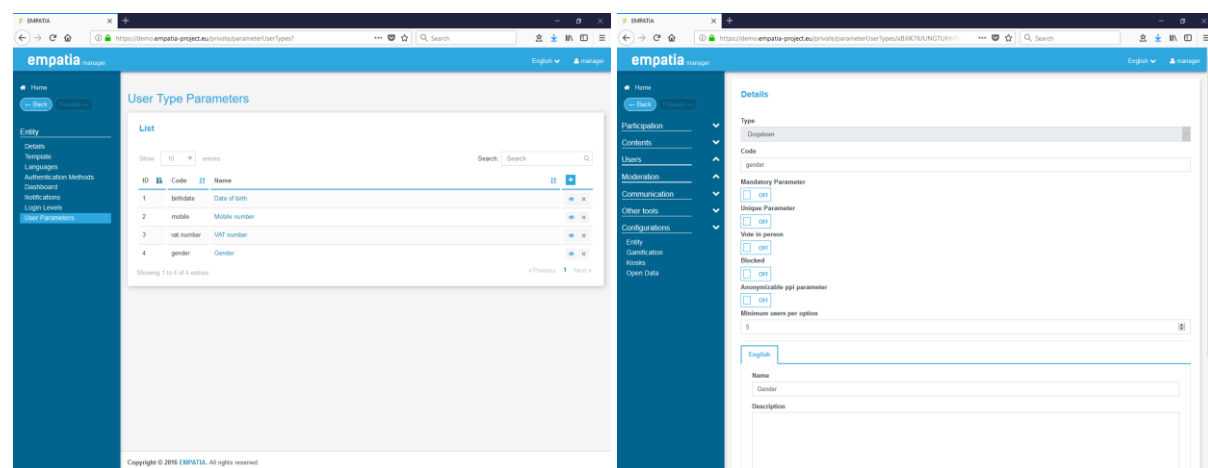
**Figure 86 – Entity Login Level**

### *User parameters*

This section is where a manager defines the user profile parameters. These are the parameters that store the users' data and are then used throughout the platform, like the Login Levels and the registration process.

The available type of parameters includes: text, radio button, check box, text area, numeric, geolocation, dropdown list, currency, date, file, mobile number. For each parameter type different configurations options are available.

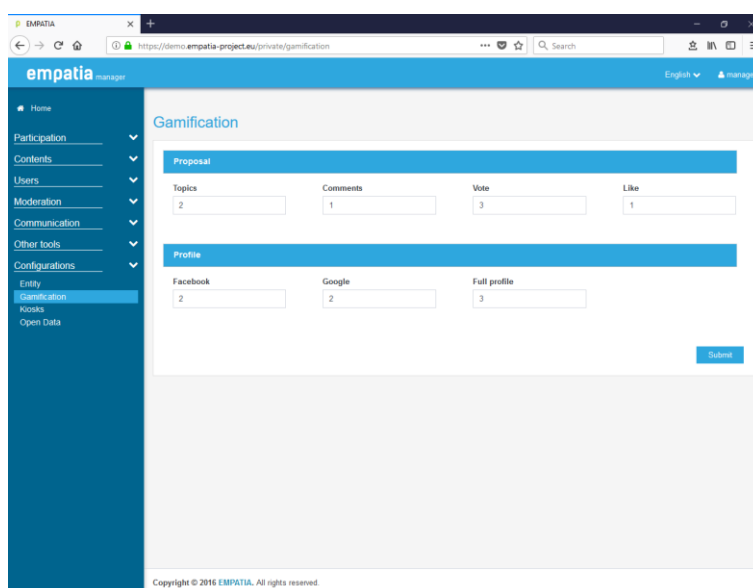
In common all parameters require the following configuration: mandatory, if the user is required to add information in this field; unique, if there cannot be two users with the same value for one entity; blocked, is a field that only the managers can edit; Personal identifiable information (PII), identifies that this field represents user sensitive personal information, fundamental for the anonymization and open data features.



**Figure 87 – User parameters**

### *Gamification*

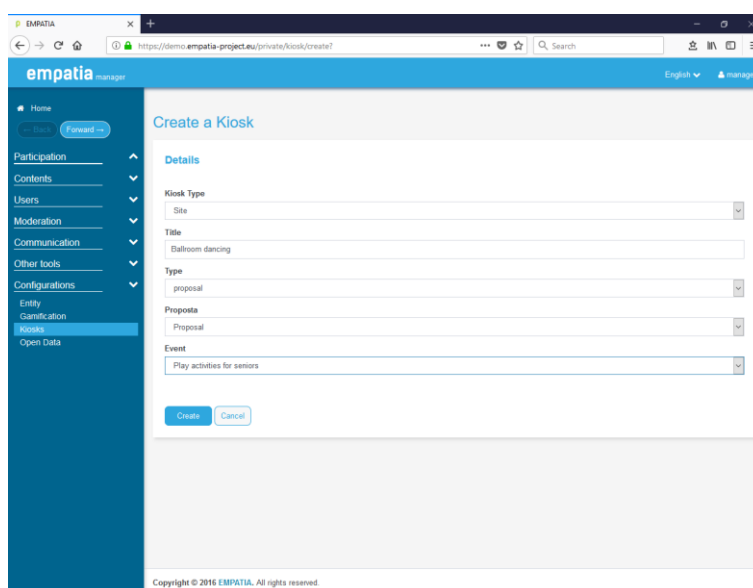
This section allows the configuration of gamification points for each participation trigger performed by users. The points are automatically added to the user when he performs the respective participation action.



**Figure 88 – Gamification configuration**

## *Kiosks*

This section allows the configuration of Voting Kiosks to specific voting sessions. It is possible to configure the Voting Kiosk, the Ballot Kiosk, the Tablet Kiosk and the Remote Control Kiosk.



**Figure 89 – Kiosks configuration**

## *OpenData*

This section allows the entity manager to define which EMPATIA Platform entity data is made available publicly as open data. This feature allows the publication of information regarding users (no PII information can be made available), participation processes and vote events.



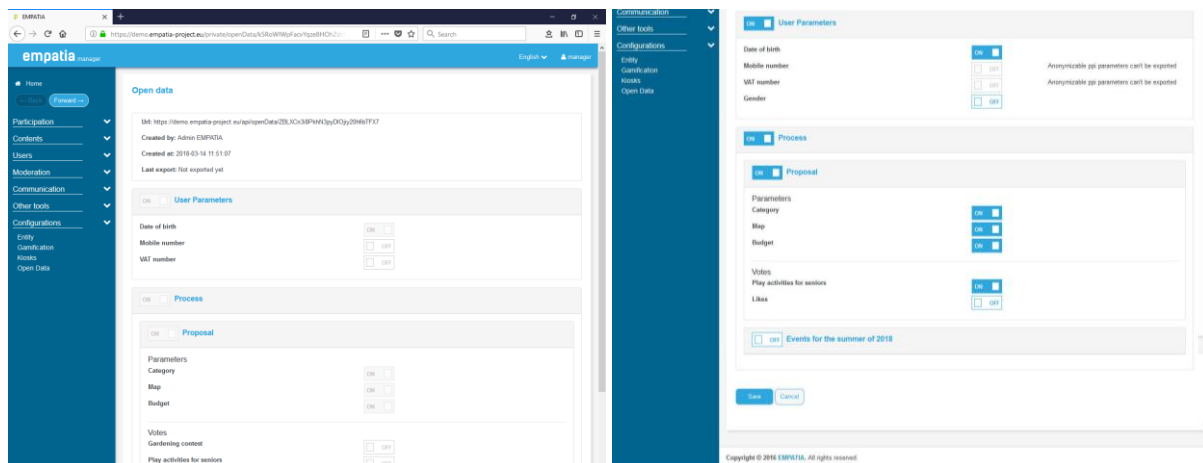


Figure 90 – Open data configuration

The open data information is made available in the URL identified in the JSON format (and GeoJSON) and can be imported in any open data platforms like CKAN and DKAN. The best practices in open data format are used.

```
{
  "type": "FeatureCollection",
  "features": [
    {
      "type": "Feature",
      "properties": {
        "id": "c4ca4238a0b923820dc5996f75849b",
        "name": "Proposal",
        "description": "Proposal",
        "type": "Proposal",
        "parameters": [
          {
            "id": "c4ca4238a0b923820dc5996f75849b",
            "name": "Proposal",
            "type": "Proposal",
            "options": [
              {
                "id": "c4ca4238a0b923820dc5996f75849b",
                "name": "Proposal",
                "translations": [
                  {
                    "language_code": "en",
                    "name": "Proposal"
                  }
                ]
              }
            ]
          }
        ]
      },
      "geometry": {
        "type": "Point",
        "coordinates": [
          12.1264467,
          41.9063311
        ]
      }
    }
  ]
}
```

Figure 91 – Open data JSON

### 3.2.3 User space

The User space is a generic area where the user of the platform (i.e. a citizen), depending of the activated configurations, can access to all information of the entity via the public web site and/or via the available tools. To access some information or participate it needs to register in the platform and provide all the required information by the entity.

The EMPATIA Platform is provided with a *default* template that implements a user space with all features available and can be used as the basis of a new template.

In the next sub-sections, we present the EMPATIA template structure followed by examples of the User space, highlighting the main features available.

### Template structure

The final template structure is composed by several key view files and directories, and others that can be added to fit specific interface requirements. This structure is based on a *default* concept, where a

default view is defined, for example for a PAD/CB, but when required specific views can be created to allow different interfaces for proposals, ideas, consultations, etc.

auth	Registration and login views
emailConfirmed.blade.php	Email confirmed view
login.blade.php	Login view
migration.blade.php	Migration of user between entities view
recovery.blade.php	Password recovery view
recoverySuccess.blade.php	Password recovery success view
register.blade.php	Registration view
successMessage.blade.php	Registration success view
updatePassword.blade.php	Password recover change password view
cb	All CB processes views
default	Default CB views
form.blade.php	Topic creation view
formSuccess.blade.php	Topic success creation view
list.blade.php	List CBs view
listTopics.blade.php	Topics list view
successMessage.blade.php	Send notification success view
topic.blade.php	Topic details view
votesConfirm.blade.php	Vote submission confirmation view
votesSubmitted.blade.php	Vote submission success view
cms	Content management views
default	Default content views
index.blade.php	Content view
list.blade.php	Content list view
sections	Common shared sections
bannerSection.blade.php	
buttonSection.blade.php	
contentSection.blade.php	
contentsList.blade.php	
emptySection.blade.php	
externalVideoSection.blade.php	
headingSection.blade.php	
internalVideoSection.blade.php	
linkedBanner.blade.php	
multipleFilesSection.blade.php	
multipleFilesSectionObject.blade.php	
multipleImagesSection.blade.php	
singleFileSection.blade.php	
singleImageSection.blade.php	
slideShowSection.blade.php	
home	Home views
index.blade.php	Home view
popup.blade.php	Pop-up view
splash.blade.php	Splash screen view
layouts	Common layout sections
footer.blade.php	Footer view
header.blade.php	Header view
macros	Macros
oneFileUpload.php	
oneFileUploadScript.php	
oneImageUpload.php	
oneImageUploadScript.php	
oneMapsLocation.php	
oneMapsLocationScript.php	
oneSingleFileUploadScript.php	
ethics	Site ethics views
default.blade.php	Default view for ethics information
user	User views
index.blade.php	User details view
messages.blade.php	Internal messages history and send view
topics.blade.php	User participation view
user.blade.php	Edit user details view

## Example Screens

After a successful login, a user is now able to see his profile and update it. Also, depending on the participation tools configurations additional menus and pages become available (ex.: restricted ideation process). Next figure presents an example of the home screen for a user.

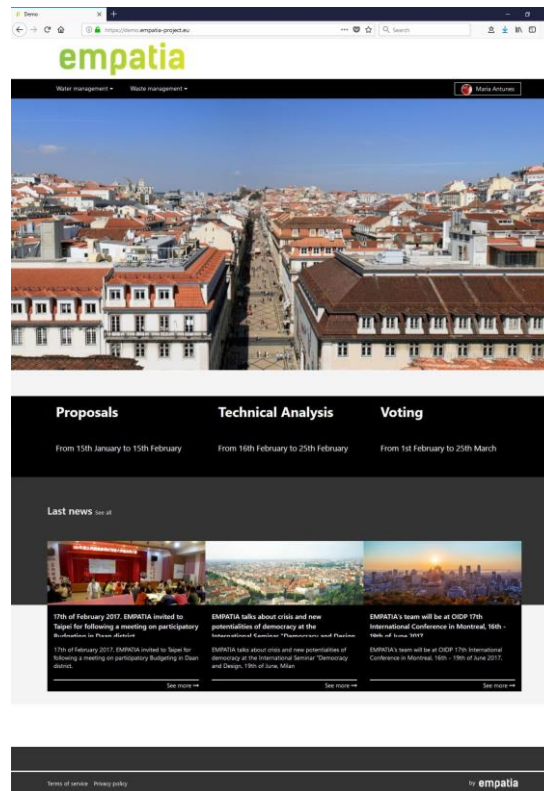


Figure 92 – User home screen

To this user an idea PAD/CB is available, as described in Figure 93.

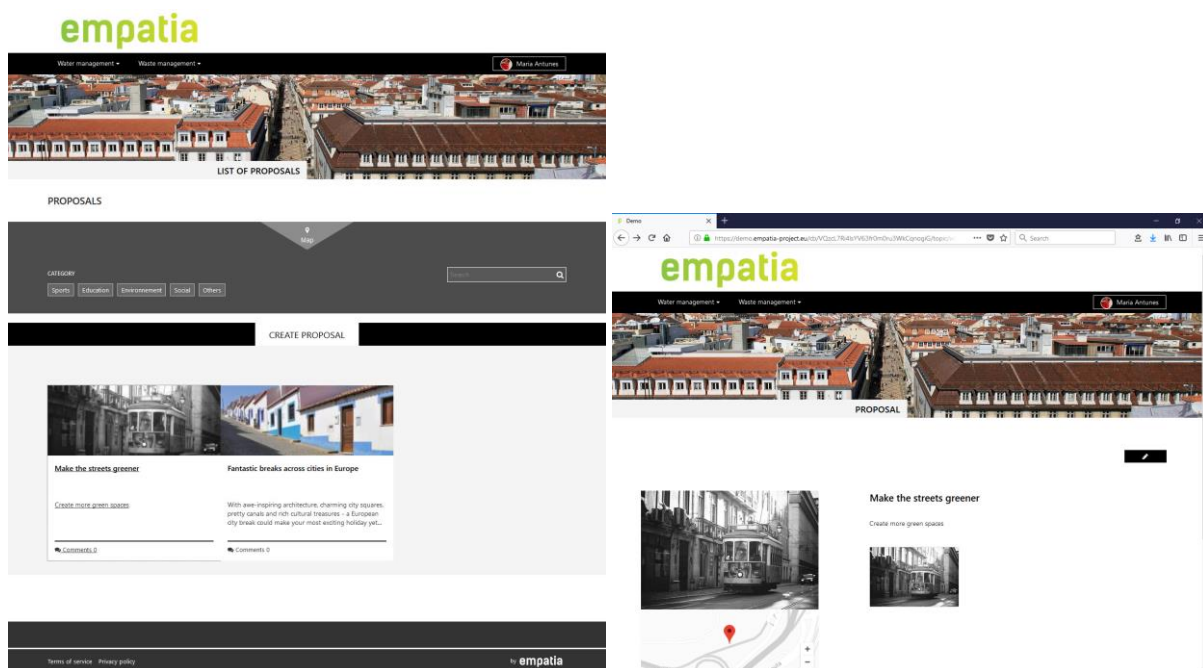


Figure 93 – Topics list and details

By selecting the option to create a new topic, the user can create a topic with the details required by this ideation process (configured in the backend). The minimum fields required for any topic (idea, discussion, forum, etc.) are the title, summary and description. Figure 94 presents two examples of PAD/CB creation, the left example is based on the most used screen in pilots and applications and the right example is a demonstration of the filtering/aggregation of proposals based on the Apache Solr/Lucene engine integration on EMPATIA to identify similar proposals.

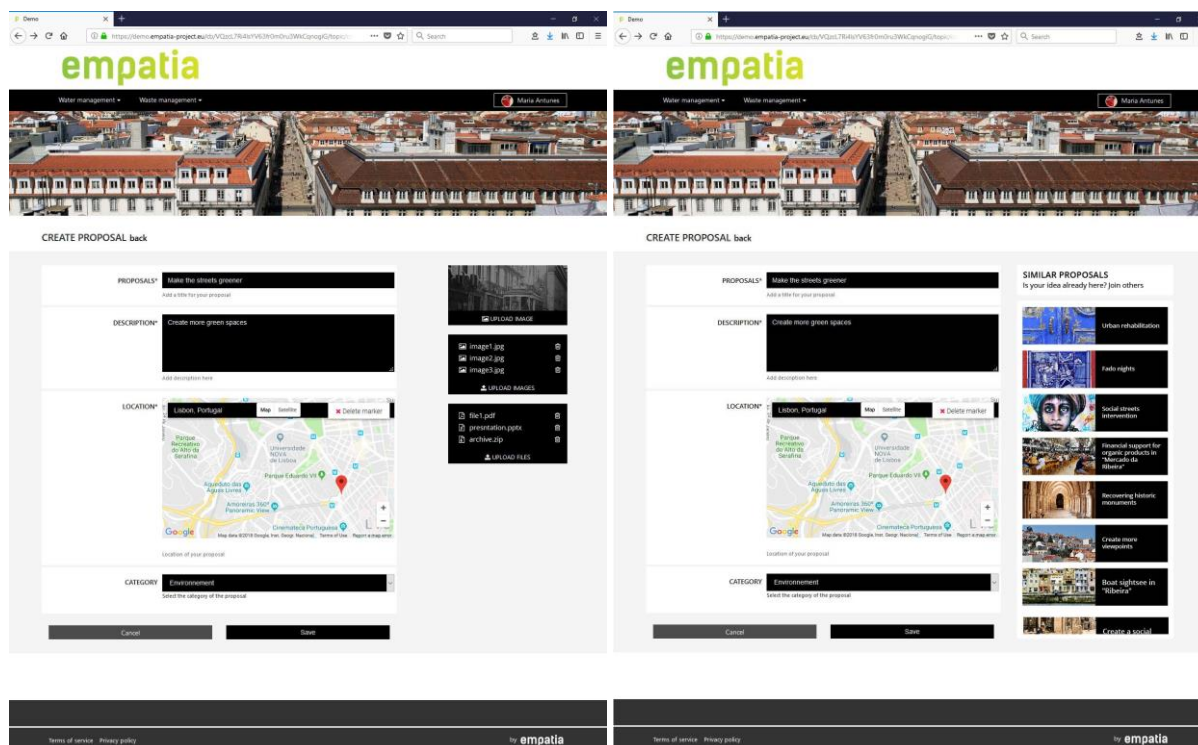


Figure 94 – Topic creation

Figure 95 presents an example of how users can collaborate in the creation of a topic. The example on the left shows a tradition editing of a topic (creation of a new version of the topic), while the example on the right shows how other authors can comment and propose changes to a topic (through the integration of the Annotator tool).

