Deliverable D1.3: Project Summary

Ubiquitous participation platform for Policy making

UbiPOL

Brunel University
EASY Connects
Turksat
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Corvinus University of Budapest
Sabanci University
PDM&FC
Fraunhofer FOKUS
IPASA

UbiPOL

Project reference: INFSO-ICT-248010

UbiPOL	**UBIPOL – PROJECT SUMMARY** **Del. no: D1.3**	
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Executive summary:

This deliverable stands for the final report for project UbiPOL. It provides an overall summary in terms of partner contribution, achievement, and impacts of the project. The project main results in terms of academic and technical achievements as well as dissemination and collaboration with other projects are also evaluated to the initial objectives.

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Abbreviations and symbols

API: Application Programming Interface.
CI: Continuous Integration.
DTO: Data Transfer Object.
ELM: Elaboration Likelihood Model.
LGPL: Lesser General Public License.

1. Project Overview

UbiPOL is an ICT project aiming at developing a family of software libraries to build a ubiquitous participation platform where citizens are engaged with the policy makers in the policy making process. This aim includes the specification and development of the basic requirements of the set of software libraries, employing them in the development of real world applications to be used in field trials, and to conduct field trials to assess the behavioural impact of the new concept brought by UbiPOL on citizens as well as policy makers.

In order to achieve the envisioned aim, work in UbiPOL was initially organised into 6 work packages, which were joined by an additional work package during the second year. The work was carried out by a consortium initially consisting of 9 partners and became 8 in the second year of the project, of which 3 are academic institutions.
Members of the UbiPOL project are associated through a consortium agreement, which has been signed at the beginning of the project. This consortium is composed of the six partner companies and one associated-partner university. The UbiPOL partners are listed along with their respective roles and activities undertaken throughout the lifespan of the UbiPOL project.

Brunel University (BRUNEL): is the co-ordinator of the project. As such it is responsible for the general management tasks and links with the European commission. BRUNEL has also a strong involvement in quality standards and had also a significant support in the theoretical definition and technical implementation of an innovative policy making workflow engine. BRUNEL also contributed to field trial activities and UbiPOL evaluation in the UK. BRUNEL leads two work packages (WP1 and WP2).

BasarSoft (BASAR): is mainly in charge of the implementation of the UbiPOL generic web services that are connecting the mobile client to the UbiPOL server-side components. BASAR also collaborated with BRUNEL on the implementation of the policy making workflow engine and developed a web-based PMWf editor that is integrated in the policy making backend application. Furthermore, BASAR consulted the consortium on issues related to geographical and map processing. BASAR is the leader of WP4.

Corvinus University (CORV): is responsible for the definition of the necessary ontologies to reflect the semantics and terms of the policy domains employed in the field trials. Therefore, CORV closely collaborated with SU in the conception and testing of the opinion mining engine. CORV has also contributed to several dissemination activities by participating and presenting UbiPOL in different international and national conferences and workshops. Furthermore, CORV contributed with other partners to WP2 in reviewing the literature of policy making modelling and business process notations.

Fokus Fraunhofer (FOKUS): reviewed the literature related to data security and privacy in the context of public services and policy making and also suggested a security architecture that, on one hand, fits the standard requirements of data privacy and security measures and, on the other hand, matches the novel features aimed by UbiPOL. FOKUS designed, implemented, and demonstrated a security architecture that can be applied to UbiPOL applications while preserving the flexibility of adopting different mechanisms for citizens' authentication such as eID. Furthermore, FOKUS participated to multiple dissemination activities.

IPASA (IPA): is mainly in charge of the full life cycle of the UbiPOL components to be used on the mobile client applications such as the policy map and communication manager components. IPA also implemented the UbiPOL mobile application for the Android platform that is used for the field trials. This included the design and implementation of a specific logging mechanism in order to collect non-personal data for the technical and behavioural evaluation of the UbiPOL platform.

PDM&FC (PDMFC): responsibility covered the maintenance of the UbiPOL project technical infrastructure. This includes the deployment and tuning of tools used for the project management purposes such as the discussion lists, SVN repository, Wiki, and hosting UbiPOL website. PDMFC also took charge of the design, implementation, and test of UbiPOL server side components interfacing with the web services. They also implemented the policy making backend web application that is designated for policy makers to control the functionality and monitor the behaviour of the UbiPOL instance. Furthermore, PDMFC disseminated UbiPOL at several occasions, notably to introduce its concept to policy makers in Portugal. PDMFC leads work package WP3.

Sabanci University (SU): is mainly working on the conception and realisation of the UbiPOL opinion mining engine. The mining engine is aimed at performing different types of sentiment analyses and categorisation of

citizens' reported issues. The designed mining engine takes public's opinions in the form of free text and policy domain ontology files, provided by CORV, as input and produces output for policy makers as a decision support tool for initiating a policy making process. SU also contributed to different dissemination activities and leads work package WP7.

TURKSAT: is basically in charge of the design and implementation of the field trials in Turkey and in the UK with the close collaboration of BRUNEL. TURKSAT also presented UbiPOL at different occasions in national and international conferences and workshops and in several public agencies in Turkey notably in Ankara and Istanbul. TURKSAT is the leader of work package WP5.

UbiPOL is addressing the need for providing an open-source platform to support citizens' engagement and participation in the policy making process. UbiPOL provides all required infrastructure to enable citizens to actively participate in the policy making processes through their mobile phones and other handheld devices. The project's main innovation is providing services that support the ability to target citizens ubiquitously by notifying them of relevant policy issues that match their location, preferences, and/or profile. Furthermore, UbiPOL services allow citizens to report issues directly to policy makers where these are filtered and classified by a specific opinion mining engine.

UbiPOL functionalities are intended to be delivered through a comprehensive platform that is:
- Operating-system agnostic (written in Java)
- Extensible (by implementing well-defined public interfaces)
- Scalable (to accept a large amount of simultaneous requests)
- Decoupled (all components making up UbiPOL are loosely coupled and only interact through public interfaces)
- Open-source (under LGPL license).

The UbiPOL platform, along with the services have served in the development of two applications, a web policy making backend application and a mobile application to be used by citizens. These two applications have been assessed in two field trials, one in the UK (Hillingdon Borough and Brunel University campus) and the second in Turkey (Turksat campus in Ankara and Pendik municipality in Istanbul).

2. Project Objectives

Besides its planned objectives, UbiPOL project distinguishes between the ubiquitous policy making platform that consist of a suite of libraries and APIs and the UbiPOL services. UbiPOL applications are the integration of both and are used for assessment via two field trials.

2.1. Goals of the UbiPOL platform:

As stated in the deliverables D3.3 "*Specification of the UbiPOL API + Profile*" and D3.4 "*UbiPOL Class Library*", this part of the project aimed at:

- Providing a suite of UbiPOL class libraries that would serve as the building blocks for any ubiquitous policy making solution.
- Documenting the main APIs to be used by developers aiming at building a UbiPOL services and application.

2.2. Goals of the UbiPOL services and applications

As stated in deliverables D4.1 "*UbiPOL Service Design*", D4.2 "*UbiPOL Service Library*", and D4.3 "*UbiPOL Field Trial Application Implementation*"

- Designing and implementing UbiPOL services to be consumed by UbiPOL applications.
- Design and implement a mobile application that runs on a common mobile platform (e.g. Android) and communicates with relevant UbiPOL services. The main purpose of this mobile application is to provide the citizens with a UbiPOL application in order to test and prove the new concepts brought by UbiPOL through planned fiel trials.
- Design and implement a policy making backend application that facilitates the administration and management of policy making workflow processes. The backend application would use UbiPOL services that are specifically provided for policy makers such as control panels and access to statistical data and information output from the opinion mining engine.
- Provide localisation facilities for the mobile and backend applications to fit with the contexts of the field trial sites, the UK and Turkey.

