



CUTLER

CUTLER - Coastal Urban development through the Lenses of Resiliency

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Engagement strategies - plan and material

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Abstract	This deliverable provides a plan for carrying out the ecosystem building activities, including promotional and communication material, awareness campaign, creation of educational material, webinars, themed events, and a hackathon.
Keywords	Ecosystem building, promotional material, awareness campaign, engagement strategies, educational material, webinars, hackathon, themed events.

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List of abbreviations and acronyms

Abbreviation	Meaning
AI	Artificial Intelligence
BI	Business Intelligence
BPM	Business Process Model
BPMN	Business Process Modelling and Notation
EC	European Commission
EU	European Union
IAMER	Inform-Advise-Monitor-Evaluate-Revise
IP	Internet Protocol
IT	Information Technology
KPI	Key Performance Indicator
OGC	Open Geospatial Consortium
SVR	Support Vector Regression
WML	Web Map Layers

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1. Executive summary

D10.4 presents the strategy and material developed by CUTLER partners towards the establishment of an ecosystem around the project, which will attract and involve third-party contributors, aiming to accelerate the adoption and broaden the scope of high quality services in the CUTLER platform.

The report details the ecosystem development strategy, offers an overview of the communication material to be employed, and describes the activities that will be taken towards building the ecosystem. These activities include: a) online engaging, educational activities such as freely available online material and thematic webinars elaborating on the scientific background or the CUTLER modules, and b) physical events, such as networking events, themed events at pilot sites and a hackathon.

The target audiences of these activities include policy makers, local stakeholders and politicians, scientists, general public but also student groups and networks, freelancers, hacking communities and more.

Work during the second period of the project will focus on the implementation of the ecosystem-building strategy described in this deliverable.

2. Introduction

CUTLER's main objective is to shift the existing paradigm of policy making, which is largely based on intuition, towards an evidence-driven approach enabled by big data. Focusing on cities with waterfront areas, our aim is to exploit the wealth of data generated by and in the cities on a daily basis (by the public administration, public or private organizations, and citizens) in order to develop an innovative platform that will help policy makers to easily design, implement, and monitor urban development policies in these cities.

In the direction of ensuring that the technologies developed in the context of CUTLER will be successfully adopted by public administrations in Europe and beyond, Task 10.3 "*Ecosystem building and engagement strategies*" hosts a set of ecosystem building activities, attracting and involving third-party contributors, aiming to accelerate the adoption and broaden the scope of high quality services in the CUTLER platform.

Deliverable D10.4 presents the ecosystem development strategy, offers an overview of the communication material to be employed, and describes the activities that will be taken towards building the ecosystem. These activities include: a) online engaging, educational activities such as freely available online material, thematic webinars elaborating on the scientific background or the CUTLER modules, and b) physical events, such as networking events, themed events at pilot sites and a hackathon.

The target audiences of these activities include policy makers, local stakeholders and politicians, scientists, general public but also student groups and networks, freelancers, hacking communities and more. The Consortium members will act as educators, initiators or mentors, assisting the interested parties in exploring the challenges and opportunities of big data analysis for effective decision making in public administration, and encouraging them to implement their own ideas on how to facilitate policy development in modern cities.

The deliverable is organized as follows:

- In Section 3, we summarize the strategy for building the CUTLER ecosystem.
- In Section 4, we present the promotional and communication material that will be used to attract stakeholders and third-party contributors.
- In Section 5, we focus on the specific elements of the online awareness campaign that will be launched to facilitate the ecosystem building.
- In Section 6, we briefly present the online material that will be freely available at the project website.
- In Section 7, we describe the thematic webinars that will be organized to educate attendees on the CUTLER scientific background and developed technologies, covering all aspects of the use of big data for policy making.
- In Section 8, we discuss the themed events (one per pilot) that will be organized at the pilot sites to demonstrate and promote pilot results on-site.
- In Section 9, we present already organized and planned networking events to disseminate the project and interest stakeholders in project outcomes.
- In Section 10, we discuss our ideas for organizing a hackathon event, allowing interested communities to learn the open platform hands-on, build plugins and win prizes.
- Section 11 draws the conclusions.