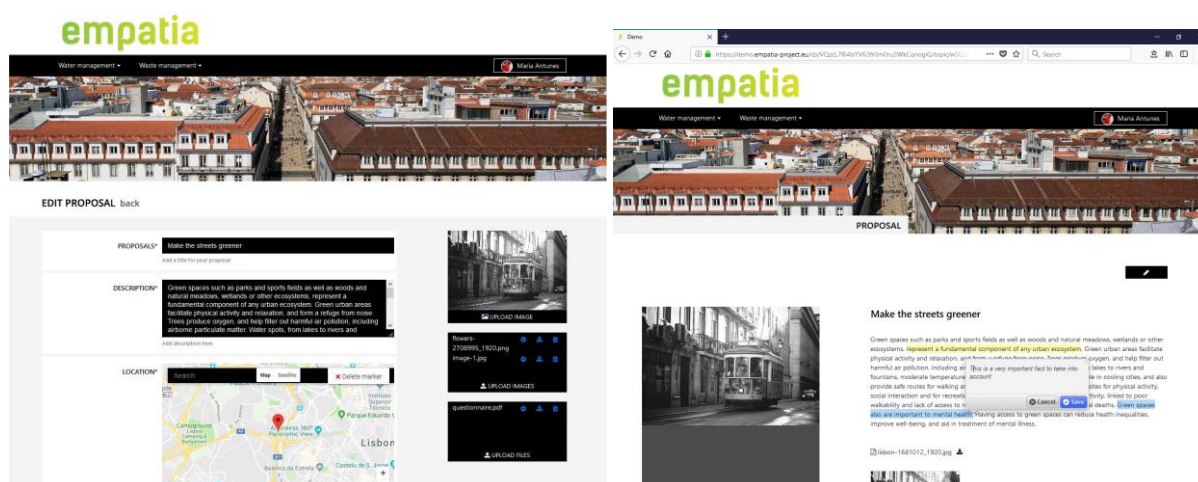


Figure 95 – Topic collaboration



Figure 96 and Figure 97 presents several other public screens examples using EMPATIA default layout. Section 4 complements these examples with additional features and different layouts.

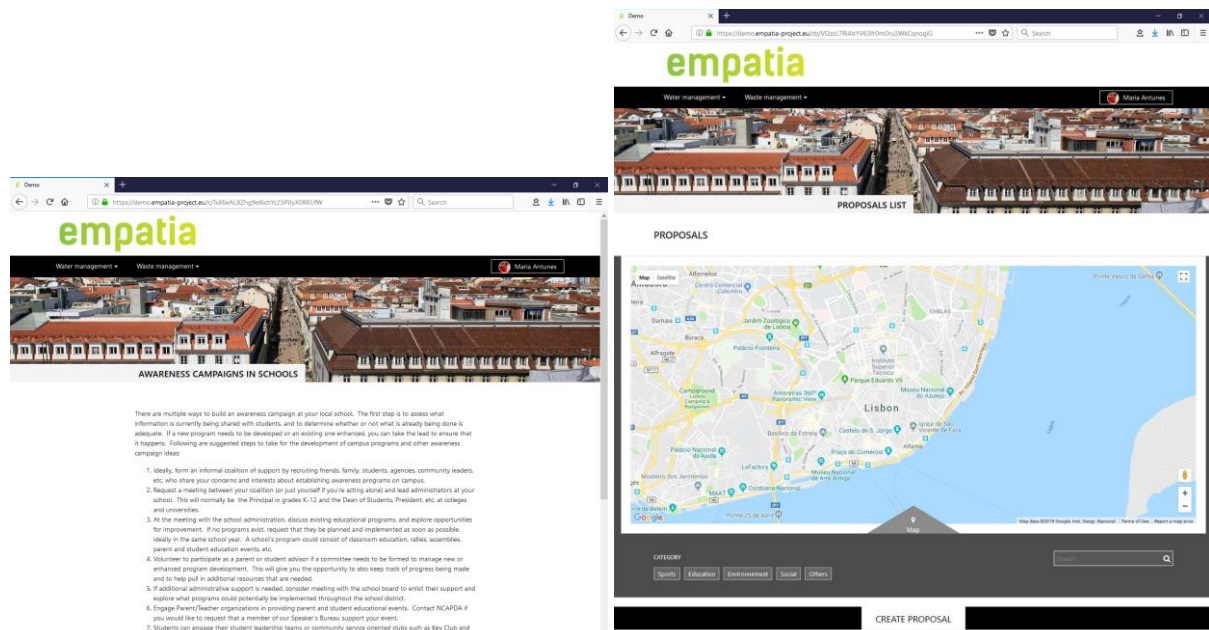


Figure 96 –Public page and map examples

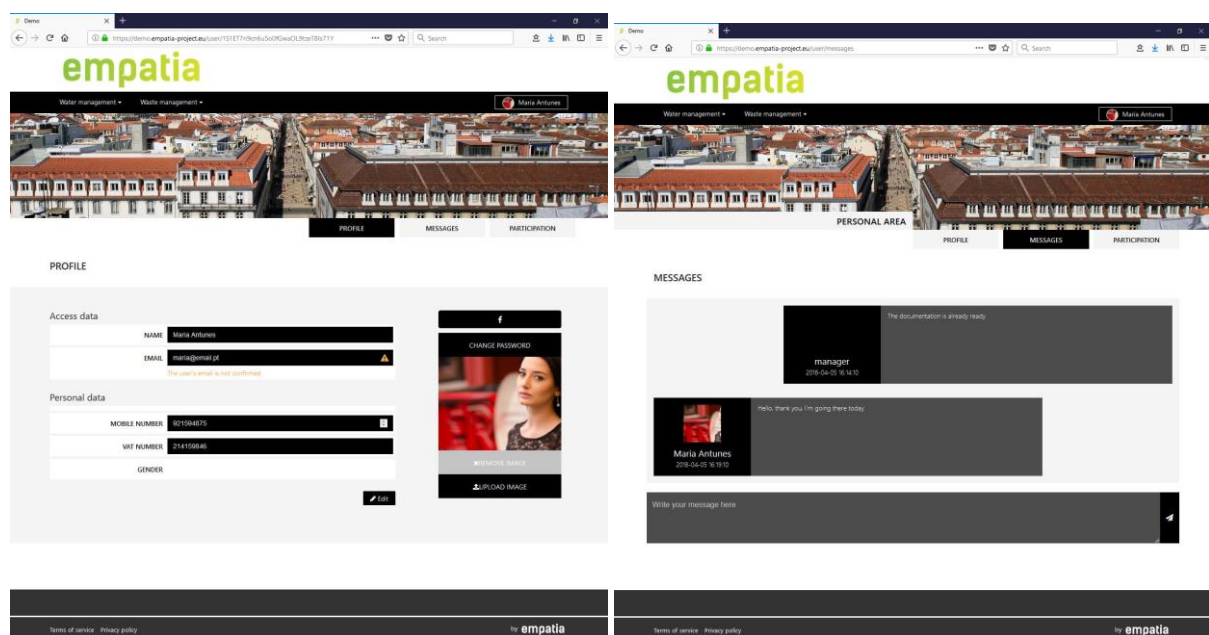


Figure 97 – Public user profile

## 3.3 EMPAVILLE role-playing game

EMPAVILLE role-playing game relies on EMPATIA Platform and has been employed to validate several features of the platform (e.g. voting). EMPAVILLE is mainly composed of:

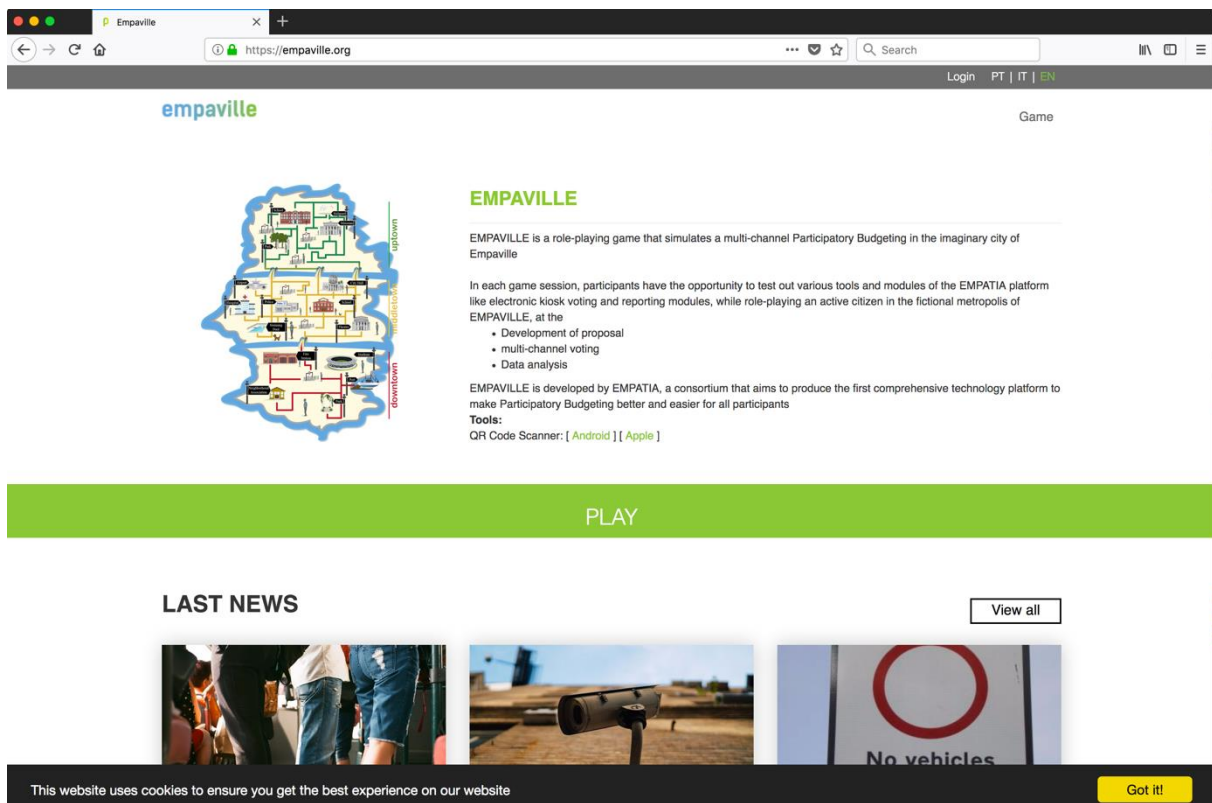
- EMPAVILLE brand/image (graphical design);

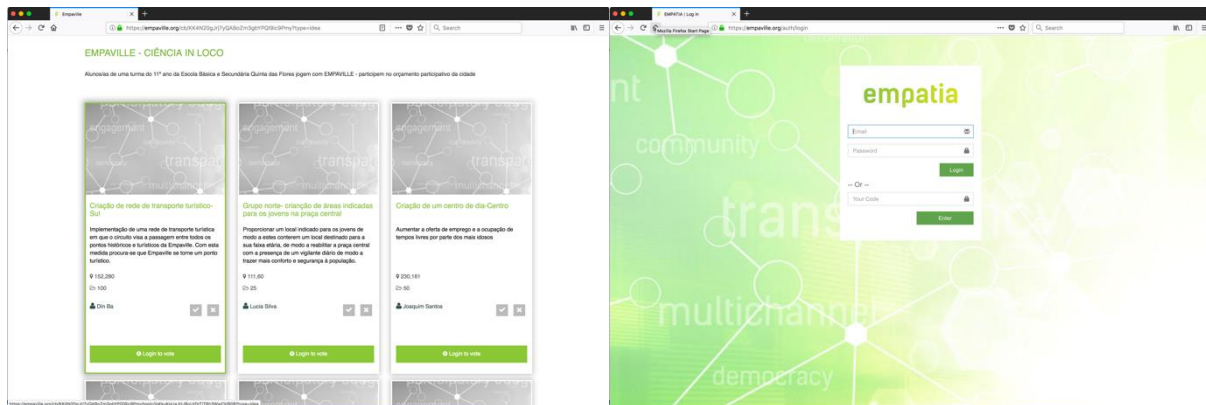
- EMPAVILLE city (city/island map);
- EMPAVILLE citizens (ID Cards with name, age, gender, profession, living and work neighbourhood and in game tips);
- EMPAVILLE presentation/game support.



Figure 98 – EMPAVILLE city map and citizen ID Card

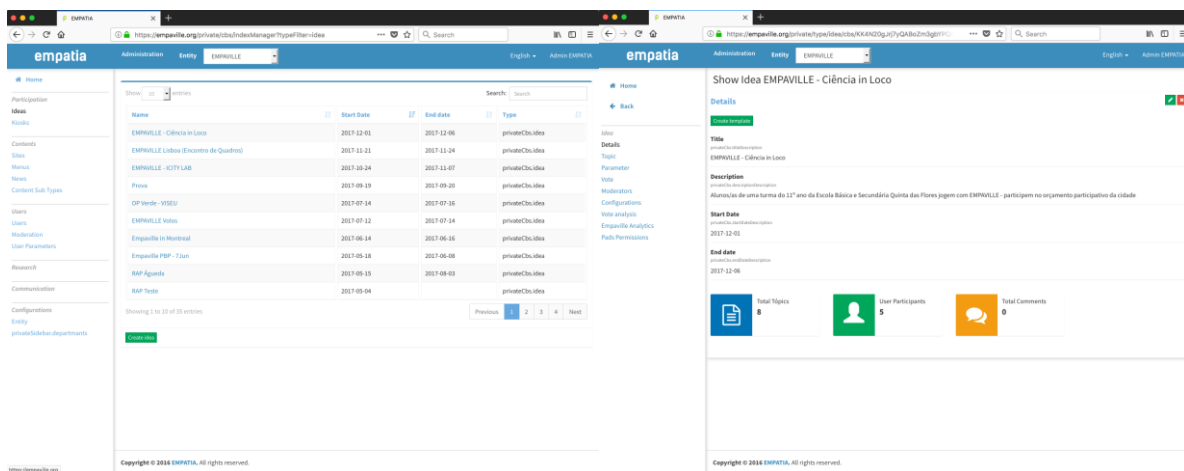
The EMPAVILLE role-playing game can be accessed through the URL <https://empaville.org/>, a dedicated EMPATIA Platform deployment. Here the user is presented with a description of the EMPAVILLE game and the access to the game. Users (game players) can use their ID Card (randomly distributed in the participation sessions) to login in the platform (login/password or alphanumeric code).





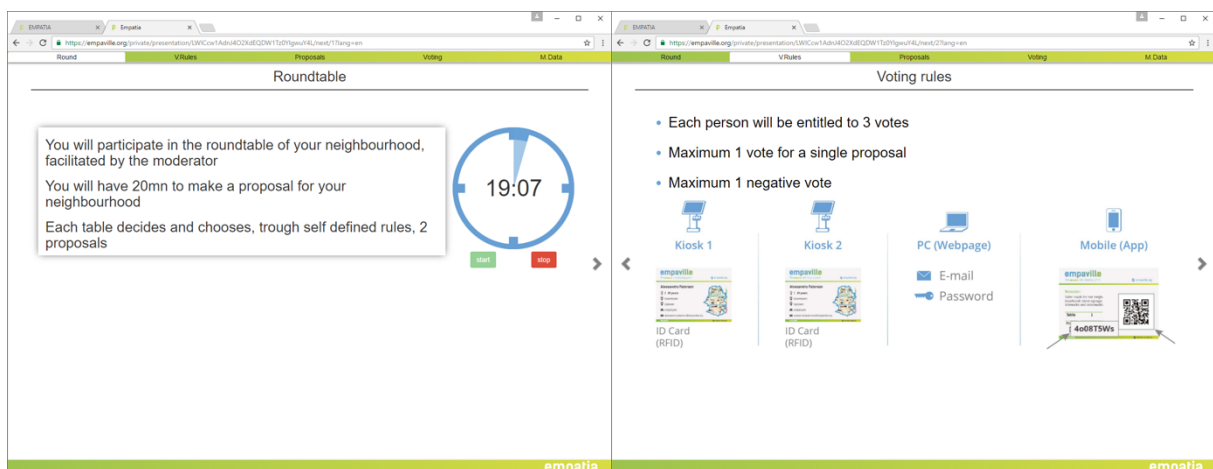
**Figure 99 – EMPAVILLE public screens**

As a manager, it is possible to manage an EMPAVILLE session in the Ideas (CB) menu. In the top of the idea detail it is possible to access the EMPAVILLE Presentation option.



**Figure 100 – EMPAVILLE CB configuration**

This EMPAVILLE presentation feature that is intended to support EMPAVILLE sessions. This presentation supports the roundtable process by counting down the time, supports the visualization of the voting rules, displays the submitted proposals (per manager) and counts down the presentation time, counts down the voting time, and presents the analytics of the EMPAVILLE session.





**Figure 101 – EMPAVILLE presentation and analytics**

Section 4.1 presents additional screens and different layouts of the EMPAVILLE role-playing game.

## 3.4 Kiosks

Although the EMPATIA Platform’s main aim is web and mobile interaction, the need was identified to test and validate solutions to improve the quality and reduce the fraud in face-to-face assemblies, mainly in voting processes. Taking into consideration the low level of ICT experience and knowhow of many of the EMPATIA Platform final users, a set of interactive Kiosks has been identified.

Three voting kiosks approaches were designed and developed:

- Voting Kiosk, that connects to an HDMI monitor/TV that allows citizens to read proposals and vote on them;
- Ballot Kiosk, that includes a traditional printed ballot alike interface, plus buttons to record the voting preferences and a small touch screen display with status information;
- Tablet Kiosk, that is an Android application that uses a simple and intuitive interface to allow citizens to browse proposals and vote;
- Touch Kiosk, which is a Kiosk that was required in the Cascais pilot to promote the voting of citizens in PB processes and also to demonstrate the easiness of voting.

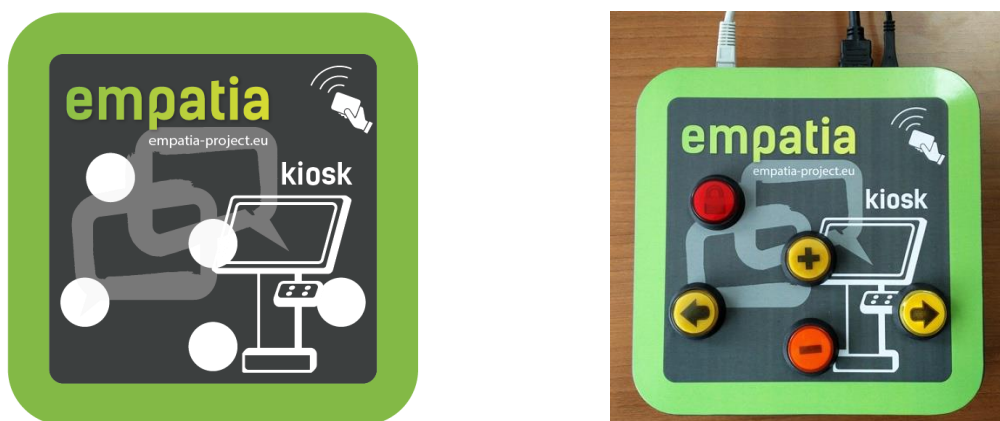


The Voting Kiosk and the Ballot Kiosk prototypes use RFID and EMV chip authentication. The Tablet Kiosk supports QR code, login/password and alphanumeric authentication.