2.3. Description of work packages

Work package 1

Work package one activities lasted for the whole life cycle of the project. Its objectives have been to coordinate and manage the project and to take care of the relationships and communication between project contractors and both the European commission and other projects. This WP was also responsible for defining the logistics of the project (selection of the tools, reporting structure and internal repository of software and documents); as well as controlling and refining the objectives of the project, and give assurance of timeliness and quality of project results and produced the quarterly and annual reports.

Communication among project partners was mainly achieved via direct emails or through mailing lists setup for each work package, development team, and project board members. Project members also made extensive use of Skype and other means of conference calling systems in order to communicate in voice. Furthermore, as a document management initiative, a private document repository and version control system (SVN) was enabled at the early stage of the project. All documents, source codes, and other resources were submitted to the UbiPOL SVN repository that is mainly maintained by PDMFC.

In order to organise and monitor the list of tasks among partners, a project management and bug tracking system (TRAC) was also put in service so project partners could post tickets and report for bugs. TRAC also provided a handy wiki tool where project partners could share a variety of information about the project such as links to documentation, UbiPOL installation instances, reported tickets, etc.

The consortium organised quarterly regular PMB meetings and temporary PMB meetings to discuss the consortium restructuring and amendments of DoW. As a result, the consortium effectively managed the withdrawal of EASY-BMBC in year 2, reallocation of the resources among the other partners, and the extension of the project term for 3 months. WP1 also ensured the progress of each work package is monitored and resolved any technical issues in collaboration with WP leaders through skype call or on-site meetings.

Work package 2

Work package two activities started at the beginning of the project and lasted until the middle of the third year. The main objective of this work package was to define an innovative workflow model to design representative policy making processes. The main features of the resulting workflow model would be to enable policy makers with a tool that:

- Permits the representation of policy making activities into structured processes consisting of interlinked tasks. Each task is considered either as an administration task, to be completed internally by a policy making institution, or as an opinion task, to be completed by citizens through casting their votes and opinions.
- Provides a comprehensive set of rules to be applied on the transitions between tasks, to define where a given opinion task is to be attached (e.g. point of interest or region), and to determine the category of respondents policy makers aim to target by an opinion task.
- Translates into a storable and reproducible form allowing the serialisation of produced policy making processes such as XML notations. This feature ensures total decoupling from visual tools (e.g process editors), persistence mode, and to conform to rules governing the validity of a process representation (e.g. XSD schemas for XML documents).

Brunel (work package leader), BMBC-EASY, TURKSAT, CORV, and SU were the main partners involved in work package two. The work package started by conducting a comprehensive review on the literature of business process modelling with particular interest on the applications related to policy making. CORV and BRUNEL reviewed the main notation used for modelling business processes such as BPMN and dataflow. This activity was detailed in the first deliverable of this work package D2.1.

As for the next activity, most of the involved partners, notably CORV and EASY, provided examples of policy making processes. After rigorous analyses of the examples and matching them with the theoretical literature it was concluded that the Macintosh policy cycle is commonly used in policy making practices; this involves the ordered steps: policy making initiation, policy draft, approval of draft, public consultation, reflection on feedback, policy approval, and finally adoption. In this regard, the PMWf would further contribute in structuring the policy making process and enhance the accuracy of public consultation by ubiquitously targeting relevant citizens, hence increasing the value of the gathered public feedback. These were described in details in the D2.2 deliverable.

In the next task, T2.3, the main focus was to deliver a theoretical PMWf model based on the theoretical and empirical survey on the relevant modelling constructs. The partners integrated their findings from the previous two tasks of this work package and produced an initial PMWf model presented as a set of XML tags. The major innovative construct in the suggested PMWf is the "opinion tag" as it allows policy makers to define the structure of the public consultation by defining what, who, and where to ask and also to impose tracking rules on tasks along the policy making process. Furthermore, the PMWf defined relations between the different constructs of the model and the general structure of a policy making process represented in PMWf XML. In order to ensure the validity and structure correctness of PMWf XML files, an XSD schema document was created and made publicly available allowing developers of the PMWf engine (described in the next work packages) to check the XML files prior execution. During this task, an important dissemination activity was also achieved by publishing the suggested PMWf model at the European Conference of Information Systems. Deliverable D2.3 explains and details the activities done in order to complete this task.

The final task in work package two was the maintenance of the PMWf model suggested in the previous task. This task mainly relied on the feedback collected from partners aware of policy making practices (TURKSAT, EASY, and CORV) in order to enhance the PMWf model. Technical suggestions proposed by developers in charge of implementing the PMWf XML parsers and engine were also reflected to optimise the execution and processing of PMWf instances. This task also involved high communication with other work packages, notably those having activities related to technical implementation and management of field trials. This task was detailed in deliverable D2.4.

Work package 3

Activities related to work package WP3 started at the third month of the project life and lasted till almost the end of the project, considering finalising the maintenance activities. This work package has multiple objectives that were all around the delivery of a system agnostic ubiquitous participation platform that would consist of standard and reusable software components. This work package is led by PDMFC. These objectives are summarised as following:

- The development of a set of reusable API's serving as building blocks for creating mobile applications allowing citizens to actively and ubiquitously participate to policy making.
- Designing and implementing server-side architecture to support the client mobile applications and enabling policy makers to manage and monitor the policy making processes. This objective consists of creating generic components that support web services and manage all the database transactions while considering high levels of security and privacy and also to provide the necessary programming interfaces needed for the creation of a policy making backend application.
- To provide a reliable and scalable server architecture supporting large numbers of concurrent connections and requests from mobile clients.

To achieve these objectives, the work package consists of several tasks that are all mainly related to technical design and implementation work. The first task, namely T3.1, aimed at deciding upon and setting up the necessary tools used for the development. This consisted of having all the involved partners to download and install the required tools on their developments machines. Furthermore, this task took care of setting up a server-side development environment powered by an SVN repository and a continuous integration (CI) system. This was achieved by PDMFC as they were hosting the whole repository on their in-house servers for the whole lifespan of the UbiPOL project. All activities involved in T3.1 are documented in deliverable D3.1 which was delivered on the 4th month of the project.

Parallel to the previous task in this work package task T3.2 consisted of activities related to the specification of requirements for the UbiPOL components and APIs, the design of those components, their implementation, and testing. This task was done in a progressive and iterative manner as BRUNEL started by identifying the essential use cases of UbiPOL and plotted those in documented UML 2.0 use case diagrams. The documentation of the use cases was done via well-defined templates mainly explaining the involved stakeholders, triggering events, scenarios, and outcomes of each use case. The initial use case diagram was extended as new functionalities were added following the suggestions of partners during face-to-face meetings, calls, and email communication. The documentation of the subsequent use cases was then distributed among partners where each partner of the consortium was assigned use cases relevant to their domain of expertise within the project. This task also included the definition of the class diagrams of UbiPOL's components such as the domain model, PMWf engine, mining engine, security framework, and components for the client and backend applications.
As the class diagrams were developed, the previously identified use cases were then further detailed via proper UML 2.0 sequence diagrams depicting the interaction among components' objects of the UbiPOL platform. This permitted to identify the respective interfaces of each component, their functional boundaries, and interactions. The output of this task is the specification of the core functionalities and API's aimed by the UbiPOL platform as detailed in deliverable D3.3. This deliverable was delivered on month 9 of the project with all tasks completed. Task T3.2 paved the path for the implementation task (T3.3) of the core modules and API's of UbiPOL and delivered in the shape of Java class libraries (deliverable D3.4) on the 23rd month of the project.

As the components are being implemented, the source code is committed to the central SVN repository setup at the beginning of the project. As the source code is submitted, a continuous integration (CI) system (Jenkins) builds the code and integrates it with the other previously submitted source codes. This ensures the integrity of the solution at any time during the implementation phase; that is, at any given time the source code of UbiPOL platform is compilable and runnable. Despite the use of a CI system for integration, it is necessary to test the validity of components' functionalities when all integrated and running together. This integration activity was the main subject of task T3.4. As T3.4 ends, the first version of UbiPOL platform is ready to be delivered in deliverable D3.5.
Parallel to the tasks achieved in work packages WP4 and WP5, which are mainly about the implementation of the mobile and policy making backend applications according to the requirements of the field trials, feedback is collected regarding the UbiPOL version 1.0 class library and is progressively reflected to finally meet all the refined requirements of the filed trials. The revised version of UbiPOL version 1.0 leads to UbiPOL version 2.0 that is employed for the field trials and delivered publicly in deliverable D3.6 on month 28 of the project.