These kiosks will mainly be used in the EMPAVILLE role-playing game, for prototype and validation purposes. Since no similar equipment was found in the analysis of the state-of-the-art (recall Deliverable D2.1), and the use cases do not detail this aspect of participation/voting, the developed prototypes have been used to identify the requirements for these types of kiosks in order to define a set of guidelines and good practices on this type of solutions.

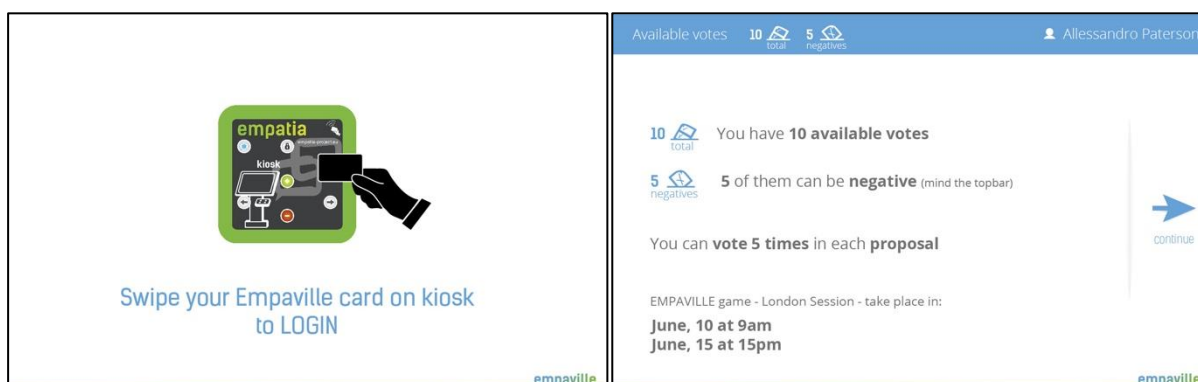
### 3.4.1 Voting Kiosk

The Voting Kiosk purpose is a cheap voting kiosk with a very basic user interface that connects to any TV/screen to allow citizens to browse proposals and cast their votes. Citizens use their ID Card (EMPAVILLE or national ID card) identify themselves to the system, and through big and responsive buttons navigate between proposals. The Plus and minus buttons allow the cast of votes in the selected proposals.



**Figure 102 – Voting Kiosk hardware**

A simple user interface (adjustable to the TV/screen resolution and orientation) guides the user through the process.



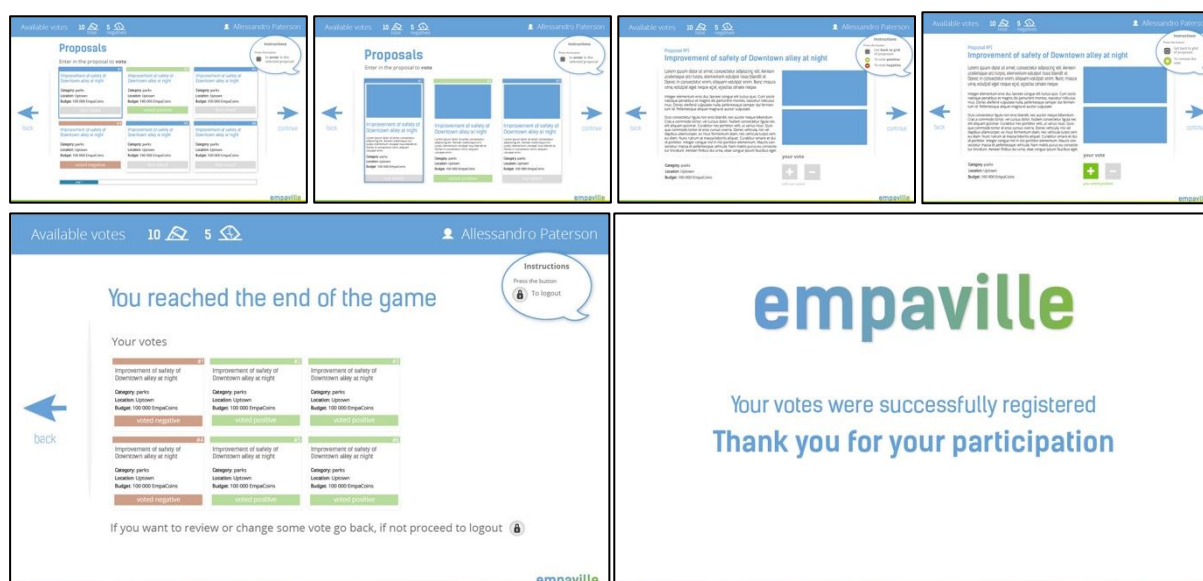


Figure 103 – Voting Kiosk TV screens

## 3.4.2 Ballot Kiosk

The Ballot Kiosk purpose is similar to a normal paper voting ballot, but provides a quick and simple citizen identification (EMPAVILLE or national ID Card), and immediate vote cast in the platform (to avoid citizens multiple vote in multiple voting places). This kiosk is composed of two main areas, one small touch screen that guides the user through the process, and a ballot like area where proposals are presented and associated with plus and minus buttons (and green/red LEDs identifying votes casted).



Figure 104 – Ballot Kiosk hardware and LCD screens

### 3.4.3 Tablet Kiosk

The Tablet Kiosk is an Android application that uses a simple and intuitive interface to allow citizens to browse proposals and vote. This Kiosk supports QR code, login/password and alphanumeric authentication. Citizens use the touch functionality to browse through the proposals and cast their votes.

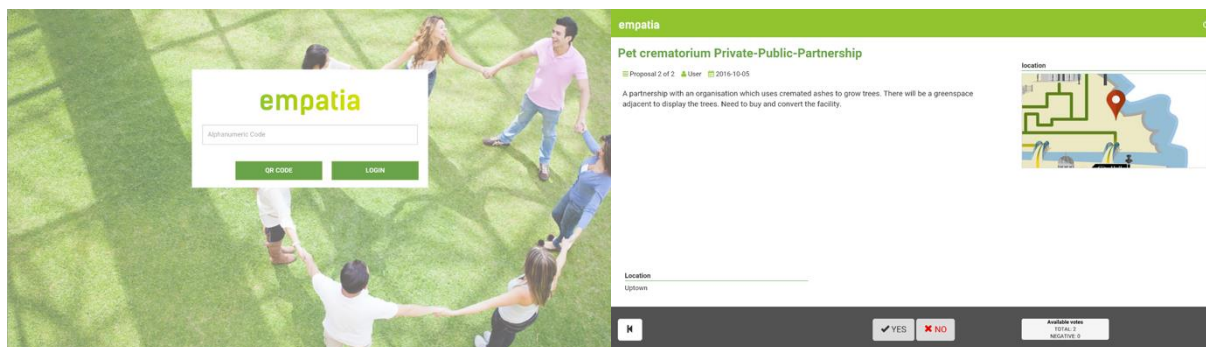


Figure 105 – Tablet Kiosk screens

### 3.4.4 Touch Kiosk

The Touch Kiosk, has the same functionalities as the Voting Kiosk, with the difference that there is no need for an external monitor. The user experience of the touch kiosk is based on a touch screen, being more intuitive and modern, providing similar experience as in the Tablet Kiosk, but in a more controlled scenario. This kiosk was developed with the collaboration of the Cascais Participation team.



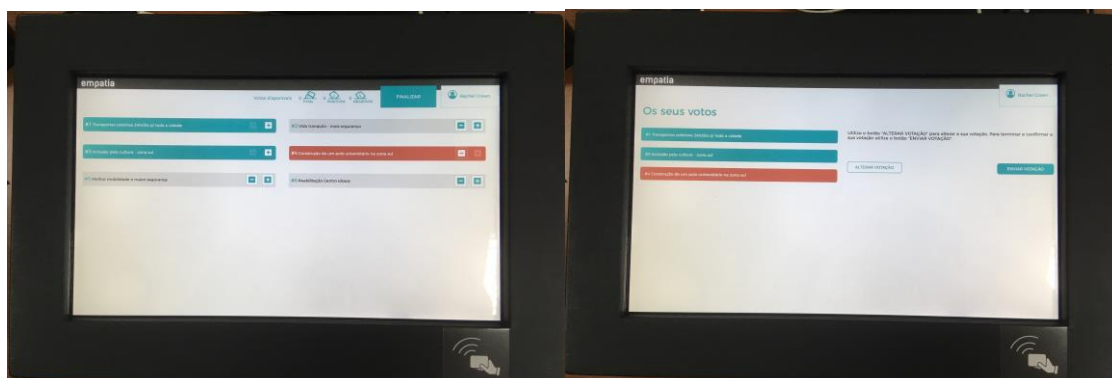


Figure 106 – Touch Kiosk screens

### 3.4.5 Remote Kiosk

The remote kiosk, as depicted in Figure 107, tries to simplify the citizens engagement in the vote events and avoid traditional vote queues and decrease the vote time required. Technically, the remote kiosks, provide a simple interface for participation, where a user selects the proposal to vote by inputting the number of the proposal with the available keys. This kiosk was developed with the collaboration of the Cascais Participation team.



Figure 107 – Remote Kiosk

The remote kiosk connects to the EMPATIA platform using protocols conceived for small devices like the Message Queue Telemetry Transport (MQTT) [52]. The remote kiosk as an identifier that is used in the exchanged messages. The vote operation, includes the id of the proposal and the identification of the device. To use the remote kiosk the vote event is configured, providing the identification of the proposals as depicted in Figure 108. Additionally, the results of a voting session can be displayed in a simple screen, and if required, in real time.

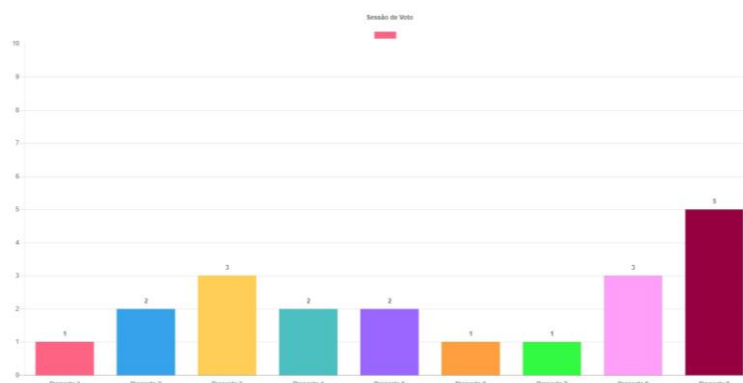


Figure 108 – Remote Kiosk voting session real-time results screen



## 4 Validation events

The EMPATIA Platform has been used to support several participation processes during the project lifetime (pilots and other applications). Despite the initial plan of three pilots it was considered important to be able to successfully achieve the project objectives to validate the EMPATIA architecture, requirements and specification in several additional scenarios. As it is described next, the project pilots suffered several delays and most of them focused on specific use case feature validation. The additional applications allowed the project to perform critical validation of the platform, identifying a high number of new requirements and changes required to the initial requirements and implementation choices.

Next, we present an overview of the EMPATIA Platform validations that have been performed (including the EMPAVILLE role-playing games).

### 4.1 EMPATIA Platform

The EMPATIA Platform has been tested in several environments that can be split in two types: EMPATIA official pilots, composed by Lisbon, Wuppertal, Ricany and Milan; applications, which are the usages of the EMPATIA Platform supported by the EMPATIA project (each with a different level of support and commitment).

The details found in this section highlight the functionalities that were developed specifically for each pilot and application, putting in evidence some support statistics provided in the scope of WP2.

#### 4.1.1 Pilots and applications timeline

Figure 109 depicts the timeline of the projects where the EMPATIA platform was used. Many of the pilots and applications run in parallel, and the feedback received in one pilot/application was included in the succeeding pilots. For instance, the features implemented in the BiPart were used in the official pilots like Milan and Wuppertal.

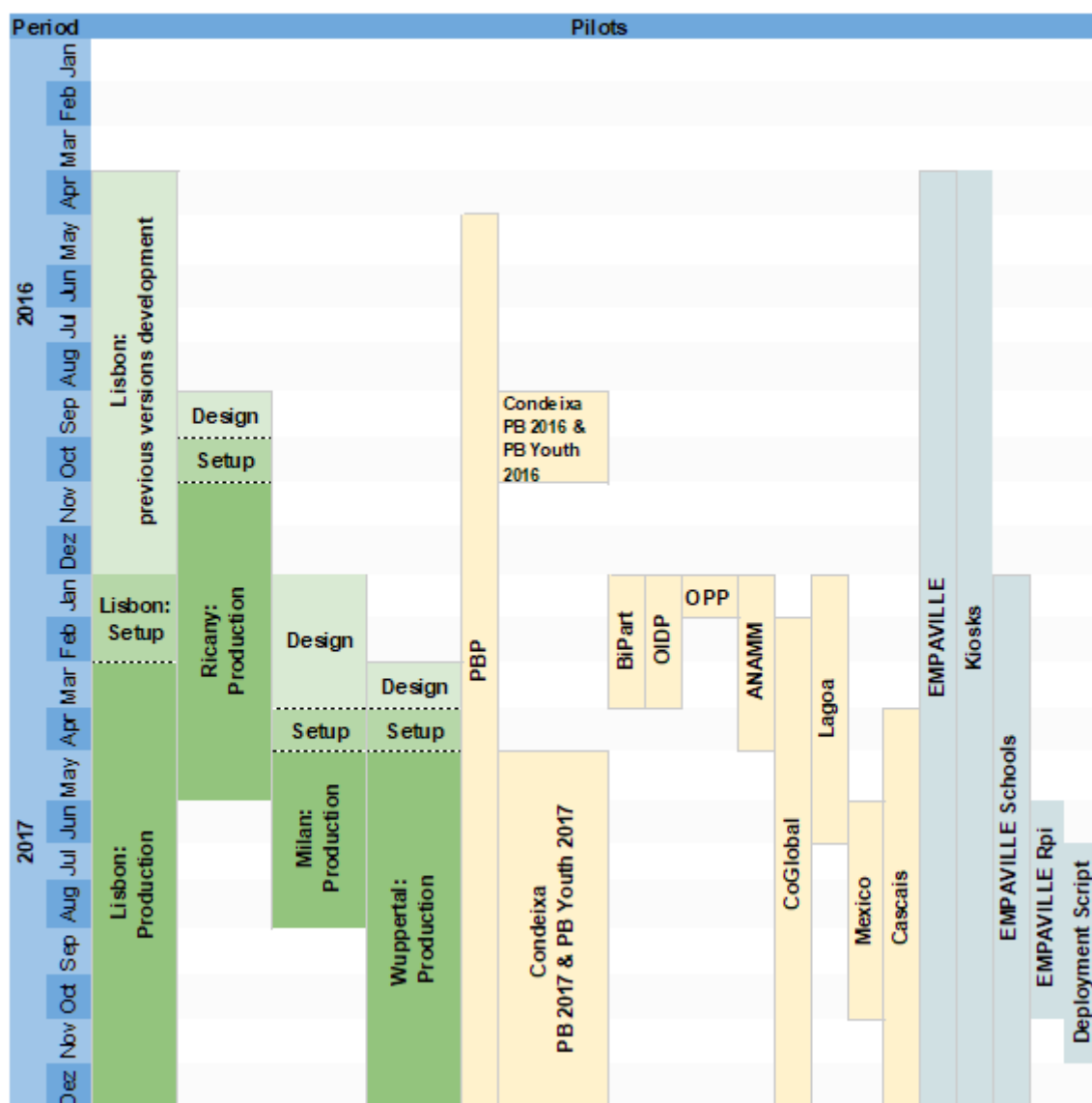


Figure 109 -- Pilots timeline

In the next sub-sections, we describe the features that were required or that were exclusive to the EMPATIA pilots and to the other applications. Further details on these pilots and applications are documented in WP3 deliverables. A list of the validated features is documented in deliverable D4.2 [41].

### 4.1.2 Lisbon pilot

The Lisbon pilot introduced several functionalities in the EMPATIA Platform, in fact the deployment of the EMPATIA Platform included several iterations, according to the requests of Lisbon municipality. This pilot is available at the URL <https://www.lisboaparticipa.pt>. At the time of writing this deliverable the EMPATIA Platform is the *defacto* official participation website of Lisbon Municipality, integrating many different participations processes (some EMPATIA features, other external platforms that were integrated). It is expected that Lisbon pilot will continue after the pilot, due to its success. The development of the EMPATIA Platform was also performed considering the design choices of the

design team of the Lisbon municipality. The Lisbon pilot required functionalities and introduced exclusive features, as summarized in Table 18.