The final task of work package WP3 is T3.5 where all maintenance activities take place. These are mainly to resolve any observed bugs or to slightly adjust in the behaviour of some components in order to optimise the functionalities of the delivered software. The maintenance log of work package WP3 is detailed in deliverable D3.7 that is delivered close to the end of the project.

Work package 4
Activities related to Work package WP4 started at the 10th month of the project and spans till nearly the end of the project (including the maintenance task). This work package is led by BASAR and mainly aims at

implementing the generic UbiPOL services based on the class libraries delivered from work package WP3 and also to produce the mobile and backend applications that will be deployed during the field trials. This objective contains the effort of proving that the UbiPOL platform developed in WP3 is reusable via providing generic web services to consumers with different operating systems, policy domain independent, and can be used for evaluation via two field trials, in the UK and Turkey.

In order to accomplish the stated objectives, the work package consists of several tasks that are all mainly related to technical design and implementation work that is closely coordinating with activities from work package WP5. The first task in this work package, T4.1, consists of the design of the UbiPOL services and the applications for the field trials.
As for UbiPOL's services, five services were identified and designed according to the functionalities provided by the class libraries delivered from WP3. These services are:
-    Authorisation service: Controlling users' access to the UbiPOL system.
-    Retrieval service: This service is responsible of delivering the requested information and data related to policy or reported issues from the server side to the client and vice versa.
-    Notification service: To notify the client application (citizen mobile applications) about new notifications matching their preferences criteria or filters.
-    Knowledge sharing service: Allowing citizens to post reported issues and comment on existing issues.
-    Tracking service: Permitting citizens to track the status of a given policy issue if the policy issue allows so. The status of a policy issue contains information related to the number of tasks a policy making workflow has, the current active task(s), the number of participants to a given opinion task, statistics about responses and other types of information.
Rather than dividing the workload by assigning a given service to one or more partners, all technical partners have a specific contribution to every service, more or less. While IPASA defined the services' endpoint interfaces and data transfer objects (DTO), PDMFC designed and implemented the façade layer separating the web service layer from the internal components and BASAR implemented the web services. BRUNEL, in collaboration with IPASA, contributed by designing the tracking service DTOs along with the tracking service endpoint interface. Also BRUNEL collaborated with PDMFC in designing the set of services to be exposed to the backend application used by the policy makers. Two types of services were observed: services to be consumed by the backend application to manage processes, and services to be consumed by the PMWf editor.
As for the design of the field trial applications, BRUNEL and TURKSAT closely collaborated with the technical partners to communicate the necessary application requirements. IPASA on their side was responsible for the design of the mobile application while PDMFC and BASAR were responsible of the backend application and PMWf editor, respectively.
Each partner involved in T4.1 detailed their part in deliverable D4.1 that was delivered on time.

As the work progressed in T4.1, the technical partners proceeded with the implementation of the designed services and field trial applications as activities for task T4.2. Task T4.3 was about the integration of the work implemented in T4.2 and performing tests of the applications as well as the behaviour and performance of all components running on the UbiPOL server instance. The tests were divided into source code automated tests during implementation, application tests by engaging some selected trialists in trying the mobile application, and non-functional tests such as stress and performance testing.
The outcome of these tasks are a software class library containing the source code and binaries for the UbiPOL services, D4.2, whereas the source code and binaries of the UbiPOL field trial applications were part of deliverable D4.3.

The last task of this work package is T4.4 which mainly consists of activities related to the deployment and maintenance of the implemented applications for the field trials. PDMFC and BASAR are the main partners in charge of this task. The output of this task is a detailed description of activities in deliverable D4.4 that is due shortly before the end of the project.

Work package 5
The objective of work package WP5 is to evaluate the operational performance of the UbiPOL applications developed in WP4, which are based on the UbiPOL platform, in conjunction with four policy making processes. Besides the operational evaluation of the applications, activities related to WP5 aims also at evaluating the benefits gained from adopting UbiPOL such as citizen engagement, transparency, and efficiency in collecting data. The evaluation processes are done via field trials in the UK and Turkey.
This work package started from the third month of the project and is expected to complete by its end. TURKSAT are leading WP5.

The first task in WP5, T5.1, aimed at defining the requirements for the applications employed in the field trials. Activities related to this task had close collaboration with relevant work in work packages WP3 and WP4, notably during the specification of requirements expected from UbiPOL as a platform, as services, and as applications. TURKSAT and EASY were the main partners leading this task. The outcome of this task is the deliverable D5.1 where technical (e.g. hardware and software) and non-technical (e.g. number of trialists, training, trials' locations, policy making processes, evaluation methods) requirements are detailed. The deliverable was submitted on time at the end of the fifth month of the project.

Activities related task T5.2 were mainly based on specifying the concrete requirements described in deliverable D5.1 as a preparation for the field trials. This started by collaborating with the policy makers at the Brunel's sustainability team in Brunel University, Hillingdon Council, the Ankara development agency, and Istanbul Pendik Municipality.
As a result of coordinating with the policy makers, several policy making processes were identified for the field trials. These are: Strategic transportation planning and promotion schemes' development in Brunel, strategic and sustainable planning for services the Council provides to residents in collaboration with Hillingdon Council for the UK. In Turkey, several surveys were developed in order to observe the general public opinion regarding the local policies for building a library, a bazar place, and medical waste services.
The identified policy making processes were then translated into validated PMWf XML files to ensure compatibility with the developed PMWf.
The output of T5.2 is the deliverable D5.2 which details the activities pursued in this task along with the a detailed description about the field trials time line, exceptions and their corresponding handling strategies, and more details on the hardware and software used for the actual implementation of the field trials. D5.2 was delivered on time on the 26th month of the project.

In the next task, T5.3, BRUNEL and TURKSAT (in collaboration with BASAR) contacted potential trialists and provided them with the necessary mobile devices purchased by BASAR for the specific reason of UbiPOL field trials. All devices were set up with proper SIM cards, an introduction about the project was provided, consent forms were signed by the respective trialists, and those were then consulted periodically for any update or feedback on the field trials.

The main task of work package WP5 is T5.4 which is the implementation and running of the field trials in the UK and Turkey in order to achieve the objectives of this work package. BRUNEL and BASAR started, managed, and monitored the progress of the field trials in the UK and Turkey, respectively. During this task, respective partners ensured the smooth progress of the data collection, which was through log files recorded on the mobile devices, and provided the necessary technical support to trialists. Also, as updates for the mobile application were released, BRUNEL and TURKSAT ensured that those were installed and running on the trialists' devices. This task started at month 31 and ended at month 36 of the project. The main outcome of this project is the Activities involved in this task were described and detailed in deliverable D5.3 that is submitted in the 36th month of the project and the data collected in the shape of log files to be analysed through a dedicated application developed and run by BRUNEL.

The last task in WP5 is T5.5, which is mainly concerned about the analyses of the data collected during the field trials and used to evaluate UbiPOL. Prior to data analyses, this task defined the metrics used for the behavioural and technical evaluation of the project. Behavioural assessment is done according to the Elaboration Likelihood Model theory and investigates the perceived efficiency in collecting citizen opinion, perceived transparency on the process making process, and perceived improvement on citizen engagement and empowerment before and after the use of UbiPOL applications. Technical evaluation metrics such as throughput, response time, and other evaluations obtained from stress tests were defined and measured. Within this task, BRUNEL conducted the data analyses using a dedicated software application developed by BRUNEL to measure the behavioural metrics and PDMFC conducted the technical analyses of the UbiPOL system employed in the field trials. The major outcome of this task is deliverable D4.5 that is submitted by month 27 of the project.

Work package 6
Activities related to Work package WP6 started from the first month of the project and has lasted till the end of the project. This work package is led by SU and it mainly aims at disseminating the progress and results achieved by UbiPOL outside the consortium boundaries. This work package also aims at defining a proper exploitation plan of the output obtained from the UbiPOL project.

The first task in this work package, T6.1, includes activities related to the dissemination of UbiPOL output to the academic community. Given the composite nature of this task, it has been broken further down to sub-tasks. The

first sub-task, T6.1.1, cared of organising international conferences and workshop. BRUNEL presented the PMWf and initial results at two annually-organised international conferences EMCIS 2011 and EMCIS 2012. Furthermore, they organised a specific track during the EMCIS 2012 and it was attended by international audience.

Sub-task T6.1.2 aimed at presenting UbiPOL and any related work at international conferences and workshops. The academic partners, BRUNEL, CORV, and SU worked on several conference papers and presented those at different international conferences. 9 conference papers were accepted, presented, and published in the respective proceedings.

The last sub-task, T6.1.3, aimed at publishing work related to activities pertaining to UbiPOL in international scientific journals publishing in the field of eGovernment, policy making, opinion mining and other relevant topics. The target outcome of this sub-task was attained by having the consortium publishing 6 papers in peer-reviewed international journals.

Deliverable D6.1 presents the list of publications done during the life of UbiPOL, which represents part of the output of this task.

Task T6.2 is the second task in work package WP6 and has a main objective to present UbiPOL and to disseminate its public output to stakeholders. This was done according to a 3-step strategy. Firstly, academic partners used UbiPOL as a case study for innovative practice in policy making and eGovernment during lectures. Secondly, all partners in the consortium contacted some of their local authorities to demonstrate and explain the features promised by UbiPOL. For instance, BRUNEL gave few presentations about UbiPOL to the Brunel Strategic and Development Office as well as to several policy makers in the Hillingdon Council. PDMFC also advertised the innovative features of UbiPOL to local municipalities in Lisbon. The detailed list of activities relevant to this task is presented in deliverable D6.2 which is delivered at the end of the project.

The next task in this work package, T6.3, included activities related to disseminate and contribute to international standards. BRUNEL contributed to this task by making the PMWf XML model publicly available online via an XSD schema allowing users to validate their PMWf XML files generated by external tools (e.g. the PMWf Editor developed by BASAR) before feeding to the PMWf engine.

Task T6.4 addressed the development, publishing and administration of the UbiPOL website. Two versions of the website were created since the beginning of the project. BRUNEL was the main contributor in the creation and maintenance of the latest version of the website. The website is hosted on private data centres belonging to PDMFC.

Lastly, task T6.5 is about the exploitation plan where all partners investigated the possibilities of providing UbiPOL as an open-source artefact and favour the re-use of UbiPOL in standard as well as in other European Projects. UbiPOL partners also investigated into possibilities to maintain UbiPOL after the project completes and provide support to user groups. Furthermore, the industrial partners as well as end user partners considered several opportunities for exploiting UbiPOL in their service and product portfolio. The detailed description of the exploitation plan as by each partner is in deliverable D6.4, which forms the main output of this task.

Work package 7

The last work package in UbiPOL is work package WP7, which is led by SU. CORV closely collaborated with the work package leader to achieve its objectives. WP7 started at month 10 of the projects and completed shortly before the end of the project. This work package is concerned with providing novel design of privacy related technology of UbiPOL. More specifically, the objectives of this work package include:
-   Ensuring that the proposed opinion mining engine is developed based on the latest and leading-edge technology and adding new knowledge to the literature.
-   To ensure the development of new algorithm for opinion mining that will be extensively used by other tasks in work packages WP2, WP3 and WP5.
-   To have a systematic evaluation of the proposed opinion mining algorithm.

The first objective is completely addressed by the first task of this work package, T7.1. The involved partners conducted a rigorous review on the literature of opinion mining and identified the key techniques to be used for the conception and implementation of a suitable mining engine that would fit with the features of UbiPOL along with preserving the privacy of citizens. This task resulted with deliverable D7.1, which was delivered on the 12th month of the project.

Tasks T7.2 and T7.3 were run in parallel as they were tackling two features necessary in the context of UbiPOL. T7.2 had as an objective to investigate the design of a context-aware privacy-preserving policy retrieval

mechanism; whereas T7.3 focused on the definition of a privacy-preserving opinion mining engine based on ontologies.

For both tasks, SU and CORV developed a specification for ontologies used in the context of UbiPOL. This ontology forms a main component of the newly-developed ontology based opinion mining engine (OBOME). The new mining engine was then employed to determine the polarity of reported opinions on the various policy domain aspects. This is done in two steps. In the former step, the policy domain aspect has are identified (namely which policy category is represented by the concept). This identification is supported by the policy modelling ontology, which describe the most important policy – related classes and structure. Then the most informative documents from the corpus are extracted and asked the user to create a set of aspects and related keywords using these documents. In the latter step, we used the corpus specific ontology to model the domain and extracted aspect-polarity associations using grammatical dependencies between words. Details on how these tasks were accomplished are presented in deliverable D7.2 which was submitted on month 25 of the project.

In the last task of this work package, T7.4, SU implemented the opinion mining engine designed in the previous tasks of this work package. CORVE on their side created the required ontologies using the protégé software. This task also includes the testing phase that was done by applying the new opinion mining engine on different pre-defined datasets. The output of the task was presented in deliverable D7.3.

3. Project Results and Achievements

3.1. Ubiquitous Participation Platform for Policy Making

One of the most important achievements of the UbiPOL project was the realization of the "UbiPOL software" in the shape of a set of class libraries in binaries.

The UbiPOL software is composed of two main parts:

- The **UbiPOL class libraries**: a set of java libraries that implement the generic functionalities intended by any UbiPOL system. These class libraries also expose the UbiPOL APIs necessary for implementing relevant applications and to set up a complete UbiPOL system.
- The **UbiPOL installation tool**: UbiPOL consists of two main parts: the client side and the server side. Since the server side is composed of multiple components having at the heart a core component that is responsible of properly gluing these functionalities along with managing transactions with the data source; therefore, setting up the server software manually is not trivial task, hence, a specific command line tools and scripts were implemented to automate this task and test the validity of an installation.

In order to promote the UbiPOL class libraries as much as possible as a reference to a ubiquitous platform for policy making, the UbiPOL software components have been publicly distributed in open-source under the LGPL license since January 2013 and can be downloaded from Sourceforge.net at (http://sourceforge.net/p/ubipol/).

The UbiPOL platform provides a homogeneous set of libraries runnable over a diversity of operating systems, hardware devices (ranging from servers to cell phones) and types of network and therefore allows ubiquitous deployment in the Internet and in the wireless environment.

3.2. UbiPOL Approach for Functionalities Development and Deployment

UbiPOL is built of several independent and autonomous components interacting through well-defined interfaces. This ensures scalability of the platform as well as an easier way for extending standard functionalities based on the proposed APIs.

All the features addressed by UbiPOL were attributed to a given component that would in turn expose one or more sets of API accordingly. This strategy was employed for the front end system as well as on the server side. For instance, the policy map component running within the UbiPOL mobile application is an independent component that is easily integratable in other applications. Similarly, functionalities related to policy making processes were encapsulated within the PMWf engine component and issues relative to mining were addressed by the opinion mining engine. However, all requirements and functionalities which are specifically representing core features of a ubiquitous policy making platform were implemented in a domain model component.

UbiPOL's different components were interacting to achieve the expected outcomes through a specific components call the "façade component". The importance of this component is twofold: it implements the façade pattern by encapsulating the whole UbiPOL system with its internal components and exposing it through an extensive set of UbiPOL APIs; it also acts as the gluing part orchestrating the calls to different components and managing transactions with the data source. Therefore, the facades component forms the unique entry point to a set and deployed UbiPOL system.