Table 18 – Required and exclusive functionalities of Lisbon pilot

Required functionalities	Exclusive Functionalities
<p>Login Levels;</p> <p>User profile (profile, messages, participation);</p> <p>Content Management for static pages;</p> <p>Home Page Popup;</p> <p>CB topics status;</p> <p>CB configuration/modification dates;</p> <p>CB users levels &amp; permissions;</p> <p>Thematic consultation specific notifications;</p> <p>Topics technical review;</p> <p>CB questionnaires management;</p> <p>Consultation wizard;</p> <p>Real-time notifications;</p> <p>Backend users levels &amp; permissions;</p> <p>Backend groups management &amp; permissions;</p> <p>Questionnaires;</p>	<p>Support for Single Sign On (SSO);</p> <p>CB voting period management;</p> <p>Associate notification to specific topic;</p>

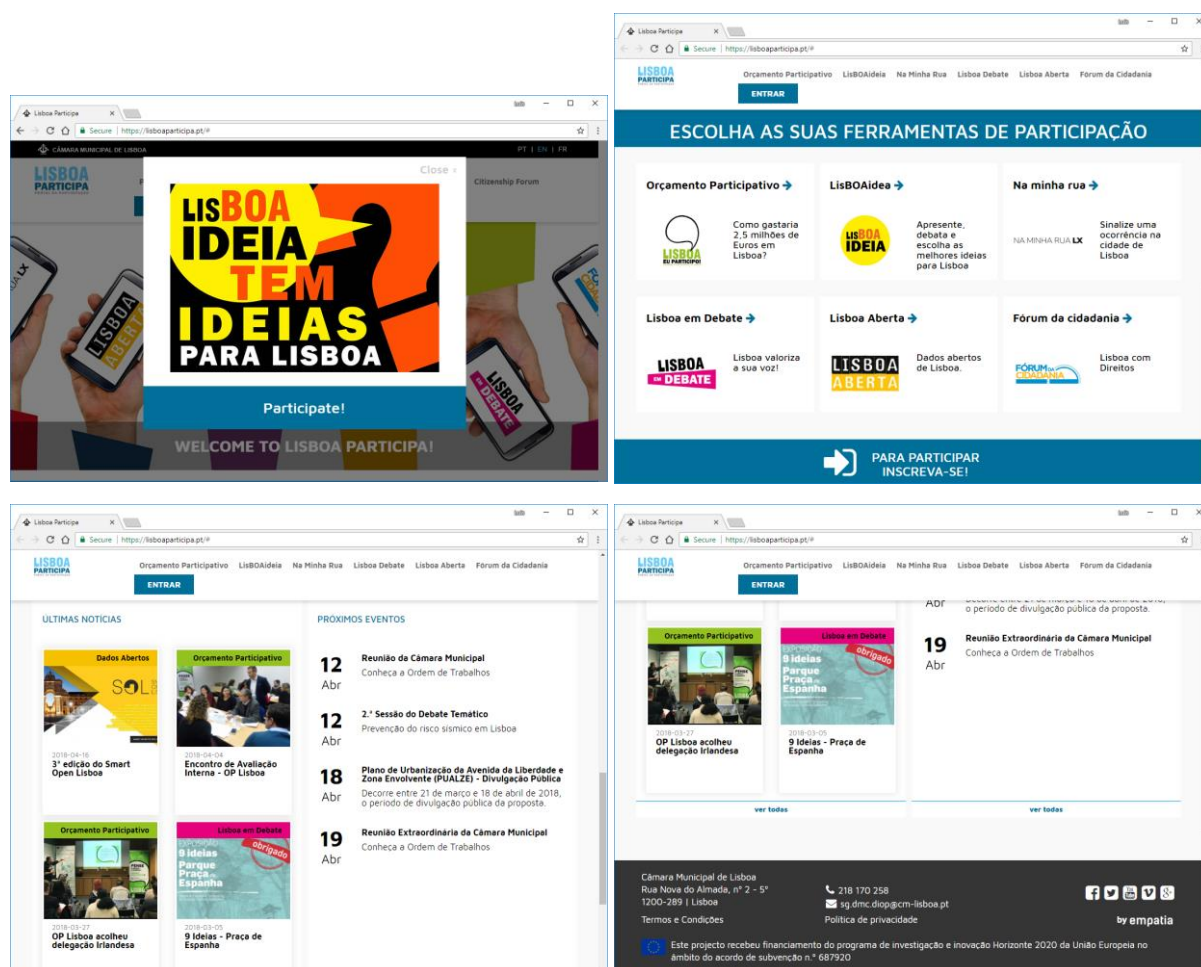


Figure 110 – Lisbon pilot home screens

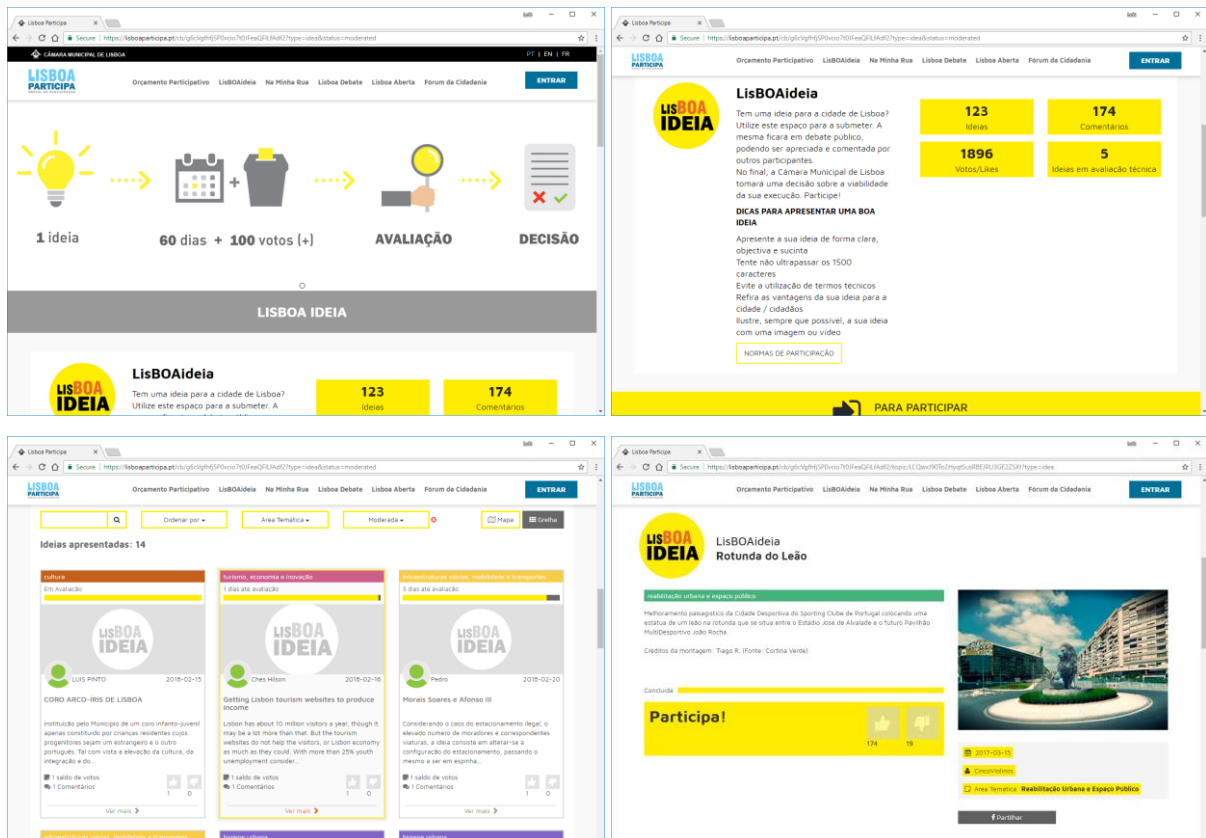


Figure 111 – Lisbon pilot LisBOAideia screens

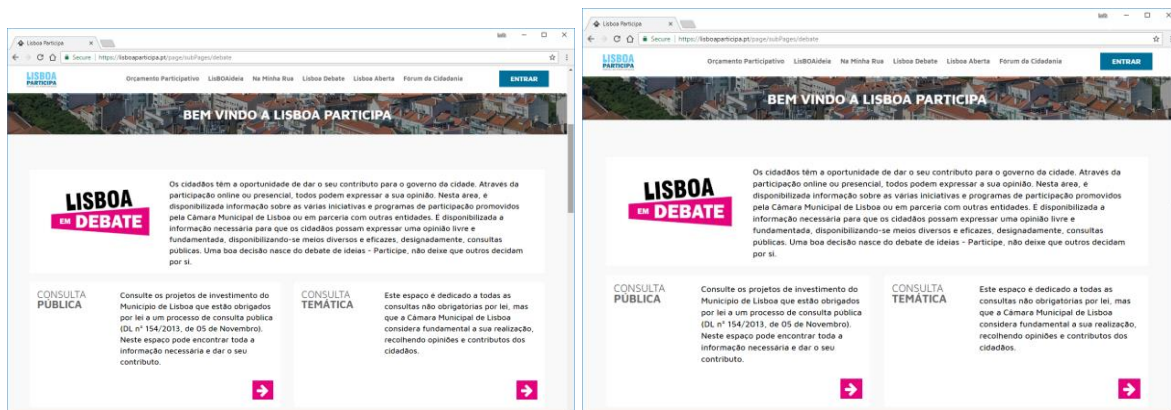
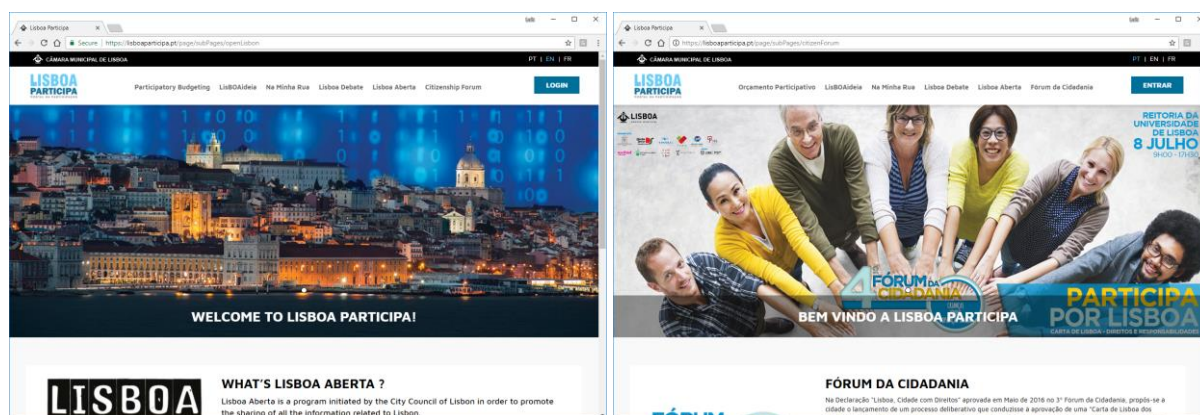


Figure 112 – Lisbon pilot Debate screens





**Figure 113 – Lisbon pilot other sections**

Table 19 summarizes the support activities in this pilot, regarding the number of issues and the average time to put features available in production.

**Table 19 – Support Activities in Lisbon pilot**

Number of Issues	Average time to production
106	< 2 days

### 4.1.3 Wuppertal pilot

This pilot, available at the URL <https://www.buergerbudget.wuppertal.de>, was developed with the collaboration of ZebraLog team, which was responsible for this pilot. This official pilot also introduced several exclusive features, as summarized in Table 20.

**Table 20 – Required and exclusive functionalities of Wuppertal pilot**

Required functionalities	Exclusive Functionalities
<p>Login Levels;</p> <p>User profile (profile, messages, participation);</p> <p>Content Management for static pages;</p> <p>Home Page Popup;</p> <p>CB topics status;</p> <p>CB configuration/modification dates;</p> <p>CB users levels &amp; permissions;</p> <p>Thematic consultation specific notifications;</p> <p>Topics technical review;</p> <p>CB questionnaires management;</p> <p>Consultation wizard;</p> <p>Real-time notifications;</p> <p>Backend users levels &amp; permissions;</p> <p>Backend groups management &amp; permissions;</p> <p>Questionnaires;</p> <p>Users XLS and PDF export;</p> <p>CB Posts Flags;</p> <p>Topics XLS and PDF export;</p> <p>Create topic on behalf of;</p> <p>SMS management (receive/send);</p> <p>Email newsletter;</p>	<p>FAQ;</p> <p>Articles;</p> <p>Questions &amp; Answers (Q&amp;A);</p> <p>Quick questionnaires;</p>

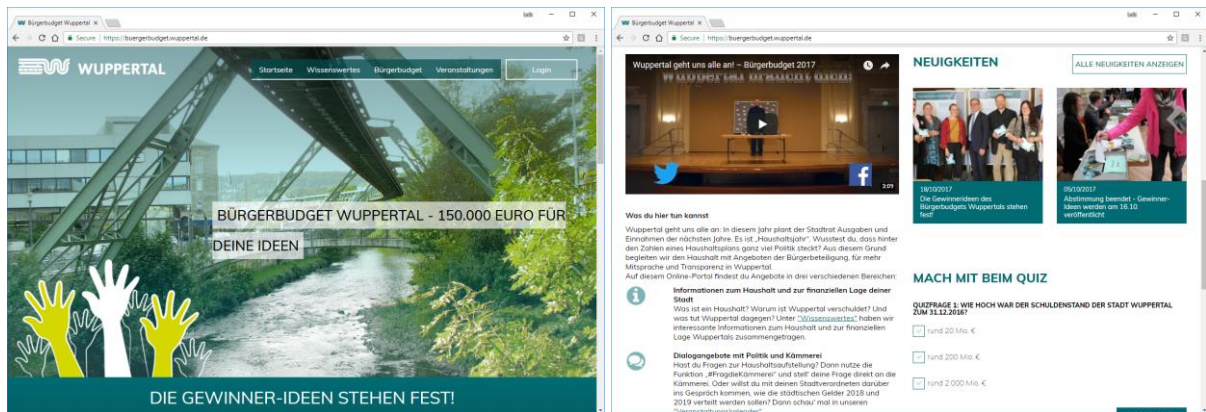


Figure 114 – Wuppertal pilot home screens

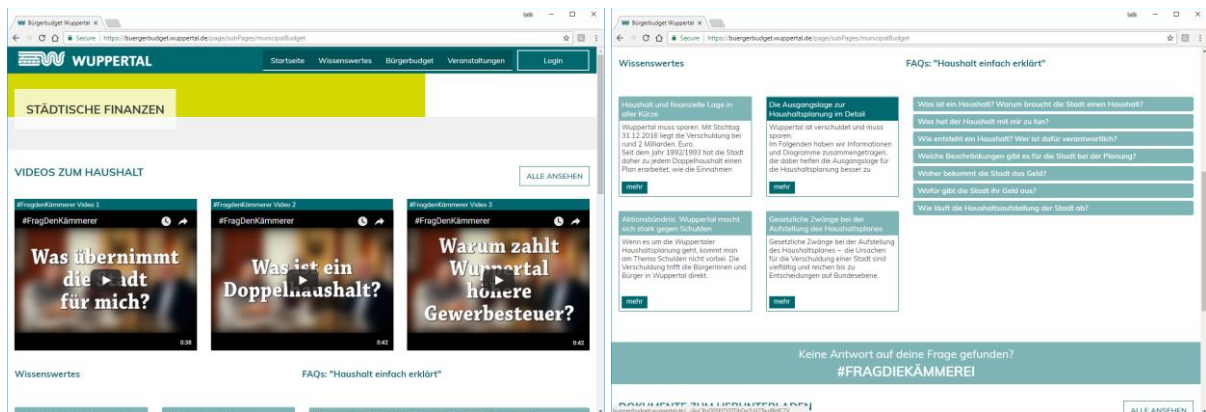
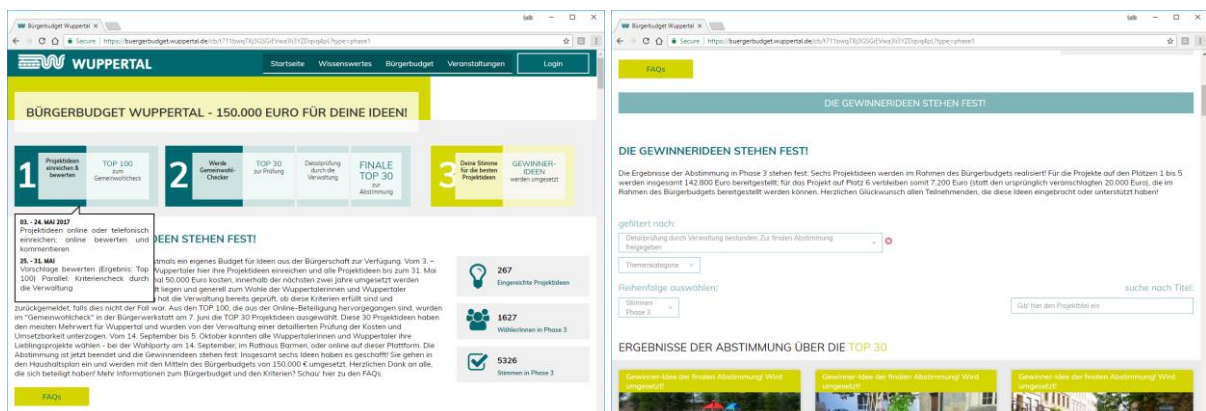


Figure 115 – Wuppertal pilot facts section



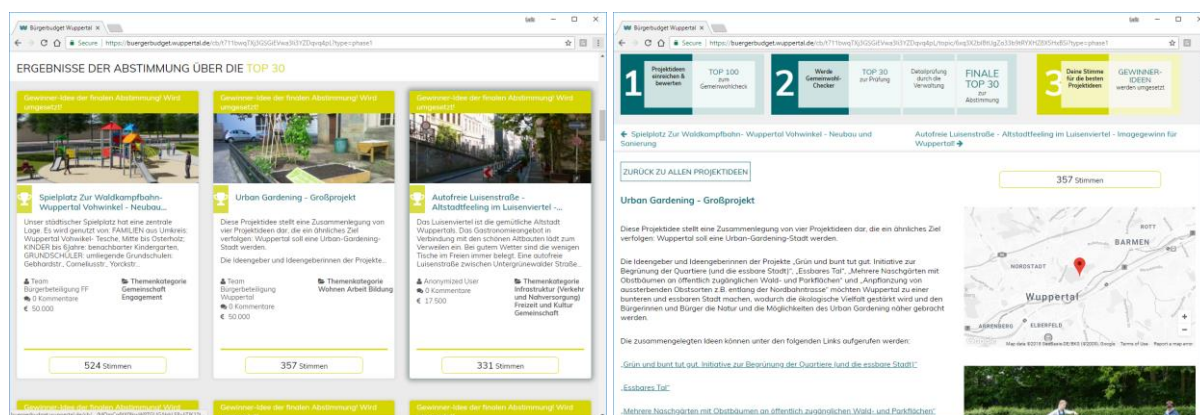


Figure 116 – Wuppertal pilot facts section

Table 21 summarizes the support activities in this pilot, regarding the number of issues and the average time to put features available in production.

Table 21 – Support Activities in Wuppertal pilot

Number of Issues	Average time to production
269	< 2 days

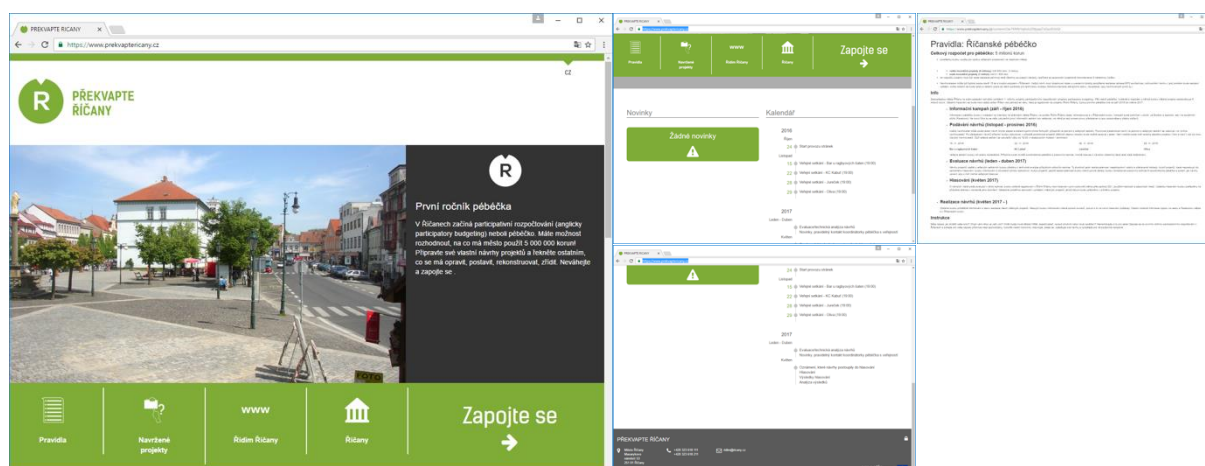
#### 4.1.4 Ricany pilot

This official pilot in comparison to Lisbon, has employed less functionalities of the EMPATIA platform, for instance, voting support was not employed. Despite such, this pilot also introduced exclusive functionalities like the creation of topics without registered users, as summarized in Table 22.