3.3. Implementation of Generic Services

On the server side, a deployed instance of UbiPOL is intended to be accessible through web services. UbiPOL's functionalities are exposed through web service endpoints which manage clients' requests and responses. According to this design, two types of services were defined:

- Services to be consumed by the policy making backend application. These were implemented as RESTful web services.
- Services to be called by the mobile frontend applications. These were implemented as SOAP web services for the field trials' applications.

In both types of services, the calling party has to authenticate against the UbiPOL security framework before accessing any exposed web service. When a calling party is successfully authenticated, the web service layer forwards the requests to the facades component where they are processed by the UbiPOL system.

3.4. Field Trial Applications and Demonstrations

In order to test the new features promised by UbiPOL, two applications, an Android mobile application and a web-based policy making backend application, were implemented to employ during the field trials. The

applications were developed using the UbiPOL class libraries and considered locale flexibility given that the field trials were running to collect data from two sites: the UK and Turkey.

Besides the usefulness of the applications developed for the field trials in collecting data, they validate the usability of UbiPOL components and APIs in developing customised applications. This forms an important milestone and proof of achievement for the project.

Another benefit of the UbiPOL applications is that they allowed members of the consortium to demonstrate the concept of UbiPOL and disseminate the idea of ubiquitous policy making by engaging citizens in the decision making process.

3.5. Technical and Behavioural Evaluation of Field Trials

In the context of UbiPOL, the field trials had a twofold aim: firstly they contributed in ensuring the technical validity of the software components developed, and most importantly, to assess the impact of the new features on the behaviour of citizens towards policy making activities and how policy makers' practices are also affected.

During the field trials, citizens' behaviour was examined in four separate experimentations in order to observe how context-related information affects their habits into participating to public policy issues. These experiments tested the effect of location matching, preference matching, social proof, and authority markers as the main variables of the ELM theory, which is used to explain and assess the behavioural impact of UbiPOL on citizens' habits. This assessment is quite novel as ELM theory was never used before in the assessment of e-government applications.

The consortium also addressed the evaluation of policy makers towards UbiPOL's concept and the backend application developed for the field trials; notably, in the sense of modelling policy making as a workflow model consisting of admin and opinion tasks.

Finally, UbiPOL went through rigorous technical testing to ensure the performance and throughput of the developed components and applications.

3.6. Dissemination and Exploitation Plans

An important result of the UbiPOL project is the conference and scientific journal papers that were published in light of UbiPOL as an innovative way for policy making. The scientific output of UbiPOL counts in 6 journal papers and 9 conferences besides the workshops and conference tracks dedicated to the project.

UbiPOL is also subject for multiple exploitation plans where partners intend to make it available as a free open-source artefact and to further use it in the development of future commercial and governmental products.

4. Deliverables and References

4.1. Project Deliverables

Del. no.	Deliverable name	WP	Owner	Nature	Diss. level	Planned month	Delivery month
D1.1	Selection of tools	WP1	BRUNEL	R	RE	1	2
D1.2	Inter-working with other projects	WP1	BRUNEL	R	RE	2	3
D1.3	Project summary	WP1	BRUNEL	R	PU	39	40
D1.4	Management Report	WP1	BRUNEL	R	RE	39	40
D1.5	Activity Report	WP1	BRUNEL	R	RE	39	40
D1.6	Ethical issues Report	WP1	BRUNEL	R	RE	39	40
D2.1	Theoretical foundation of PMWF	WP2	CORV	R	PU	3	4
D2.2	Policy makers feedback on PMWF	WP2	CORV	R	CO	5	6
D2.3	Policy making workflow model specification	WP2	BRUNEL	R	RE	8	9
D2.4	PMWF maintenance logs	WP2	CORV	R	RE	32	33
D3.1	UbiPOL development environment	WP3	BASAR	R	PU	4	5
D3.2	D32 specification of the scalable UbiPOL server architecture	WP3	PDMFC	R	CO	5	6
D3.3	Specification of the UbiPOL API+Profile	WP3	IPASA	R	RE	9	10
D3.4	UbiPOL Class Library	WP3	SU	P	PU	23	24
D3.5	UbiPOL version 1.0	WP3	PDMFC	P	PU	18	19
D3.6	UbiPOL Version 2.0	WP3	BRUNEL	P	PU	28	30
D3.7	UbiPOL platform maintenance history	WP3	SU	R	CO	37	39
D4.1	UbiPOL service design	WP4	IPASA	R	CO	15	15
D4.2	UbiPOL service library	WP4	BASAR	R	PU	23	25
D4.3	UbiPOL application implementations	WP4	BASAR	D	PU	30	30
D4.4	UbiPOL application version 2	WP4	BASAR	R	CO	38	40
D5.1	Requirements for field trials	WP5	BMBC-	R	RE	5	5

				EASY				
D5.2	Specifications of field trials	WP5	BMBC-EASY	R	RE	26	26
D5.3	Field trials	WP5	BMBC-EASY	O	RE	36	38
D5.4	Evaluation of UbiPOL	WP5	BRUNEL	R	RE	37	39
D6.1	Publications of academic articles	WP6	SU	O	PU	39	40
D6.2	Presentations to policy makers	WP6	PDMFC	O	PU	39	40
D6.3	Uploading results to UbiPOL web sites	WP6	BRUNEL	O	PU	39	40
D6.4	Exploitation plan	WP6	FOKUS	R	RE	39	40
D7.1	Literature review on opinion mining and security	WP7	SU	R	PU	12	12
D7.2	UbiPOL ontology description	WP7	SU	R	PU	25	25
D7.3	Algorithms and evaluation report	WP7	SU	R	PU	38	39

4.2. Overview of Main Deliverables

Deliverable: D1.1

Title: Selection of tools

Short Description:

To ensure easy co-operation between teams, Task 1.1 of UbiPOL defines the logistics of the project by choosing specification methods, software management and development tools, and communication facilities, so as to ease the development of UbiPOL, the communication and co-ordination of the different teams in Europe, and ease the integration of the work.

This document, Deliverable D11, is the output of this task. It produces the inventory of existing tools and proposes choices for the project. In the first phase, families of tools have been identified for the different tasks of the project. This led to compare the tools available on the market for each of these families, according to requirements in terms of quality, coherence and budget. Finally, the specific tools have been selected to be used for the development of the project.

The following table lists the selected tools for each family and gives their usage (either Required or Suggested).

Tool Family	Selected Tools	Usage
Requirements analysis and traceability	- DOORS	Suggested
Analyses and Design	- StarUML	Required
Source code versioning and bug tracking	- SVN - TRAC	Required Required
Development IDE	- Eclipse	Suggested
Developer support	- CodeWizard Java	Suggested
Java software development kits	- Sun JDK for server - Java ME SDK 3.0 for client	Required Required
DBMS	- MySQL	Required
Map service	- Google Maps	Required
Application server	- Glassfish	Required
Ontological engineering tools	- Protégé	Required
Testing tools	- JMeter	Suggested
User interface design	- Fireworks CS4	Suggested

Partner Responsible: BRUNEL

Deliverable: D1.2

Title: Inter-working with other projects

Short Description:

Project UbiPOL is addressing the need for the development of a new governance model in which citizens can participate in policy making processes (PMPs) in the middle of their everyday life overcoming spatial and time barriers. The core of the governance model is a ubiquitous participation platform that motivates its users to be involved in PMPs.

This deliverable summarizes the collaboration opportunities with other projects that will be explored and accomplished by the members of the UbiPOL project. The inter-working strategies are developed in three areas: project implementation, standardisation, and dissemination. Ten relevant projects for inter-working are identified and inter-working plans with the projects are detailed.

Partner Responsible: BRUNEL

Deliverable: D1.3 (this)

Title: Project Summary

Short Description:

This deliverable stands for the final report for project UbiPOL. It provides an update of the project objectives, methodologies and management aspects. The project main results in terms of theoretical and technical achievements as well as dissemination, collaboration with other projects and impacts on standards are also evaluated to the initial objectives.

Partner Responsible: BRUNEL

Deliverable: D1.4

Title: Management report

Short Description:

D1.4 is the deliverable containing the annual reports that summarised the financial activities of the consortium. It comprises the financial budgets for each project year of each partner and resource allocations. Summarising, 30% of total PMs and 29% of total direct costs have been claimed during year 1. WP2 has claimed about 82% as its most of the tasks have been completed in year 1 while WP4 and WP5 have claimed about 16% and 11% respectively as the tasks of the work packages are biased toward the end of the project. In year 2, the consortium expected to spend about 282.5 PMs by the end of year 2 and the actual spending figure is 280.23 with less than 1% deviation. In terms of finance figures, the consortium spent about 66% of total budget by the end of the second project year. This is in line with the original plan in DoW document. In year 3, all partners spent most of their allocated resources and budget as planned and no significant issue was identified.

Partner Responsible: BRUNEL

Deliverable: D1.5

Title: Activity report

Short Description:

D1.5 describes the work activities achieved annually by each partner. In the first project year, all planned deliverables and tasks were delivered in time and approved by the commission. A good progress was made in the year. The second project year saw a delay in delivering D3.6 UbiPOL version 2.0 and therefore some delay in WP4 UbiPOL services and application. The delay affected the progress of project year 3 and three months of extension of the project term was given to the consortium. All deliverables planned in year 3 were delivered and the field trials were successfully completed to verify the UbiPOL concept.

Partner Responsible: BRUNEL

Deliverable: D2.1

Title: Theoretical foundation of PMWf

Short Description:

Project UbiPOL is addressing the need for the development of a new governance model in which citizens can participate in policy making processes (PMPs) in the middle of their everyday life overcoming spatial and time barriers. The core of the governance model is a ubiquitous participation platform that motivates its users to be involved in PMPs.

D21 aims to review existing studies on policy making processes, workflow modelling, and policy domains addressed in existing eParticipation research projects. The review shows that Macintosh policy cycle is most widely cited in the studies and adopted in UbiPOL. There are many workflow modelling formalisms available in the workflow literature to represent the policy modelling processes and one of the formalisms will be selected after the completion of ―Task 2.2 policy makers survey‖ which will produce sample policy making processes in four countries. The policy domains are classified into 14 different categories by EUROPA and this report reviews each category and reviews example research projects that apply eParticipation technology to few of the policy domains.

Partner Responsible: BRUNEL

Deliverable: D2.2

Title: Policy makers' feedback on PMWf

Short Description:

Project UbiPOL is addressing the need for the development of a new governance model in which citizens can participate in policy making processes (PMPs) in the middle of their everyday life overcoming spatial and time barriers. The core of the governance model is a ubiquitous participation platform that motivates its users to be involved in PMPs.

D22 aims to collect sample policy making processes via interviews with policy makers in four countries: UK, Portugal, Hungary, and Turkey. The collection of policy making processes in four countries reveal similarity in policy making processes therefore strong support for developing a policy making workflow model which will be delivered in month 8. The details of the generic policy making process model adopted in the survey, the survey methodology, and the collected sample processes are detailed in this document.

Partner Responsible: BRUNEL

Deliverable: D2.3

Title: Specification of PMWf model

Short Description:

This document proposes a new type of workflow modelling framework to be used for eParticipation of citizens in policy making processes. The PMWF modelling framework is designed to link policy making processes with citizens' every-day life context and POIs so that citizens could be involved in the policy making processes in the middle of every-day life. The PMWF framework consists of two sub models: policy making process model (PMPM) and POI model (POIM). PMPM is used to define policy making processes, and POIM to define hierarchies of POIs on a geographical map. The two sub models are inter-linked each other to allow citizens can identify any policy issues and processes based on their current context (location and other contexts). The PMWF framework is applied to exemplary PMPs in the UK and Turkey to show its feasibility and validity. The PMWF framework proposed in this document is a very initial draft in the early stage of the UbiPOL project and will be improved in the later stage of the project. In particular, the framework will be the basis for the implementation of UbiPOL platform and services in WP3 and WP4. The feedback from the other work packages will be used to enhance the framework and the improvement history will be the major contents of next deliverable in WP2, The maintenance log of PMWF model.

Partner Responsible: BRUNEL

Deliverable: D2.4

Title: PMWf maintenance logs

Short Description:

This deliverable aims at presenting the maintenance logs of the PMWf model initially proposed in deliverable D2.3. Based on the feedback gradually obtained from the consortium policy makers and system developers, the initial specifications of the PMWf model encountered several changes to reach its final state. These changes are detailed in this deliverable. Firstly, the initial PMWf model is revisited along with its advantages and inconveniences as observed by policy makers and developers. Afterwards, the list of changes addressing policy makers and developers feedback is described along with the corresponding changes in the XML notations. The XSD schema governing the structure of PMWf XML instances is then presented. Finally, the policy making processes employed by the field trials are presented and detailed with their XML representations to demonstrate the suitability of the latest PMWf XML notation to model real-world policy making processes and run them in a rule-based workflow engine.

Partner Responsible: BRUNEL

Deliverable: D3.1

Title: UbiPOL development environment

Short Description:

This document describes the UbiPOL development environment in terms of the tools to be used for development and the services provided to support work on the project. In the initial sections the tools used for the development phase of the project are described. These are the tools that had been deemed as required in the D1.1 deliverable. For each tool a description is presented on how to obtain, install and setup the tool for use. In the last section the services made available to support work on the project are introduced. These services comprise mailing lists for communication among project participants; project public site; Subversion repository for source version control; issue tracking for task management and bug reporting; wiki for collaboration and maintaining internal project documentation.

Partner Responsible: PDMFC

Deliverable: D3.2

Title: Scalable UbiPOL server architecture

Short Description:
This document describes the architecture of the UbiPOL server. The scalability of the server is one of the concerns made explicit. The three-tiered architecture of the UbiPOL system is introduced and described in the initial sections. The use of SOAP web services with J2ME client applications is also addressed in detail. The final sections present several scenarios for horizontal scaling of the system through load-balancing among multiple computing nodes.

Partner Responsible: PDMFC

Deliverable: D3.3

Title: Specification of the UbiPOL API + profile

Short Description:
This document contains the analysis and design of the UbiPOL system required to begin the implementation phase by the development team. Two parts of the UbiPOL system are visible to end users: the mobile frontend application and the policy maker backend application. Both this applications are described, including domain model, detailed use cases and the design of the graphical user interface. Two components of the backend application are given dedicated chapters, given its scope and importance: the policy workflow component and the opinion mining component. Security and identity management are very important to the UbiPOL system and are detailed. The system deployment architecture is also addressed, with emphasis placed on the system distributed nature and on its scalability. Finally, performance testing is also addressed. Performance testing is to be used as tool during development to ensure the system meets the required performance goals. This document is not the final step on the analysis and design of the UbiPOL system. It is to be taken as an initial stepping stone and it will evolve into new versions during the development phase. The new versions will include enhanced detail, clarifications and even changes that may be found needed as work progresses. The successive versions will start as being blueprints for the implementation to be performed and will morph into the master technical reference documentation of the UbiPOL system.

Partner Responsible: PDMFC

Deliverable: D3.4

Title: UbiPOL class library

Short Description:
This document is part of the D3.4 deliverable. Its purpose is to provide a high level description of the internal architecture of the software that comprises the UbiPOL system.

Partner Responsible: PDMFC

Deliverable: D3.5

Title: UbiPOL version 1.0

Short Description:
This document is part of the D3.5 deliverable. It provides a high level description of the architecture of the UbiPOL system software.

Partner Responsible: PDMFC

Deliverable: D3.6

Title: UbiPOL version 2.0

Short Description:
This document is part of the D3.6 deliverable. It provides a high level description of the internal architecture and organization of the software components that are part of the UbiPOL system. The information contained here is mainly targeted at developers.