Table 22 – Required and exclusive functionalities of Ricany pilot

Required functionalities	Exclusive Functionalities
	Create topics without registered users;

This pilot has started in October 2016, and the ideation process start on the 1<sup>st</sup> of November 2016, and it is available in the URL <https://www.prekvaptericany.cz/>. Figure 117 presents some screens of the Ricany pilot EMPATIA Platform.





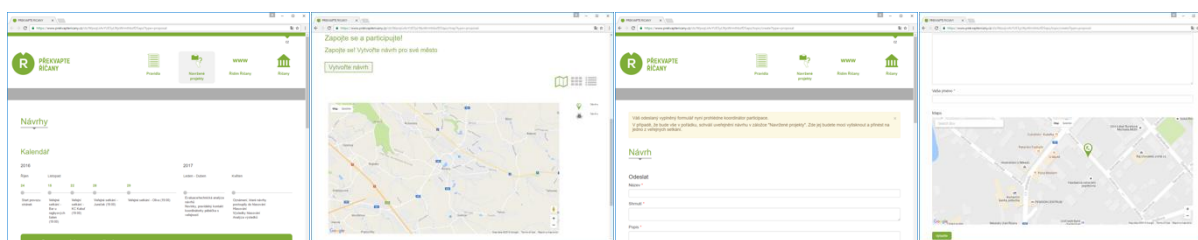


Figure 117 – Ricany pilot screens

Table 23 summarizes the support activities in this pilot, regarding the number of issues and the average time to put features available in production.

Table 23 – Support Activities in Ricany pilot

Number of Issues	Average time to production
23	< 2 days

### 4.1.5 Milan pilot

This pilot uses EMPATIA Second Cycle features for monitoring the implementation of projects selected with the participatory budget process held in 2015-16. The monitoring process started in March 2017 by collecting and organizing information and the site is available at the URL <https://monitoraggio.bilanciopartecipativomilano.it> since May 2017. Figure 118 shows some screens of the Milan pilot EMPATIA Platform.



Figure 118 – Milan pilot screens

Table 24 summarizes the support activities in this pilot, regarding the number of issues and the average time to put features available in production.

Table 24 – Support Activities in Milan pilot

Number of Issues	Average time to production
115	< 3 days

### 4.1.6 Other Applications

Beside the official pilots, EMPATIA has implemented other applications as summarized in Table 25. Next sections provide details regarding the functionalities in each other application.

Table 25 – Other applications

Other Application	Partner	Description of activities
Condeixa	CES	Design, development, support, training and web hosting
CoGlobal – Torredonjimeno	CES	Support, training and web hosting
CoGlobal – Casares	CES	Support, training and web hosting
CoGlobal – Conil de la Frontera	CES	Support, training and web hosting
Banco Mundial México	InLoco	Deployment and training
Lagoa	InLoco	Tailored development, support, training and web hosting
Participatory Budgeting Project (PBP)	CES	Demonstration activities
BiPart – Pavia	ONE	Design, development, support, training and web hosting
BiPart – Cormano	ONE	Design, development, support, training and web hosting
BiPart – Monza	ONE	Design, development, support, training and web hosting
OIDP	CES	Design, development, support, training and web hosting
OPP Coimbra	CES	Design, development, support, training and web hosting
ANAMM	InLoco	Design, development, support, training and web hosting
Cascais	InLoco	Design, development, support, training and web hosting
OPJP	InLoco	Development, support, training and web hosting

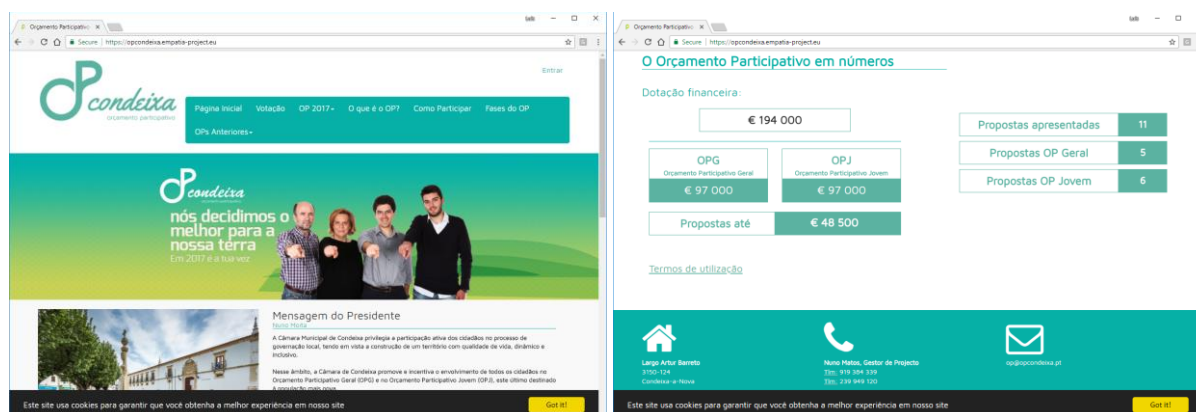
## Condeixa

Condeixa was the first other application running in the Condeixa municipality in Portugal as described in Deliverable D2.2 [21].

This was an important EMPATIA application because it allowed the testing and validation of the vote features of the EMPATIA Platform. This increased the confidence on the voting features by ensuring that no issues existed in this core feature of the platform. The required and exclusive functionalities are summarized in Table 26.

Table 26 – Required and exclusive functionalities of Condeixa pilot

Required functionalities	Exclusive Functionalities
In-person registration;	



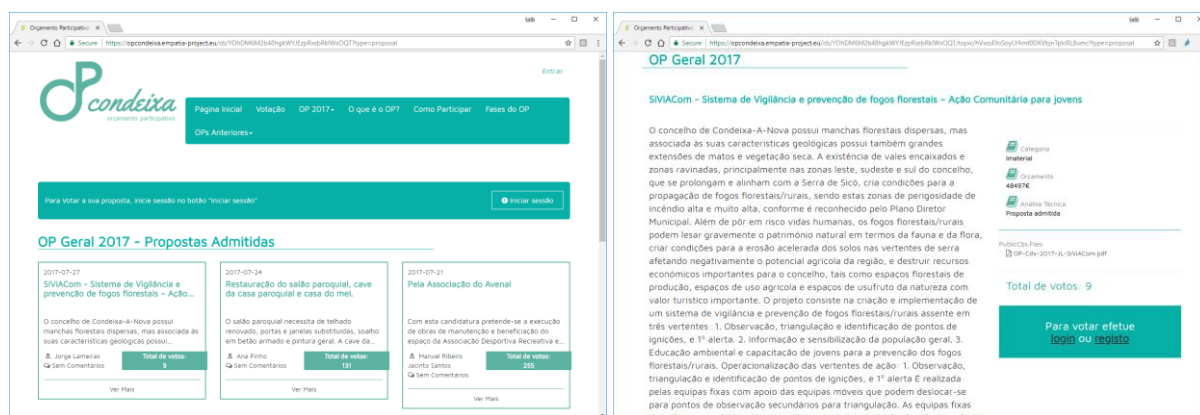


Figure 119 – Condeixa application

## CoGlobal

The CoGlobal application run in different cities, such as Torredonjimeno, Casares, Conil de la Frontera in Spain and did not introduce required or exclusive functionalities.

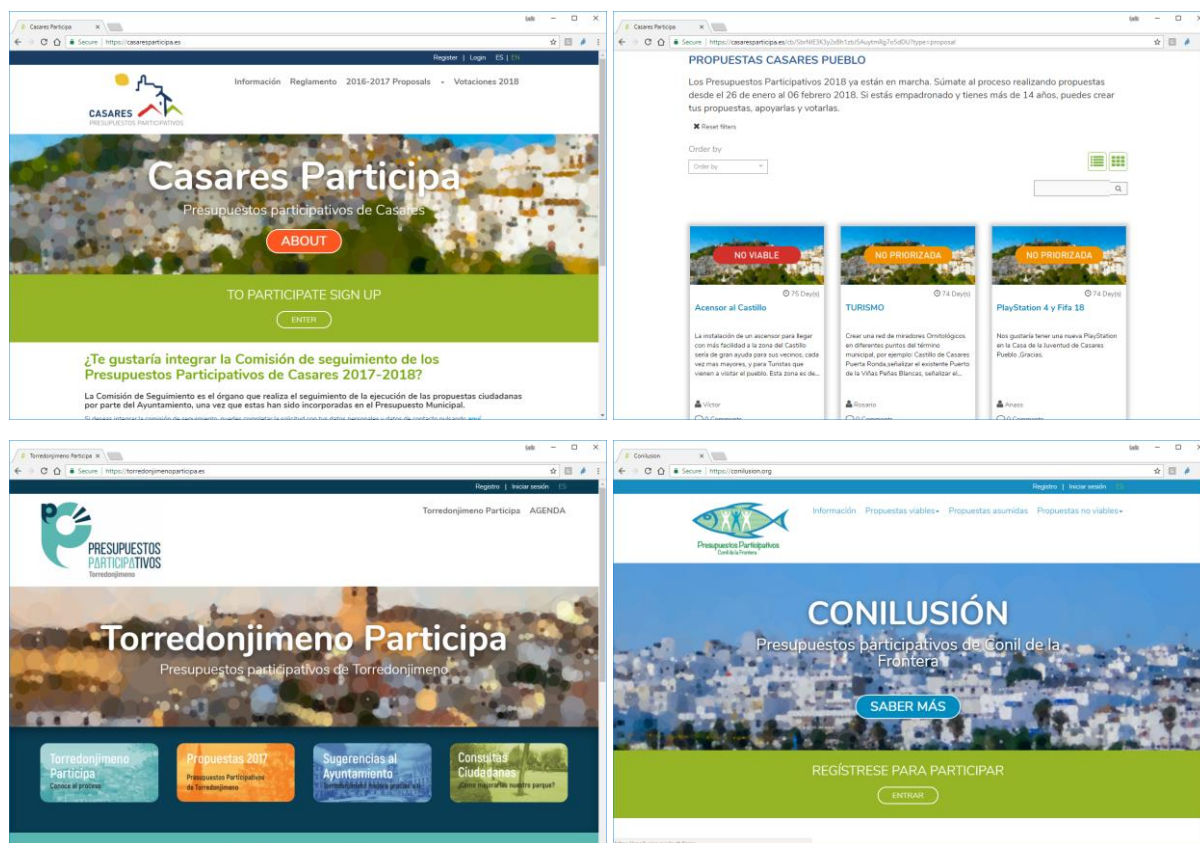


Figure 120 – CoGlobal applications

## Banco Mundial México

This application was a consequence of the need to have a PB platform to manage the first PB process in Cananea (Mexico). The World Bank team and local IT companies tested several PB Platforms, and selected EMPATIA Platform as the tool to support their process. No required or exclusive functionalities have been associated with this EMPATIA application since it was used the existing in-person vote feature.

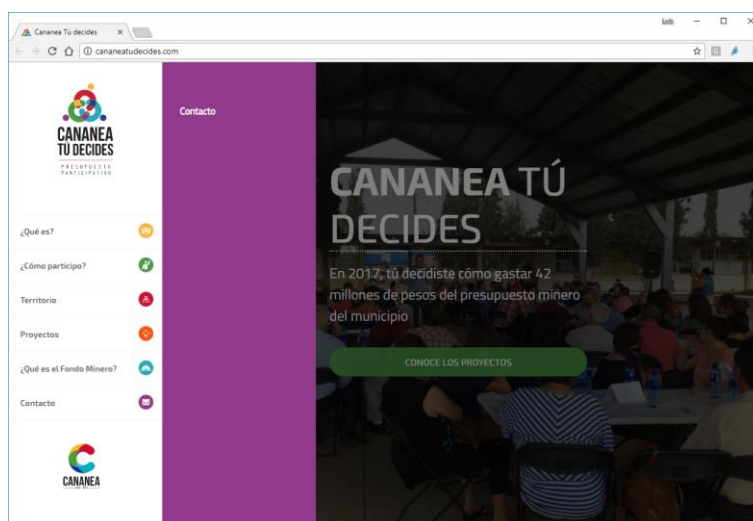


Figure 121 – Cananea application

## Lagoa

In the course of the RAP dissemination events, several requests to pilot the EMPATIA Platform were received, like the Municipality of Lagoa request to manage their Youth PB. The main focus in this application was the in-person voting, as summarized in Table 27.

Table 27 – Required and exclusive functionalities of Lagoa pilot

Required functionalities	Exclusive Functionalities
In-person vote;	

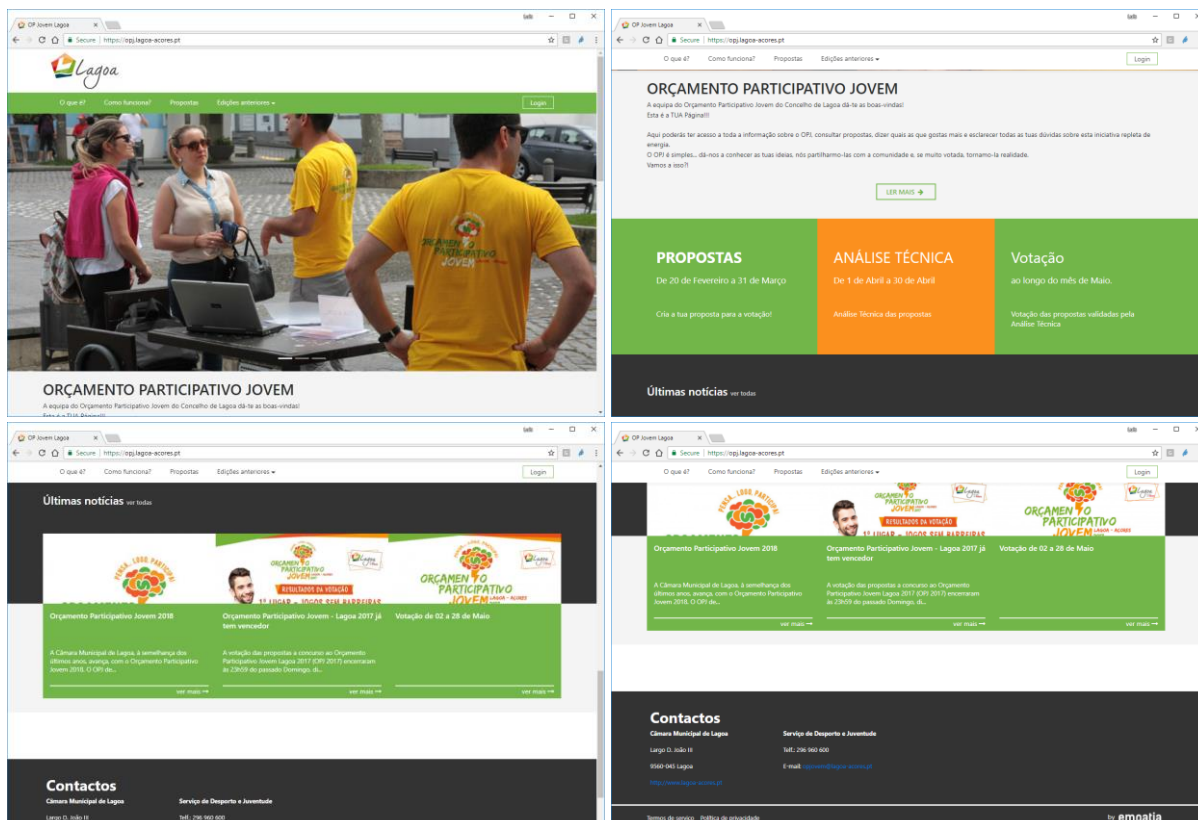




Figure 122 – Lagoa application

## PBP

This application focused mainly the specificities of the US model characteristics, like budget voting. In this application, several demonstrations of the EMPATIA platform and EMPAVILLE were conducted.

## BiPart

Three BiPart applications were implemented in Italy, namely in the cities of Pavia, Cormanò and Monza and required functionalities and introduced exclusive ones, as summarized in Table 28

Table 28 – Required and exclusive functionalities of BiPart application

Required functionalities	Exclusive Functionalities
User profile (profile, messages, participation); Registration stepper; Recover account with SMS code; Splash screen; Public topics list sorting options; Topics multiple owners; Alliances; Technical draft (status publish); CB translations management; Vote Support; Vote Follow; Paper blind vote; Anonymous vote; CB email template management; Send message to topic owners; Short links;	Voting receipt; SMS newsletter;

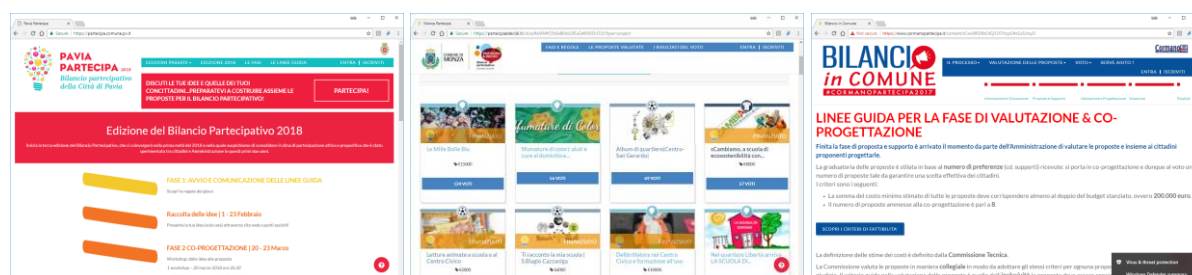


Figure 123 – BiPart applications

## OIDP

This application focused the development of a worldwide mapping participatory innovations to disseminate at the OIDP 2017 meeting [40]. This application did not require specific functionalities neither presented exclusive functionalities.