Partner Responsible: PDMFC

Deliverable: D4.1

Title: UbiPOL service design

Short Description:
This deliverable details the design of UbiPOL services and field trial applications. The concept of UbiPOL service in relation with Web service is defined and five identified services are designed. For each service, a short description, relevant use cases, class and sequence diagrams are provided. The latter part of the deliverable provides requirement analysis of the field trial application as an impact analysis. The impact analysis provides the details of the target policy making processes for the trials and how UbiPOL technology make impacts to the real world policy making processes. Also the detailed design of the field trial application is provided via use cases, class model, sequence diagram, and GUI screens. Finally, the questions to be used in the opinion tags for the field trials in the UK and Turkey are provided as Appendix.

Partner Responsible: BASAR

Deliverable: D4.2

Title: UbiPOL service library

Short Description:
This deliverable is a software class library containing all the source code and binaries for the UbiPOL services. The binaries are to be run on a compatible applications server and are ready for deployment and use with the applications developed fir the field trials.

Partner Responsible: BASAR

Deliverable: D4.3

Title: UbiPOL application implementations

Short Description:
This deliverable is a document that intends to address applications used during the field trials, overview of use cases of those trials and the UbiPOL system configuration for future developers.

Partner Responsible: BASAR

Deliverable: D4.4

Title: UbiPOL application version 2.0

Short Description:

The maintenance activities carried out in task 4.4 went on in parallel with the implementation phase of applications in WP4. During task 4.4, the technical partners working on the development of applications maintained close contact with field trial partners in WP5. This was in order to ensure that feedback and recommendations from field trial end-users is reflected on the implementation and integration process of applications in WP4. As a result, a final and revised version of field trial applications (version 2) was delivered in WP4. The D4.4 deliverable report provides detailed documentation on all the new use-cases defined and implemented based on the feedback from field trial end-users (both citizens and policy makers). Each new major requirement implemented for the front-end application (the Android application used by citizens) is described and documented in the report on section 2 (subsections 2.1 up to 2.12). As per each new major requirement, the use-case is defined. Then, the software implementation of the use-case is documented through class and sequence diagrams as well as screen shots. This covers the 3 layers on the front-end: communication, data and presentation. A similar approach is used in section 3 for the PMBE and Workflow Editor applications (the back-end applications used by policy makers). Section 4 describes software and hardware requirements, the build and the deployment procedure of UbiPOL applications (both front-end and back-end). And finally, the last section was allocated for conclusions.

Partner Responsible: IPASA

Deliverable: D5.1

Title: Requirements for field trials

Short Description:
Project UbiPOL is addressing the need for the development of a new governance model in which citizens can participate in policy making processes (PMPs) in the middle of their everyday life overcoming spatial and time barriers. The core of the governance model is a ubiquitous participation platform that *motivates* its users to be involved in PMPs. This deliverable sets out the necessary requirements for testing this in the field.
This document serves to outline the purpose and scope of EASYC's and Turksat"s Field Trials. It shows the common core of the applications and the adaptations to specific tasks. In sections 2 and 3 short description of the Field Trials will be given and possible applications of UbiPOL services are introduced for the field trials in the two countries. Sections 4, 5 and 6 identify requirement categories for the system to use during Field Trials as well as to plan and execute a successful Field Trial of the UbiPOL project. These requirement categories are used for both Field Trials. The real requirements will be set up based on this categories and criteria. Annex I, II and III give some examples of requirements.
Section 7 collects all actions as well as documents to be produced in preparation as well as during the Field Trial in a so called "implementation plan". This implementation plan will be used as a guideline for the work of WP5 and finally for the preparation and execution of the Field Trials.

Partner Responsible: EASY

Deliverable: D5.2

Title: Specification of field trials

Short Description:
This document is an extension of D5.2 with including the specifications for the UBIPOL Field Trials for UK and Turkey from institutions and participants sides. Detailed, concrete information about dates, locations, target groups and their UBIPOL service usage and the citizen participants; the hardware and software tools; and the organization of the field trials are provided in the content.

Partner Responsible: TURKSAT

Deliverable: D5.3

Title: Field trials

Short Description:
UbiPOL project is addressing the need for the development of a new governance model in which the citizens can participate in policy making process in the middle of everyday life. This document serves to outline the execution of the field trials in detail by the different UbiPOL partners. In chapter 2, the field trials are detailed

and the following questions are addressed:
- Where did the field trials take place?
- Who executed and administered the field trials?
- To whom were the field trials applied?
- When did the field trials take place?

Partner Responsible: TURKSAT

Deliverable: D5.4

Title: Evaluation of UbiPOL

Short Description:
This report aims at providing the framework that is used to evaluate the platform and services of UbiPOL, as well as, at presenting the findings of the evaluation. The evaluation framework comprises a technical and a non-technical perspective that is applied using the empirical data from the field trials in the UK and Turkey. Following the first perspective, a set of technical factors are measured regarding the platform's functionality, reliability and usability. The technical evaluation findings are further supplemented by the assessment of the software components in other deliverables; i.e. D3.7 for the scalability testing and D7.3 for the opinion mining engine evaluation report. Following the second perspective, behavioural factors are evaluated regarding the platform's and provided services' ability to motivate citizens to participate to the policy-making processes when they receive a request to do so. The findings of the evaluation confirm that UbiPOL is successful in attracting more the citizens' attention to policy issues and achieving high participation to policy making processes.

Partner Responsible: BRUNEL

Deliverable: D6.1

Title: Publications of academic articles

Short Description:

As part of the dissemination activities UBIPOL consortium published their academic results in major conferences and Journals. This deliverable provides abstracts of all published articles during the project duration. During the course of the project, the consortium published 6 journal paper, 10 conference papers, 5 book chapter inclusions. In this deliverable we provide a summary of the UbiPOL publications.

Partner Responsible: SU

Deliverable: D6.2

Title: Presentations to policy makers

Short Description:
This deliverable summarises all the dissemination activities against policy makers by consortium partners. It provides a detailed list of such activities including the target policy makers, events, the contents of the dissemination activities including date, venue, type of activities such as presentation, informal talk, formal meeting.

Partner Responsible: PDMFC

Deliverable: D6.3

Title: Uploading results to UbiPOL websites

Short Description:
The type of the deliverable is "other" and uploading the public deliverables from the project on the project web site (http://www.ubipol.eu) is the major outcome. The consortium continuously uploaded all public deliverables since the start of the project and they can be downloadable from the project web site.

Partner Responsible: BRUNEL

Deliverable: D6.4

Title: Exploitation plan

Short Description:
This deliverable defines UbiPOL as a future product in a market and described how UbiPOL can be deployed in different organizations. The deliverable identifies stakeholders in the future markets and shows how each UbiPOL component can position itself as a competitive product. Ubipol partners also focus on their exploitation plans in which they have described how the Ubipol results would be used to improve their business and competitiveness. Also, a methodology which specifies how UbiPOL can be adopted or developed further in different organizational contexts. The exploitation activities are addressed in details taking into account different dimensions: market analysis, interested communities, competitors, and individual exploitation roadmaps. In addition to that, a short discussion of the open source strategy adopted by the consortium is discussed.

Partner Responsible: FOKUS

Deliverable: D7.1

Title: State of the art on opinion mining

Short Description:
This document presents the state of the art on opinion mining which will be the basis of our research for the UbiPOL opinion mining engine. Opinion mining is the process of automatically extracting what the writer thinks about a specific topic. In the context of UbiPOL, we are going to target the comments entered by the citizens about policy issues and try to extract the opinion of citizens about these policy issues as a feedback mechanism for the policy making process. We plan to exploit domain ontologies to incorporate semantics into the opinion mining process. In this report, we provide a survey of existing approaches for opinion mining including polarity analysis together with evaluation metrics. We also surveyed the state of the art natural language processing tools that can be used for opinion mining.