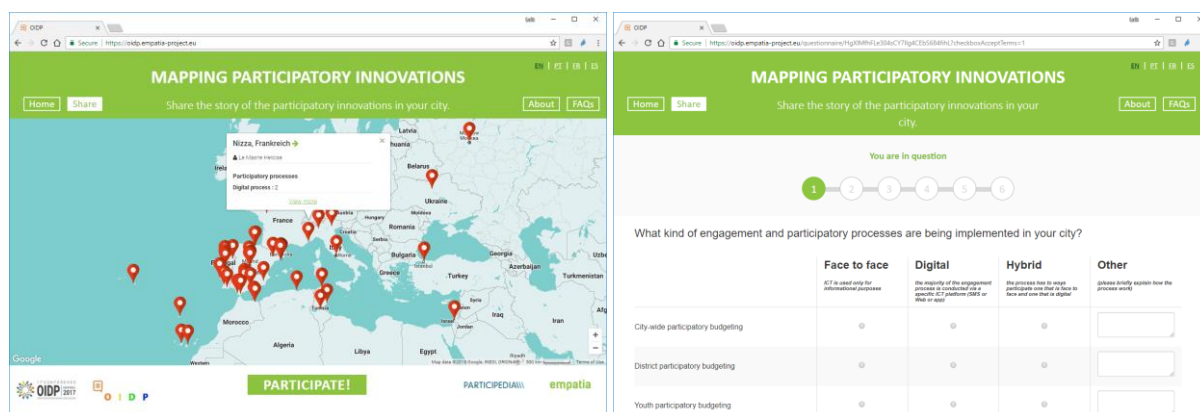


Figure 124 – OIDP application

## OPP

This application developed a registration page for the Coimbra meeting of the Portuguese national PB. This other application only required the implementation of a dedicated public area, as such no specific exclusive functionalities are associated with this application.

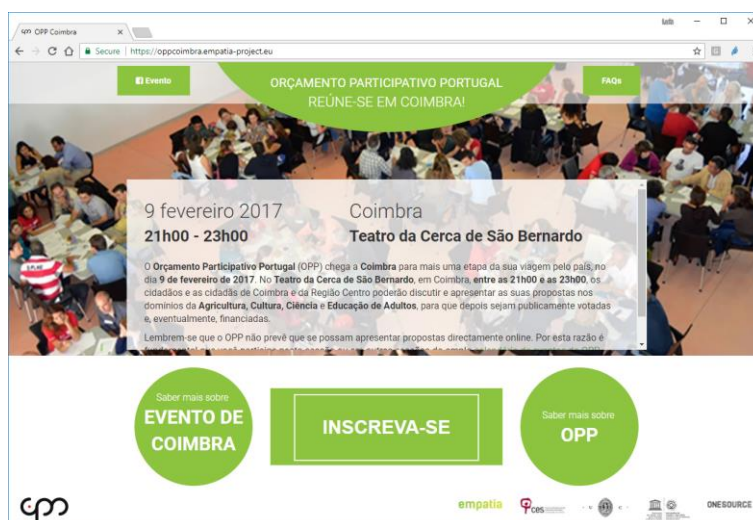


Figure 125 – OPP application

## ANAMM

This application was employed to test the usage of the EMPATIA Platform Questionnaire feature in Mozambique, as such no exclusive functionalities have been introduced or were specifically required by this application.



Figure 126 – ANAMM application

## Cascais

Cascais is the most participative municipality in Portugal, with a current PB process of more than 90.000 votes (~70.000 voters). Cascais has implemented Cascais Ideias (similar process to LisBOAideia), Cascais Consultas (similar process to Lisboa Debate), and used several EMPATIA Kiosks in their PB process assemblies.

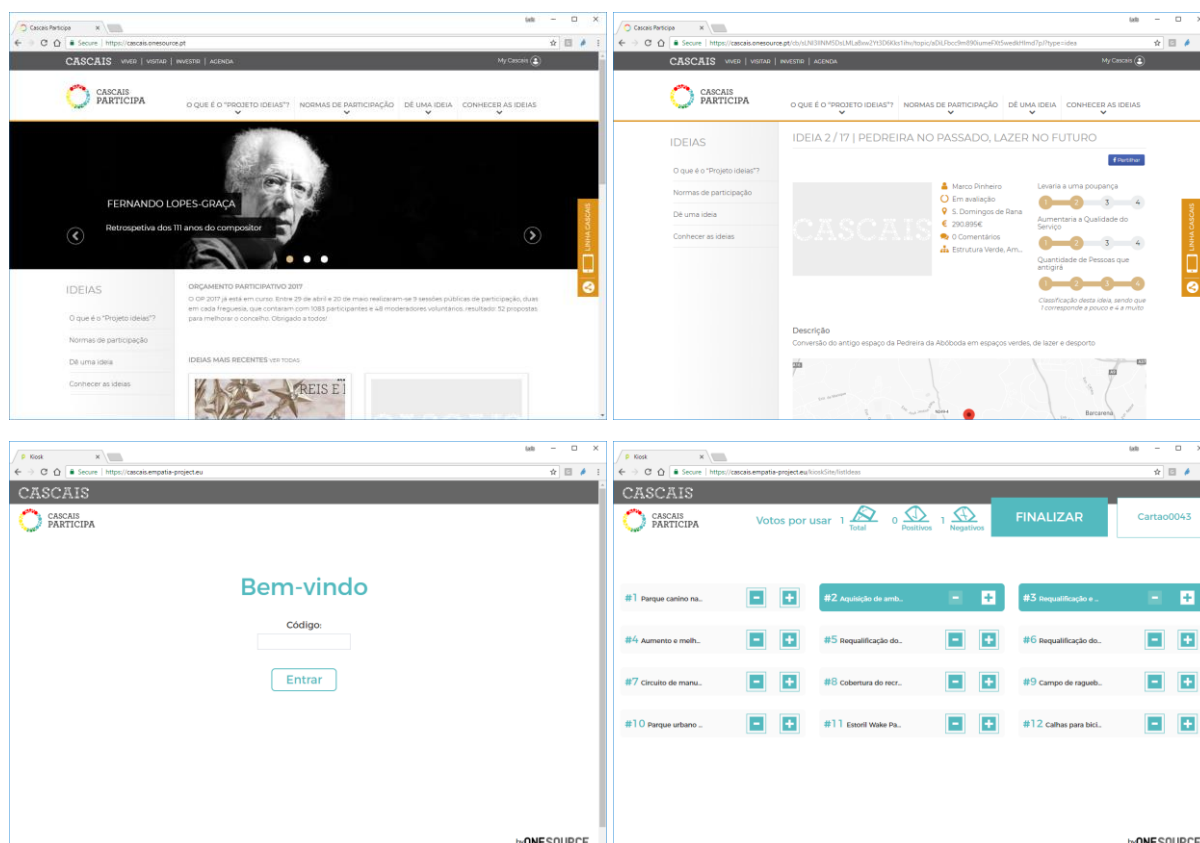


Figure 127 – Cascais applications

## OPJP

This application corresponds to the Portuguese National Youth PB. This process was developed outside of the EMPATIA Project but used the open source EMPATIA Platform.

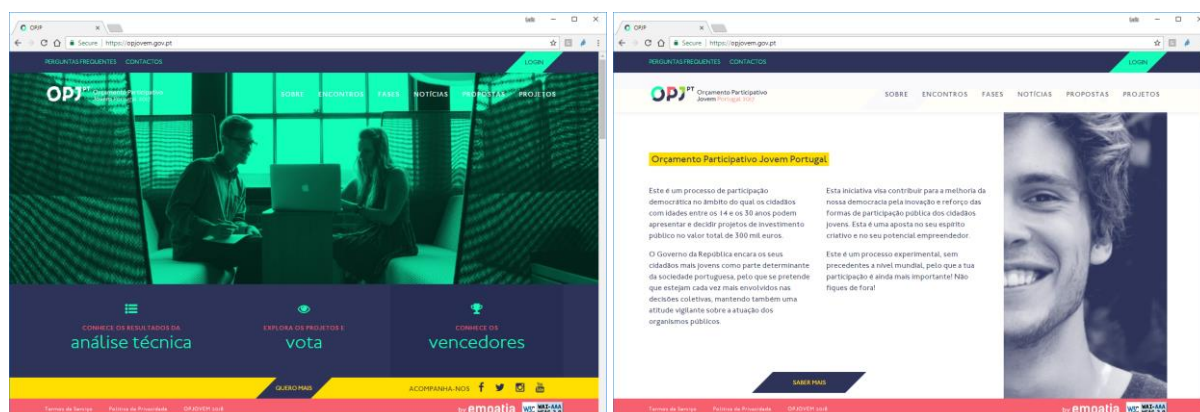


Figure 128 – OPJP application home page

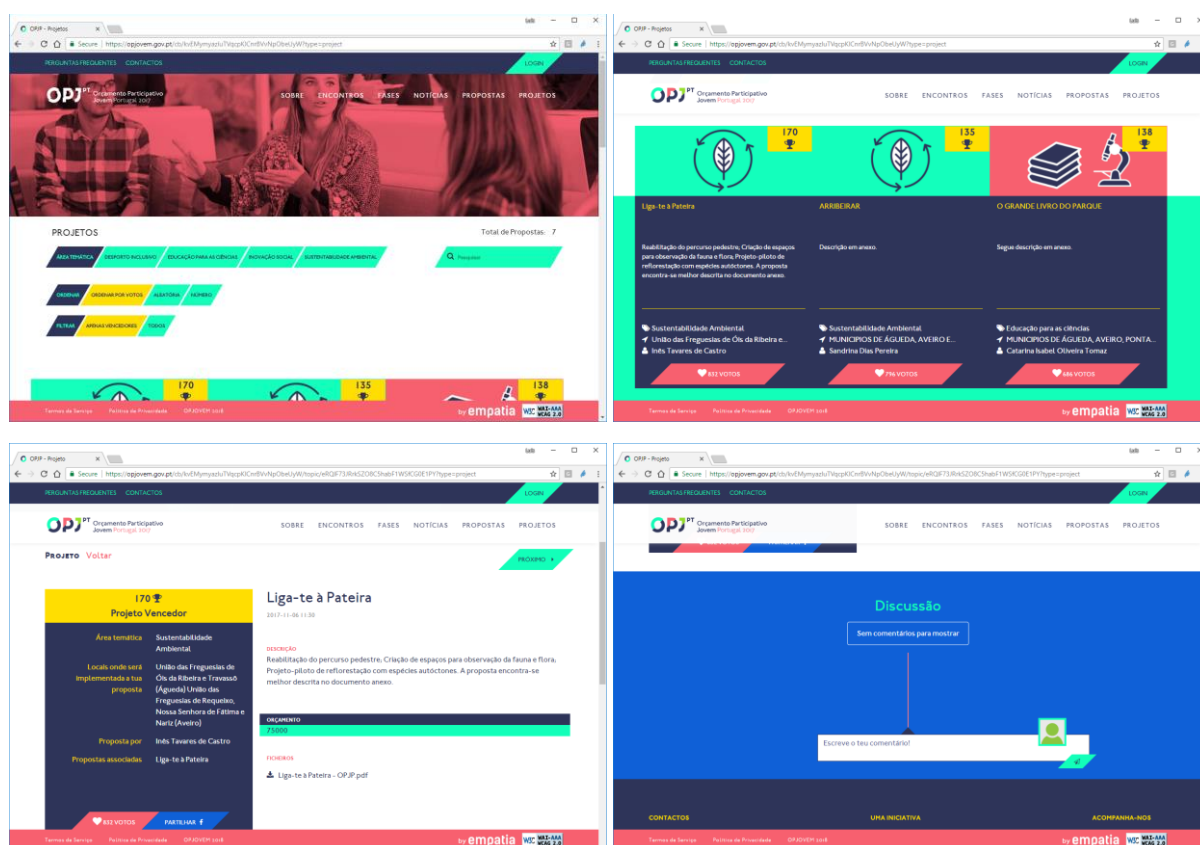


Figure 129 – OPJP application projects

## EMPAVILLE role-playing game

The first validation events were performed in the EMPAVILLE role-playing game events using the URL <https://empaville.org> supported by the same EMPATIA Platform deployment (different entity). In these sessions, the EMPATIA features used were: micro-website (CM and WUI components), proposals (CB and WUI components), voting (Vote and WUI components), and the EMPAVILLE presentation (CM, analytics and WUI component). Other supporting components like AUTH, FILES and LOGs were also validated in these events.

The EMPAVILLE sessions are presented next.

**Table 29 – EMPAVILLE sessions**

Date	Event	Results
2016-05-22	4th International Conference on Participatory Budgeting in North America	First EMPAVILLE session where keys EMPATIA Platform and Kiosks issues were identified, mainly regarding usability. 6 proposals were submitted, and 40 votes were casted using the web interface, mobile interface, and the three kiosks available (tablet, Voting and Ballot).
2016-06-02	EMPATIA National Workshop in UK	Second EMPAVILLE session where improvements done based on the first event feedback were validated. Most of the previously identified usability issues were properly addressed and only minor new usability remarks were received. 8 proposals were submitted, and 87 votes were casted using the web interface, mobile interface, and the three kiosks available (tablet, Voting and Ballot).
2016-07-09	Festival della Partecipazione Aquila	Italian EMPAVILLE session using a new layout (based on BiPart OpenDCN) and without kiosks. This was the first validation event where no technical team member was present, allowing us to validate the simplicity of the backend to manage EMPAVILLE sessions. 6 proposals were submitted, and 69 votes were casted using the web and mobile interfaces.
2016-09-19	Summer school in Olhão	Portuguese EMPAVILLE session dedicated to municipality PB staff with Voting Kiosk and Tablet Kiosk. 8 proposals were submitted and 77 votes were casted using the web interface, mobile interface, and the two kiosks available (tablet and Voting).
2016-09-25	Italian 5 Stelle meeting	Italian EMPAVILLE session using an improved BiPart OpenDCN layout and without kiosks. This validation supported EMPATIA by validating the new CB, Vote and WUI components implementation that includes additional configuration options. 7 proposals were submitted and 47 votes were casted using the web and mobile interfaces.
2017-01-16	EMPAVILLE School Porto	Portuguese EMPAVILLE sessions dedicated to a school in Porto. 6 proposals were submitted, and 18 votes were casted from students. Groups of students were made for the voting.
2017-02-07	EMPAVILLE School Pereira	Portuguese EMPAVILLE sessions dedicated to a school in Pereira. 6 proposals were submitted, and 18 votes were casted from students. Groups of students were made for the voting.
2017-02-08	EMPAVILLE School Caldas da Rainha	Portuguese EMPAVILLE sessions dedicated to a school in Caldas da Rainha. 6 proposals were submitted, and 18 votes were casted from students. Groups of students were made for the voting.
2017-02-09	EMPAVILLE School Águeda	Portuguese EMPAVILLE sessions dedicated to a school in Águeda. 6 proposals were submitted, and 18 votes were casted from students. Groups of students were made for the voting.
2017-03-01	EMPAVILLE at Instituto Superior de Engenharia of Coimbra	Portuguese EMPAVILLE session dedicated to opinion gathering in a superior school of Coimbra. 8 proposals were submitted, and 293 votes were casted.

2017-05-01	EMPAVILLE Lisbon	Portuguese EMPAVILLE session in Lisbon. 12 proposals were submitted, and 137 votes were casted.
2017-06-14	EMPAVILLE in Montreal	Canadian EMPAVILLE session. 9 proposals were submitted, and 74 votes were casted.
2017-07-12	EMPAVILLE in Volos	EMPAVILLE session to demonstrate the potential of the EMPATIA platform in Greece. 6 proposals were submitted, and 37 votes were casted.
2017-10-24	EMPAVILLE ICITY LAB	EMPAVILLE session with 5 proposals and 30 casted votes.
2017-11-21	EMPAVILLE Lisbon (municipality personnel)	Portuguese EMPAVILLE session organized for municipality personnel. 7 proposals have been submitted, and 40 votes were casted.
2017-12-01	EMPAVILLE Science	EMPAVILLE session promoted by inLoco, regarding science. 9 proposals have been submitted, and 64 votes have been casted.

In the total of EMPAVILLE events, EMPATIA Platform was validated by **more than 150 PB experts**, from different countries, in **16 sessions**, created **115 proposals**, and **1067 votes**.

#### 4.1.7 4th International Conference on PB in North America

Next, we present some figures about the EMPATIA Platform used in the EMPAVILLE session.

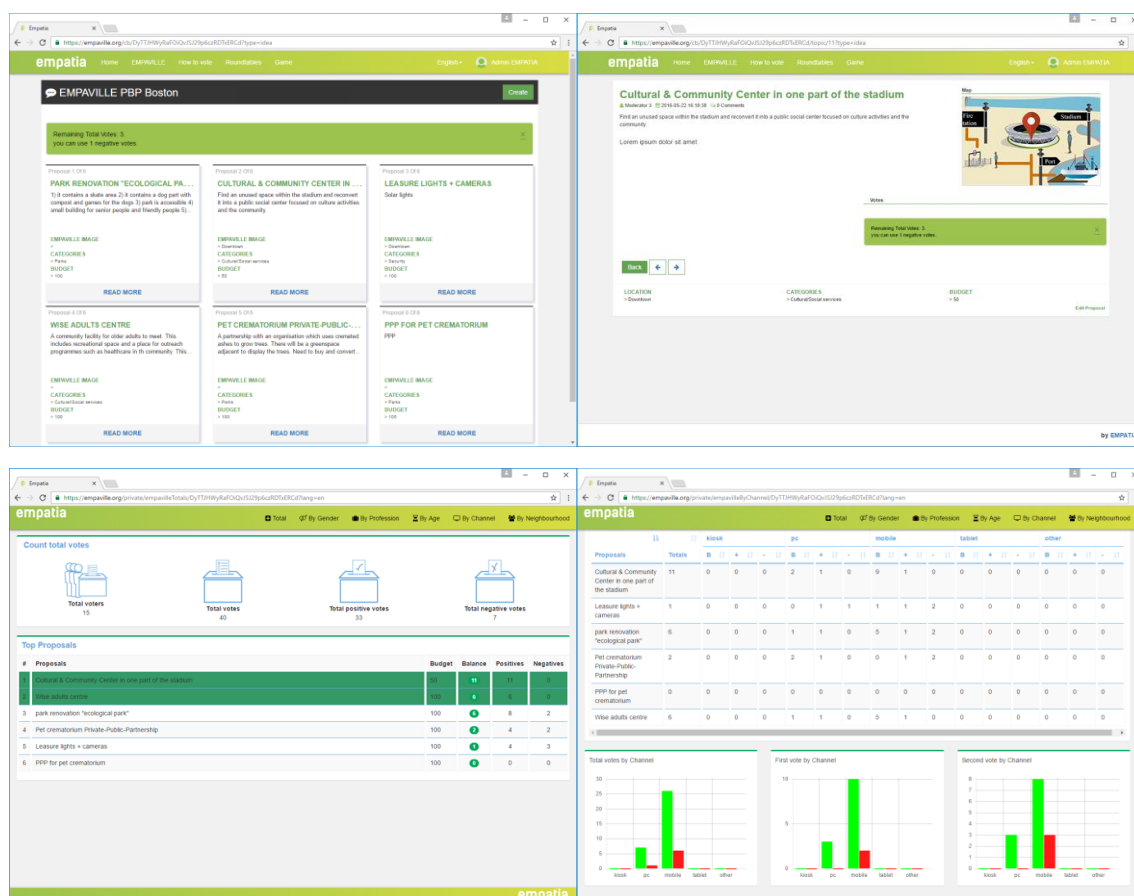


Figure 130 – EMPAVILLE PBP session proposals and analytics



Figure 131 presents some event photos, including the ideation process tables, the EMPAVILLE presentation with time count down, the kiosks table and the notebook of a moderator while adding a new proposal.



Figure 131 – EMPAVILLE PBP session photos

#### 4.1.8 EMPATIA National Workshop in UK

Next, we present some figures about the EMPATIA Platform used in the EMPAVILLE session.

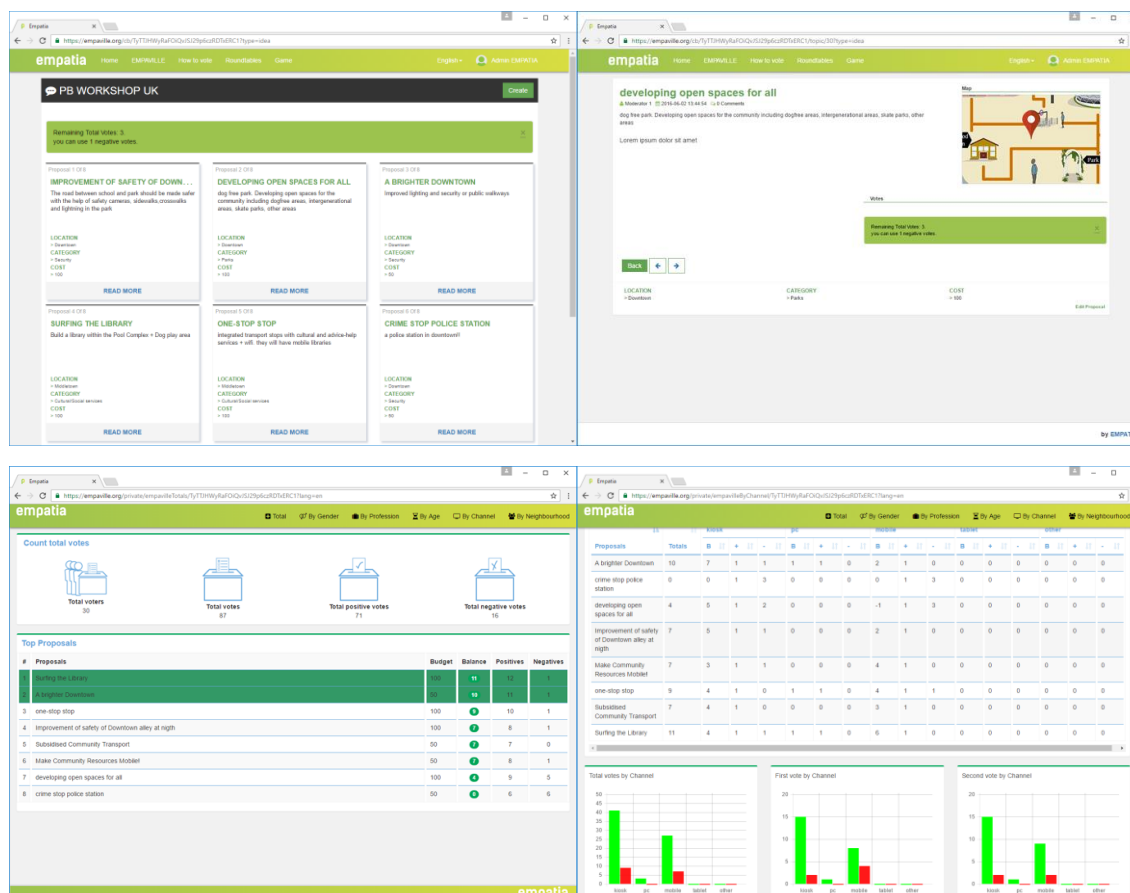


Figure 132 – EMPATIA PB UK session proposals and analytics

Figure 133 present some event photos, including the ideation tables, and the kiosks tables.

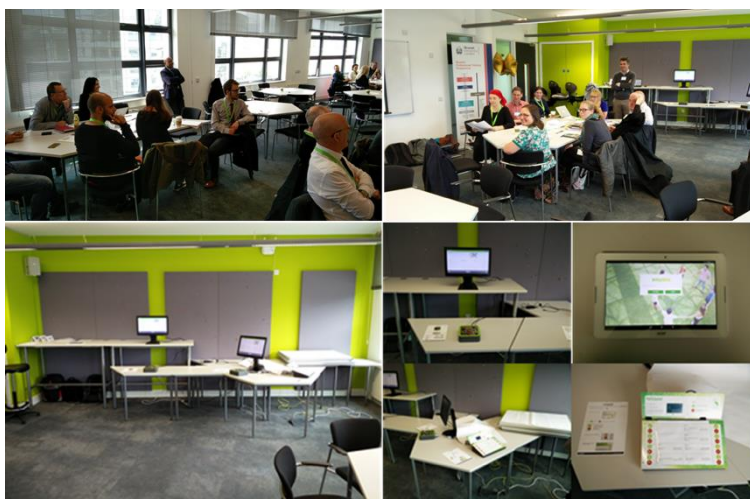


Figure 133 – EMPATIA PB UK session photos

## 4.1.9 Festival della Partecipazione Aquila

Next, we present some figures about the EMPATIA Platform used in the EMPAVILLE session.

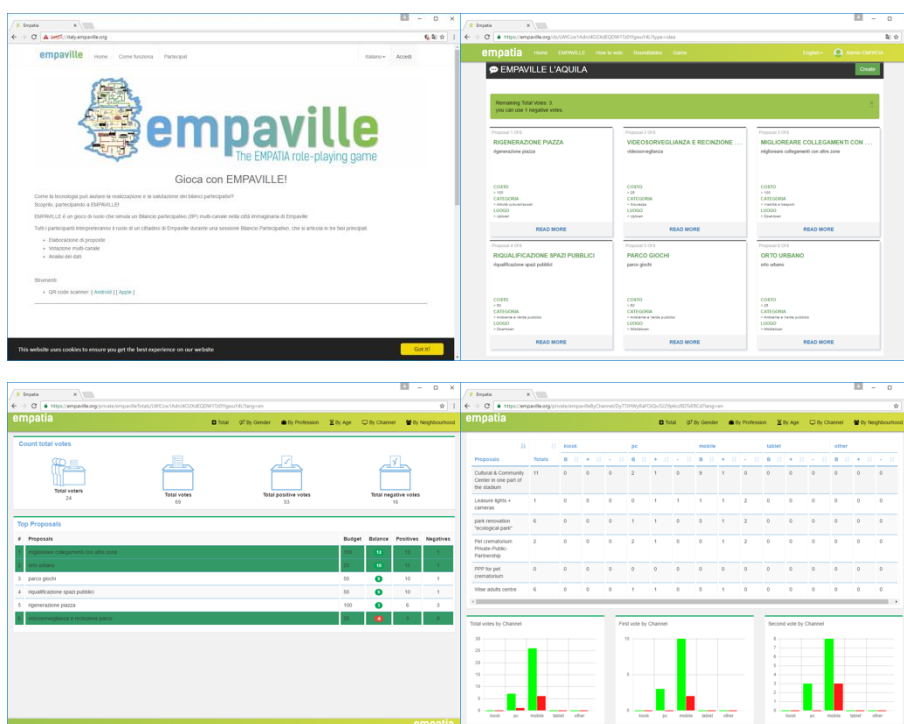


Figure 134 – EMPAVILLE Aquila session proposals and analytics

## 4.1.10 Summer school in Olhão

Next, we present some figures about the EMPATIA Platform used in the EMPAVILLE session.

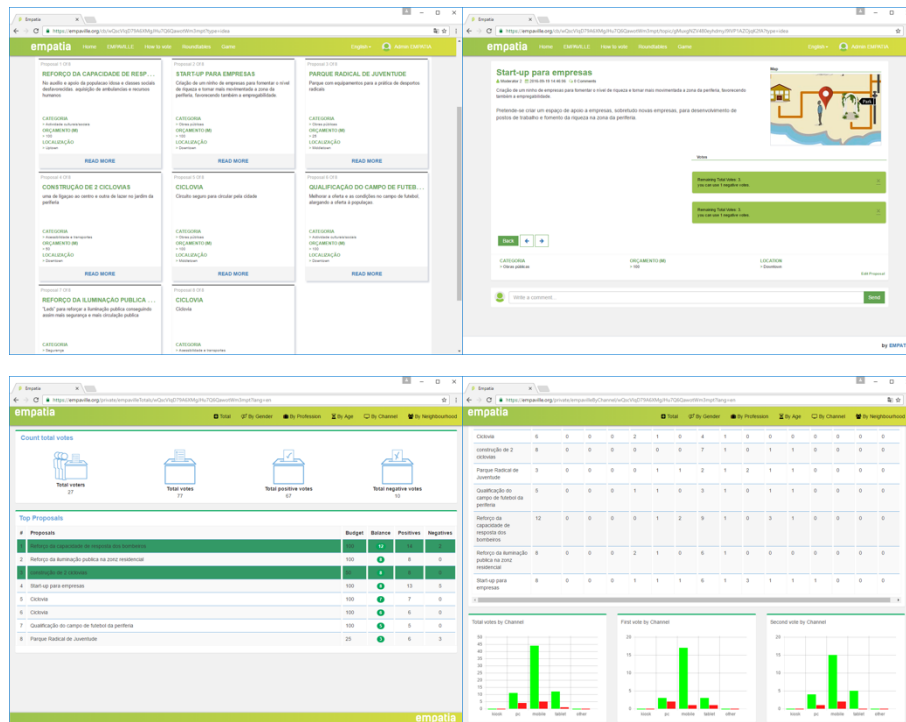
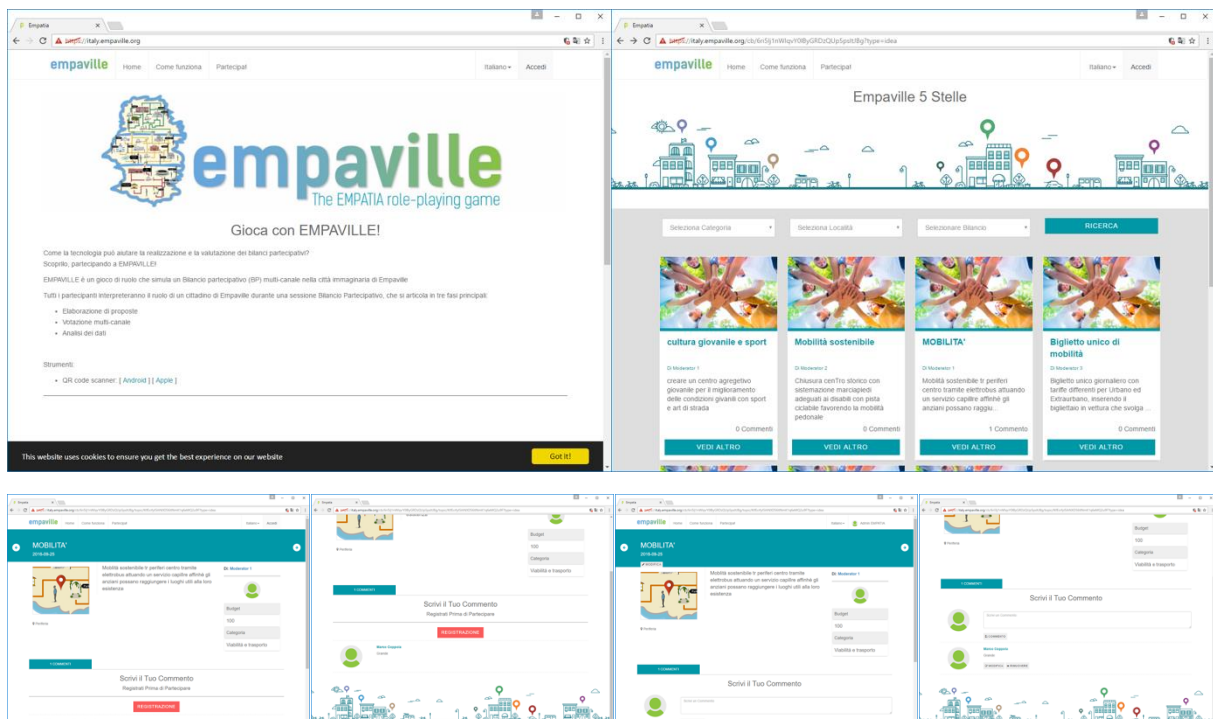


Figure 135 – EMPAVILLE Olhão session proposals and analytics

### 4.1.11 Italian 5 Stelle meeting

Next, we present some figures about the EMPATIA Platform used in the EMPAVILLE session.





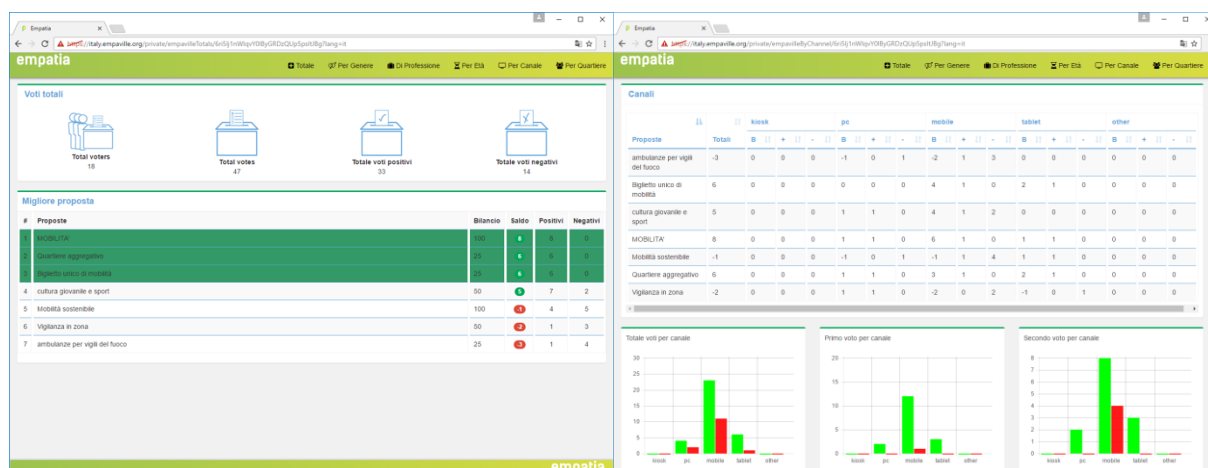


Figure 136 – EMPAVILLE 5 Stelle session proposals and analytics

## 4.1.12 EMPAVILLE School Pereira

Figure 137 highlights the vote results for the 6 proposals that were voted in this school.

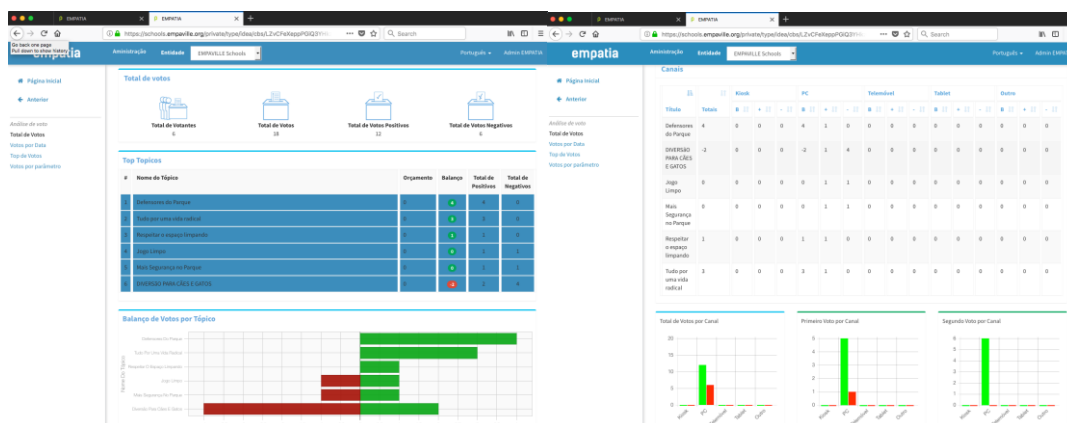


Figure 137 – EMPAVILLE 6 School Pereira session proposals and analytics

## 4.1.13 EMPAVILLE School Caldas da Rainha

The results of the voting session held in the school of Caldas da Rainha are depicted in Figure 138.

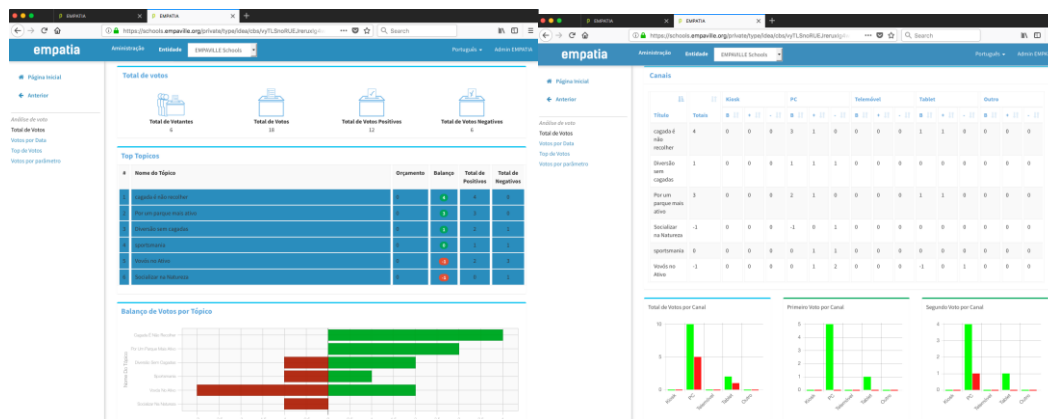


Figure 138 – EMPAVILLE 6 School Caldas da Rainha session proposals and analytics

#### 4.1.14 EMPAVILLE School Águeda

Figure 139 illustrates the results of the six proposals that were voted in the school of Águeda.

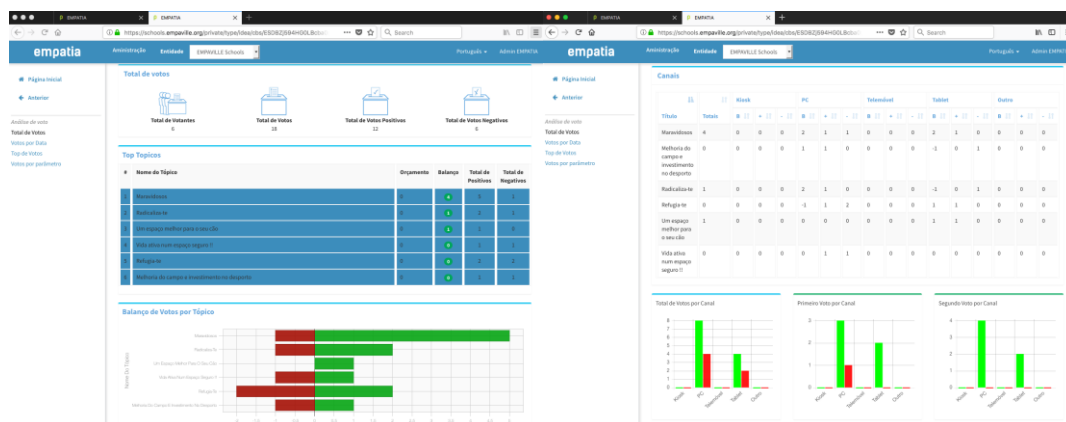


Figure 139 – EMPAVILLE 6 School Águeda session proposals and analytics

## 5 EMPATIA Platform Release

This section includes information regarding the public release of the EMPATIA platform. The provided information includes details regarding the software repositories in GitHub, the containers available in Docker Hub and the virtual machines with the deployed components.