Partner Responsible: SU

Deliverable: D7.2

Title: UbiPOL ontology description

Short Description:
Ontology has a special role in the UbiPOL system, they help structure the policy related context, provide conceptualization for policy domain and use in the opinion mining process. This deliverable details ontology specifications in UbiPOL, mainly from opinion mining aspects. Role of ontology items in UbiPOL system are diverse. The most important application is the opinion mining related one, where we applied them for providing policy categorization and tags for the opinions. We utilized them in policy modelling for structuring places used in POIs (POI ontology) and for policy issue conceptualization (policy modelling ontology). In this deliverable we presented a system called Ontology Based Opinion Mining Engine (OBOME) for analyzing a domain-specific opinion corpus by first assisting the user with the creation of domain ontology from the corpus. Then we determine the polarity of opinion on the various domain aspects. In the former step, the policy domain aspect has are identified (namely which policy category is represented by the concept). This identification is supported by the policy modelling ontology, which describe the most important policy – related classes and structure.Then the most informative documents from the corpus are extracted and asked the user to create a set of aspects and related keywords using these documents. In the latter step, we used the corpus specific ontology to model the domain and extracted aspect-polarity associations using grammatical dependencies between words. Later, summarized results are shown to the user to analyze and store. Finally, in an offline process policy modeling ontology is updated.

Partner Responsible: SU

Deliverable: D7.3

Title: Algorithms and evaluation report

Short Description: This report has three parts: First, we identify the privacy problem regarding public opinions and propose a new probabilistic privacy model MSA-diversity, specifically defined on datasets with multiple sensitive attributes. Then, we introduced formal definitions for the security and privacy requirements of keyword search on encrypted cloud data including hiding the search pattern. Also we proposed a scheme that uses cryptographic techniques as well as query and response randomization. Also we extent our opinion mining engine. We evaluated new features to be used in a word polarity based approach to sentiment classification and we considered different aspects of sentences, such as length, purity, irrealis content, subjectivity, and position within the opinionated text. This analysis is then used to find sentences that may convey better information about the overall review polarity (Gezici et al., 2012). Later, we worked the effect of subjectivity-based features on sentiment classification on two lexicons and proposed new subjectivity-based features for sentiment classification (Dehkharghani et al., 2012) Finally, we addressed the problem of adapting a general purpose polarity lexicon to a specific domain and propose a simple yet effective adaptation algorithm (Demiroz et al., 2012).

Partner Responsible: SU

4.3. Main publications

Publications on journals

Date	Title	Publication
2013	Privacy Preserving Publishing of Opinion Polls	Computers and Security
2013	An Effcient Privacy-Preserving Multi-Keyword Search over Encrypted Cloud Data with Ranking	Distributed and Parallel Databases
2012	Supporting Public Policy Making Processes with Workflow Technology: Lessons Learned From Cases in Four European Countries	International Journal of Electronic Government Research (IJEGR), Volume 8, Issue 3
2011	Workflow technology as an e-participation tool to support policy-making processes	Journal of Enterprise Information Management, Vol. 24 Iss: 2, pp. 197 – 212
2011	Ubiquitous Participation Platform for POLicy Makings (UbiPOL): A Research Note	International Journal of Electronic Government Research (IJEGR), Volume 6, Issue 1
2011	Proposing a Knowledge Amphora Model for Transition towards Mobile Government	International Journal of E-Services and Mobile Applications (IJESMA), Volume 3, Issue 1

Publications on conferences/workshops

Date	Title	Publication target
2012	An aspect-lexicon creation and evaluation tool for sentiment analysis	ECML PKDD'12 Proceedings of the 2012 European conference on Machine Learning and Knowledge Discovery in Databases
2012	Subjectivity-Based Features for Sentiment Classification: A Study on Two Lexicons	IEEE 12th International Conference on Data Mining Workshops, ICDM Workshops
2012	Efficient and secure ranked multi-keyword search on encrypted cloud data	EDBT/ICDT Workshops
2012	Evaluating M-Government Applications: An Elaboration Likelihood Model Framework	European, Mediterranean & Middle Eastern Conference on Information Systems (EMCIS 2012)
2012	OBOME - Ontology Based Opinion Mining in UBIPOL	European, Mediterranean & Middle Eastern Conference on Information Systems (EMCIS 2012)
2012	A location based policy making workflow engine.	European Middle East and Mediterranean Conference on Information Systems, Munich Germany, 7 – 8 June 2012.
2012	Persuasive Computing for mParticipation – ICT application to eGovernance	tGov: Transformational Government 2012, London, 8 -9 May 2012.
2011	UbiPOL: A Platform for Context-aware Mobile Device Applications in Policy Making	UBICOMM 2011, The Fifth International Conference on Mobile Ubiquitous Computing, Systems, Services and Technologies
2011	Policy Modeling in Risk-driven Environment	5th International Conference on Theory and Practice of Electronic Governance
2011	How the Ubipol security solution is built and how the eID solution could be used	ePass and eID cards conference in Istanbul, Turkey , 24-25 October 2011

Publications on book chapters

Date	Title	Publication target
2012	Ubiquitous Participation Platform for POLicy Making (UbiPOL): Security and Identity Management Considerations	Trust, Privacy and Security in Digital Business (TrustBus 2012)
2012	Improving Take-Up of e-Government Services in Turkey (and EU): Suggestions from Practice In Turkey	Transformational Government Through EGov Practice: Socioeconomic, Cultural and Technological Issues
2011	E-Government Developments in Turkey for Supporting Public Sector Transformation	Public Sector Reform Using Information Technologies: Transforming Policy into Practice
2011	The Demand Side for Development of E-Government Services and Gateway in Turkey: Taking Citizen Perceptions and Suggestions into Account	Stakeholder Adoption of E-Government Services: Driving and Resisting Factors
2011	eParticipation and Policy-making Support in Ubipol Approach	Communication with the Public from the Local Government Perspective

5. Conclusions

UbiPOL allows policy makers provide citizens with an innovative service for participation to policy making processes. Location-based participation is a new concept that allows policy makers penetrate into citizen's every-day life to collect relevant and fresh opinion. The impacts of UbiPOL were proved through experiments conducted in the UK and Turkey and can be summarised as follows.

Firstly, UbiPOL improved empowerment and engagement of individuals, groups and communities in policy making processes. UbiPOL allowed policy makers penetrate into citizens' everyday life to make them involved in PMPs through location based notification of relevant policy issues. In particular, handheld devices are some of the most frequently and widely used devices in daily life, and the availability of such eParticipation tools on handheld devices increased participation in PMPs significantly which was proved through the experiments conducted in the last project year. As a result, citizens became more aware of political issues and processes surrounding their everyday life with less effort. According to the focused group interview with the trialists (D5.4), the increased awareness of the political issues in relation to their everyday life turned out to empower citizens by their involvement in PMPs with more opportunity to make their voice heard on the processes. Also, this empowerment increased their engagement in PMPs as citizens were able to realise how the political issues affected their everyday life. This was be a significant motivation for citizens to participate into PMPs.

Secondly, UbiPOL increased trust of citizens through transparency and feedback of their contributions. The transparency of policy making processes was enhanced through the PMWf engine which automated the policy making processes and provided citizens with the process information so that they could track down the final results of their participation. In particular, as defined in D2.3, a citizen opinion is stored as an opinion tag and related to relevant policy making process. A workflow functionality of UbiPOL ensured the seamless tracking of each citizen opinion from the beginning to the end of the relevant policy making process. Also, the notification service of UbiPOL played a crucial role in providing citizens with feedback as a result of adding their opinions on PMPs. While, citizens in many cases tend to forget about their participation to a PMP, the notification service of UbiPOL notified the progress of the relevant PMPs when important events were created in the middle of the PMP execution to keep citizens up-to-date with the whole PMP progress.

Thirdly, UbiPOL allowed policy makers have more efficient collection of feedback to continuously improve governance. Citizen opinion is usually created in the middle of their everyday life. As a result, the collection of 'fresh' opinion is imperative in the policy making process. While most of the eParticipation tools take a passive approach to collecting citizens opinion by assuming that citizens would voluntarily visit their web sites, UbiPOL allows policy makers take more proactive approach in which they can control the time and location of collecting citizen opinion. Also, the close link between citizen opinion and site objects, e.g. train stations, road work sites, commercial malls and home, allowed policy makers to track how citizens feel and think about the policies in the middle of their everyday life through the support of UbiPOL backend application delivered in WP4 of the project and verified through the focused group interview with policy makers.