The EMPATIA platform has been released as Open Source, as initially planned, under the GNU Affero General Public License [20].

### 5.1 Open Source repositories

All the EMPATIA platform components have a dedicated repository in GitHub, where they are available to download from. The list of repositories and links is the following:

- Analytics - <https://github.com/EMPATIA/Analytics>
- Empatia - <https://github.com/EMPATIA/EMPATIA>
- Events - <https://github.com/EMPATIA/Events>
- Files - <https://github.com/EMPATIA/Files>
- Monitoring - <https://github.com/EMPATIA/Monitoring>
- Notifications - <https://github.com/EMPATIA/Notifications>
- Questionnaires - <https://github.com/EMPATIA/Questionnaires>
- Voting - <https://github.com/EMPATIA/Voting>
- WUI - <https://github.com/EMPATIA/WUI>

### 5.2 Dockers

A docker container was prepared containing the entire EMPATIA platform configured, including the database. As such, this docker container should be used more as a demo than as a production deployment since all the data is lost when the docker is stopped.

The container is available in Docker Hub: [https://hub.docker.com/r/empatia/empatia\\_platform/](https://hub.docker.com/r/empatia/empatia_platform/)

### 5.3 Virtual Machines

A virtual machine (VM) image was prepared and is available to download from the EMPATIA website. The VM comes with the EMPATIA platform already deployed, as well, as the databases, MySQL and Redis, and with all the necessary configurations made, such as the Virtual Hosts configuration of Apache.

### 5.4 Installation Scripts

In order to simplify the deployment of the EMPATIA platform, an installation script was prepared and is available to download from the EMPATIA website.

In the same webpage where the download link is available, there can be found a small and simple guideline on how to use it to deploy the EMPATIA platform and listing the prerequisites that are necessary for the EMPATIA platform to run properly.

## 5.5 EMPAVILLE Raspberry Pi

With the aim to facilitate the EMPAVILLE role-playing game, a deployment of the EMPATIA platform was made on a Raspberry Pi 3 with all the configurations necessary to play EMPAVILLE right out of the box. The Raspberry Pi creates a wireless local area network (WLAN) to which the mobile devices and Kiosks can connect to in order to play EMPAVILLE.

The image of the Raspberry Pi installation is available to download at the EMPATIA website.

## 6 WP2 objectives and achievements

This section summarizes the WP2 objectives, as defined in the EMPATIA Project DoA, and how these have been successfully achieved. We start by presenting the WP2 and respective tasks objectives and then we present how each objective was achieved.

This WP not only achieved successfully all defined objectives, but produced results far beyond what was initially expected, but fundamental to the support of the pilots and all other applications of the EMPATIA Platform. At the end of the project, the EMPATIA Platform is a key reference in the field and surpasses greatly all other competitors in quality and quantity of features and dynamicity.

### 6.1 Objectives

The objectives of WP2 are summarized in Table 30, considering the objectives documented in the Description of Work and the respective associated tasks.

**Table 30 – WP2 objectives**

Objective ID	Task	Description of objective
Obj 1.	T2.1	Analyse the reference scenarios and requirements defined in WP1
Obj 2.		Design the architecture of the EMPATIA platform
Obj 3.		Detailed specification of components, modules and APIs
Obj 4.	T2.2	Explore how to better inform and aggregate people and their ideas towards common solutions and actions
Obj 5.		Study, develop and integrate the most appropriate voting systems
Obj 6.		Create algorithms to automatically aggregate contents across multiple sources and suggest them to targeted people
Obj 7.		Identify, develop and integrate mechanisms of gamification and democratic incentives for participants to join and work together
Obj 8.	T2.3	Research and develop advanced algorithms and mechanisms for processing the data present in the EMPATIA Platform
Obj 9.		Linking with external sources of data
Obj 10.		Automatically generated infographics will be produced to provide constant feedback to citizens and promote a clear identification and presentation of existing proposals, their location, their impact among many other aspects
Obj 11.	T2.4	Development of the EMPATIA platform
Obj 12.		Integration of existing open source components and modules
Obj 13.		Include open source software algorithms for opinion mining, trend identification, automatic classification, data visualization

## 6.2 Achievements

This subsection presents evidences on how the objectives of WP2 have been achieved and provides references to the sections of this document or other documents, where further details of the objectives achievement can be found. Table 31 describes the achievement of WP2 objectives and provides references to the sections or documents where further details regarding the achievement of WP2 objectives can be found.

**Table 31 – WP2 objectives achievement**

Objective ID	Description of achievement	Section(s) or document(s)
Obj 1.	<b>Analyse the reference scenarios and requirements defined in WP1</b>	
	The requirements gathered in WP1 have been analysed to devise the technical requirements. These requirements have been improved based on WP3 and WP4 feedback.	Documented in Deliverable D2.1 [1] and summarized in Appendix A.
Obj 2.	<b>Design the architecture of the EMPATIA platform</b>	
	The architecture of the EMPATIA Platform has been specified and refined based on the scenarios and requirements.	Documented in Deliverable D2.1 [1] and Deliverable D2.3 [6].
Obj 3.	<b>Detailed specification of components, modules and APIs</b>	
	The specification of the architecture of EMPATIA Platform includes detailed information of components and respective APIs.	Documented in Deliverable D2.1 [1] and D2.3 [6].
Obj 4.	<b>Explore how to better inform and aggregate people and their ideas towards common solutions and actions</b>	
	<p>The designed filtering and aggregation methods integrate multiple sources and suggest them to targeted people. This feature is supported by the Apache Solr/Lucene tool that adds to EMPATIA a full-text search, hit highlighting, faceted search and real-time indexing that is integrated in order to provide the advanced filtering and aggregation features.</p> <p>Collaborative writing (comments/annotations) and versioning of topics is also an important feature available to promote collaboration between users.</p> <p>These features were not validated in pilots or other applications for lack of interest of the processes responsible. The only feature validated was the versioning of topics.</p>	<p>Some screens of the filtering and aggregation features are displayed in section 3.2.3 - Example Screens.</p> <p>The collaborative writing and versioning features are presented in section 3.2.3 - Example Screens and in section 3.2.2 in section PAD/CB - PAD details.</p>
Obj 5.	<b>Study, develop and integrate the most appropriate voting systems</b>	
	The Vote component of the EMPATIA Platform supports several vote methods: support, like, follow, multi-vote, negative-vote, budget-vote, weight-vote.	The vote methods supported are described in several sections of this document (mainly administration, manager and user spaces) and examples are presented in section 4.
Obj 6.	<b>Create algorithms to automatically aggregate contents across multiple sources and suggest them to targeted people</b>	

	In the context Lisbon pilot, several open data sets were integrated in the platform to provide more user relevant information.	Some screens are presented in section 4.1.2.
Obj 7.	<b>Identify, develop and integrate mechanisms of gamification and democratic incentives for participants to join and work together</b>	
	In EMPATIA each user has a gamification field that stores the points of the user. These points are automatically set based on participation triggers. The manager defines the points associated to each participation trigger.  This feature was not validated in pilots or other applications for lack of interest of the processes responsible.	This feature is described in section 3.2.2 – Configurations and in the user details.
Obj 8.	<b>Research and develop advanced algorithms and mechanisms for processing the data present in the EMPATIA Platform</b>	
	The platform provides several Analytics and dashboards about Votes, Accesses, Users, Messages, Emails and SMS, including extensive visualization and export features and some dynamic data management and visualizations.	Described in Section 3.2.2, mainly in subsections PAD/CB (Vote analytics), Users and Communication.
Obj 9.	<b>Linking with external sources of data</b>	
	This objective was integrated in Obj 6 in the scope of the Lisbon pilot where several analytics approaches were used to present several external sources of Lisbon open data.	Some screens are presented in section 4.1.2.
Obj 10.	<b>Automatically generated infographics will be produced to provide constant feedback to citizens and promote a clear identification and presentation of existing proposals, their location, their impact among many other aspects</b>	
	This objective includes the following achievements: <ul style="list-style-type: none"> <li>Validated EMPATIA Platform processes transparency through the available data visualizations and export mechanisms available with easy traceability and accountability.</li> <li>Integration of external open data sources into EMPATIA with relevant public visualizations.</li> <li>Extensive integration of external open source tools.</li> <li>Release of internal platform open data (managed by the entity) that can be integrated in specialized open data tools like CKAN and DKAN.</li> </ul>	The evidences of this objective are present in sections 3.1.3. (external tools and libraries), 3.2.2 (internal analytics) and in the results achieved in the validation events described in section 4.
Obj 11.	<b>Development of the EMPATIA platform</b>	
	The EMPATIA platform has been designed and implemented in two prototypes, as documented in Deliverable D2.2 for P1 and for P2 the final prototype in this deliverable.  The platform was validated and experimented in 22 different scenarios (pilots and other applications).  The platform is available in several software repositories: GitHub, Docker Hub containers and virtual machine.	Section 2 with technological components description, Section 2.2 with details regarding development.  Validation events described in section 4.  Platform releases are described in section 5.
Obj 12.	<b>Integration of existing open source components and modules</b>	

	<p>The inter-operability with existing services and frameworks has also been achieved, in diverse pilots. Besides introducing specific requirements, the pilots employed, in some cases, tools services with which EMPATIA Platform had to interact. The pilot in Lisbon, required EMPATIA Platform to interact with existing platforms.</p>	<p>Section 4 details the features introduced and validated in the diverse pilots.</p>
Obj 13.	<p><b>Include open source software algorithms for opinion mining, trend identification, automatic classification, data visualization</b></p>	
	<p>This objective corresponds to the following requirements:</p> <ul style="list-style-type: none"> <li>• The Analytics component of the EMPATIA Platform provides infographics and supports diverse visualization mechanisms that can be used in any phase of a PB process to monitor the participation of citizens and gather useful and relevant insights.</li> <li>• EMPATIA Platform has been released as open-source, and several facilities for deployment have been made available, including containers and virtual machines.</li> </ul>	<p>Section 2 describes the analytics component, while section 4 provides some pilots statistics. The detailed release of the EMPATIA Platform is available at Section 5.</p>



## 7 Conclusions

This deliverable presents the EMPATIA Platform in terms of supported features associated with the requirements initially identified in WP1 and revised with the feedback from pilots and other applications. These features have been described on a component basis.

The document also includes details regarding the availability of the EMPATIA Platform as open source software (one of the goals of WP2), as Docker containers, as virtual machines and with installation scripts that allow the deployment of the EMPATIA Platform without requiring specialized skills.

This document also reports the development activities, that were performed to support the functionalities required in pilots, including specific details of the different kiosks components. Much of the developed functionalities have been employed in pilots and other applications, within different specificities in terms of supported features and supported functionalities.

The usage of EMPATIA Platform in several different scenarios allowed the project to deliver an outstanding Platform to support many different type of participation processes, as well as means to perform the participation (e.g. via web, mobile applications or through kiosks).

At the end of WP2 and the EMPATIA Project, the platform has been used in more than 22 real participation processes, with more than 43.000 registered users, 2.500 topics created and 40.000 votes. From May to December 2017 the platform supported processes that had more than 100.000 unique visitors with average visit duration higher than 5 minutes.

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## 9 Appendix A – Requirements mapping

This appendix presents a rough mapping of the EMPATIA platform requirements, considering: the original requirements from WP1 activities, the requirements addresses by the M12 WP2 Prototype, the requirements introduced or substantially changed due to Pilots' feedback, and the requirements addressed by the latest WP Prototype (M24). This mapping is simplified and optimized for better understanding and reading (at the cost of losing some detail and precision). For each component requirement it is identified (in blue) the main (or final) requirement source and in which prototype it was developed/fulfilled.

As can be verified by analyzing this table, many of the features of the WP2 Prototype P2 (M24 EMPATIA Platform version) did not result directly from the requirements established by WP1, but from requirements identified later (or substantially changed) by the pilots or directly from WP2 internal work.

Component	Requirement	WP1 Requir. (D1.2 & D1.4)	WP2 Prototype P1 (M12)	Pilots requir.	WP2 Prototype P2 (M24)
Analytics	Information of Total Votes and Daily Votes				
	Information and count of votes per parameters (gender, profession, age, etc)				
	Analysis of first and second votes per parameters (gender, profession, age, etc.)				
	Information and count of votes per voting channel (web, tablet, sms)				
	Analysis of first and second votes per voting channel (web, tablet, sms)				
	Voting statistics by multiple parameters (date, town, education)				
	Topic (proposals, ideas, issues) analysis				
	Participation analysis				
	Dynamic and customizable dashboards				
	Automated reports				
Design	Define flow, rules and configure procedure for proposal's development and review				
	Graphical and detailed specification of the participation model steps				
	Design Templates				
	Integration of the technical analysis in the model steps				
	Definition of rules, channels and access control policies				
Authentication	Registration, Authentication, Accounting and Authorization				
	Profile Management				
	Process Management - Define rules for entity and process - (personal data policy)				
	Authentication with multiple methods (credentials, QRCode, RFID, OAuth)				
	Open standards for authorization & authentication (user roles)				
	In-person registration				
	Registration Stepper				
	Recover account with SMS code				
	Users XLS and PDF export				

	User-profile (profile, messages, participation)				
	Support for credentials renewals, SSO and One-time generated password				
	User/Login levels				
	Data Anonymization				
	Dual-Factor authentication				
CB/PAD	Management of PADs				
	Moderate/approve				
	Define rules for management of relations				
	Read/download/export PAD voting results				
	Facilitation functions				
	Management of Moderators				
	Manage CB and its parameters				
	Management of Vote Sessions				
	Support diverse consultations methods				
	Block/Unblock PADs				
	Management of Post Abuses				
	Management of Comments				
	Access Control				
	Management of Topic Cooperators				
	Version Control in all PAD elements (topic, post)				
	CB voting period management				
	Topics multiple owners				
	Create topics without registered users				
	Thematic consultation specific notification				
	CB Topics status				
	Consultation Wizard				
	Include technical analysis in export				
	Support Alliances				
	Support topic draft (status publish)				
	CB translation management				
	CB questionnaires management				
	Create topic on behalf of				
	Public topics list sorting options				
	CB users levels & permissions				
	Management of Participation				
	Management of Topics (Ideas, proposals, issues)				
	Support advanced search mechanisms				
CM	Support News/Pages				
	Support News/Pages				
	Support Calendar/Events				
	Support other categories				
	Support other categories				
	Support static pages				
	Support files in multiple formats (txt, doc, pdf)				
	Support images in multiple formats (jpeg, png, gif)				
	Support videos in multiple formats (MPEG4, webM, Ogg)				
	Support WYSIWYG editor				

	Version and access control for all content types				
	Support home page popup				
	Support FAQ				
	Support articles				
	Support Question & Answers				
	Support splash screen				
	Support Short links				
Open Data	Support export/import to/from CKAN				
	High availability of data				
	Support Dataset relationships				
Orchestrator	Management of Authentication Methods per entity/site				
	Management of User Roles per entity/site				
	Management of Countries per entity/site				
	Management of Currency per entity/site				
	Management of Languages				
	Management of Time Zones				
	Process Management - Define rules for entity and process				
	Management of Co-Construction (e.g. work in groups)				
	Management of User groups per entity/site (e.g. departments)				
	Management of newsletters subscriptions per entity/site				
	Management of Menus per entity/site				
	Management of PADs parameter templates per entity/site				
	Management of discussions per entity/site				
	Management of entities				
	Management of layouts per entity/site				
	Management of PAD Entities per entity/site				
	Management of Forums per entity/site				
	Management of Geographic Areas per entity/site				
	Management of Homepage configurations per entity/site				
	Management of Homepage types per entity/site				
	Management of Topics (ideas, proposals, etc.) per entity/site				
	Management of Kiosks per entity/site				
	Management of Module Types (e.g. options in menus) per entity/site				
	Management of newsletters subscriptions per entity/site				
	Management of Contents per entity/site				
	Management of PADs Parameters, Parameters Types and Parameters Options per entity/site				
	Management of User Parameters and User Parameter Options per entity/site				
	Management of Permissions per entity/site				
	Management of Roles per entity/site				
	Management of Translation Configurations per entity/site/PAD				
	Management of Sites per entity				
	Management of Users per entity/site				
	Management of Vote Methods per entity/site				

2nd cycle	Project implementation monitoring				
	Support community building and co-implementation				
	Management of evolution				
Events	Management of Events				
	Management of Sessions				
	Management of Sponsors				
	Management of Payments				
	Management of Registrations				
	Management of Speakers				
	Export to pdf				
Files	Download/Upload Files				
	Management of Files				
	Search Files				
	Chunked Upload				
	Management of usage and access rights				
Monitoring	Management of Logs				
	Performance graphs				
	Export data in JSON				
	Support multiple data sources				
Notifications	Notifications email management				
	Visualize notifications				
	Users subscribed notifications				
	Management of Email Groups				
	Management of Email templates				
	Automatic notifications (e.g. deadline of event approaching)				
	Support notifications for thematic consultation				
	SMS management (receive/send)				
	Platform notifications (users and managers)				
	Associate notification to specific topic				
	Real-time notifications				
	Email/SMS newsletter				
	Send message to topic owners				
	Support CB email template management				
Questionnaires	Management of Questionnaires				
	Management of Form Reply Answers				
	Management of Question Groups				
	Management of Questions, Questions Types and Questions Options				
	Management of Forms and Form Configurations				
	Anonymous Answers				
	Answers reports and analytics				
	Export Answers to PDF				
	Management of Icons				
	Management fo Event Schedules				
	Management of Participants				
	Support Quick Questionnaires				
	Export Answers to PDF				
	Data Anonymization				



Vote	Create/configure polls				
	Define rules/limitation for polls				
	Applicable voting methods				
	Vote/Support				
	Define coefficients for weighted vote				
	Timeline of Votes				
	Management of Votes				
	Management of Vote Methods				
	Submit Votes				
	Votes Rules				
	Management of Vote Method Groups				
	Management of Vote Events				
	Statistics of Votes per Event				
	Support anonymous voting				
	Support votes				
	Follow votes				
	In-Person vote				
	SMS vote				
	Paper blind vote				
	Voting receipt				
	Export user with votes and topics information				
WUI (and Kiosk)	Vote with Kiosks				
	Login in Kiosks				
	Logout in Kiosks				
	Show/Select Topic (idea, proposal)				
	Show multiple topics at the same time				
	Support multiple types of kiosks (with and without screen)				
	Support touch paradigm				
	Support multiple languages				

Figure 140 – Requirements mapping