3. Ecosystem building strategy in CUTLER

In this section, we briefly present the CUTLER ecosystem building strategy and its different elements, which are then further explored and described in the following sections.

In order to ensure that the technologies developed in the context of the project will be successfully adopted by public administrations in Europe and beyond but also to accelerate the adoption and broaden the scope of the CUTLER platform services, we propose a set of activities that will attract and involve stakeholders and third-party contributors, interested in policy making and the use of big data to support it. The **ecosystem building activities** have training processes in their core, aiming to simultaneously **disseminate, share knowledge, educate, and practically involve stakeholders** in the development of the CUTLER platform.

The starting point of our ecosystem building strategy is the development of appropriate **promotional and communication material** to attract stakeholders (see Section 4). This involves the design of leaflets focusing on different aspects of CUTLER (data crawling, analytics, visualization, etc.) and the creation of videos demonstrating the CUTLER concept and technologies as well as the first version of the dashboards that have already been developed for the pilot cities.

This material will be utilized in the context of an **online awareness campaign** based on social media and online communication, which aims to attract relevant stakeholders and introduce them to the project goals and outcomes, but also interest them in joining our ecosystem and participate in ecosystem building events like networking events, thematic webinars, hackathon, etc. (see Section 5). The main tool to this end is the establishment of a **User Group** through the established collaboration networks of project partners, starting from the stakeholders that have already participated in the networking events organized during the first period of the project.

Given that training and education are at the heart of the ecosystem building activities, we have developed **online educational material**, which is available on the project website (see Section 6). This material includes: a) **open software** developed in the context of the project (data crawlers, visualization widgets, platform interface, etc.); b) **manuals for developers**, explaining how to use and integrate the open software components, how to create a policy-specific dashboard using the CUTLER interface, etc.; and c) short **reports** on different aspects involved in big-data-based decision making, such as tools and methodologies for modelling the decision making process of public administration bodies, guidelines on handling legal and ethical issues for big data use in public administration, as well as methodologies for evaluating the impact of policy making in terms of the environment, society and economy.

Aside from offering free informational/educational material, we also plan to organize a **series of webinars** to educate interested parties, mainly data scientists but also policy makers with an interest on big data exploitation, on the project's scientific background and the different CUTLER modules (see Section 7). These thematic webinars will elaborate on the issues mentioned before, covering theoretical and practical issues of data-based policy making, addressing issues such as data collection, data indexing and visualization, modelling of policy impact in economy/environment/society, modelling of decision making process based on business process models, handling of legal and ethical issues in data processing, creating efficient dashboards to support policy design/monitoring/evaluation, etc.

Besides the aforementioned online engaging and educational activities, our ecosystem building strategy also includes physical events such as themed events, networking events and a hackathon. More specifically, four **themed events** (one per pilot) will be organized in each pilot city to demonstrate and promote project results to local

stakeholders and local communities on-site (see Section 8). These will be focused on the policy problems we deal with in each pilot and will present how CUTLER has been used to assist policy makers in making decisions related to these urban development policies, balancing efficiently consequences on the society, the economy and the environment.

In addition to these events, a series of **networking events** aiming at policy makers, industry and the scientific community on an EU-level has already been launched (see Section 9). These focus on presenting the project objectives and outcomes through short presentations by project partners, dealing with different aspects of using big data for policy making, also showcasing how these aspects have been dealt with in the different city pilots.

Finally, a **hackathon** will be organized during the last months of the project, allowing communities to learn the CUTLER platform hands-on, build new components and win prizes (see Section 10). Provided with consortium mentoring, attendants will leverage the advantage of predictive analytics on economic, social and environmental data to implement their own ideas on how to facilitate decision makers in policy development. Target audiences include student groups and networks, freelancers, hacking communities and start-ups.

Figure 3-1 presents an overview of the proposed ecosystem building strategy, illustrating its different components and their interconnection. In the following sections, we describe in more details the ecosystem building activities, including details on their content/focus, partners involved in their organization/implementation, target audiences, place and time, and tools employed for disseminating the events/material and attracting participants/interested parties.

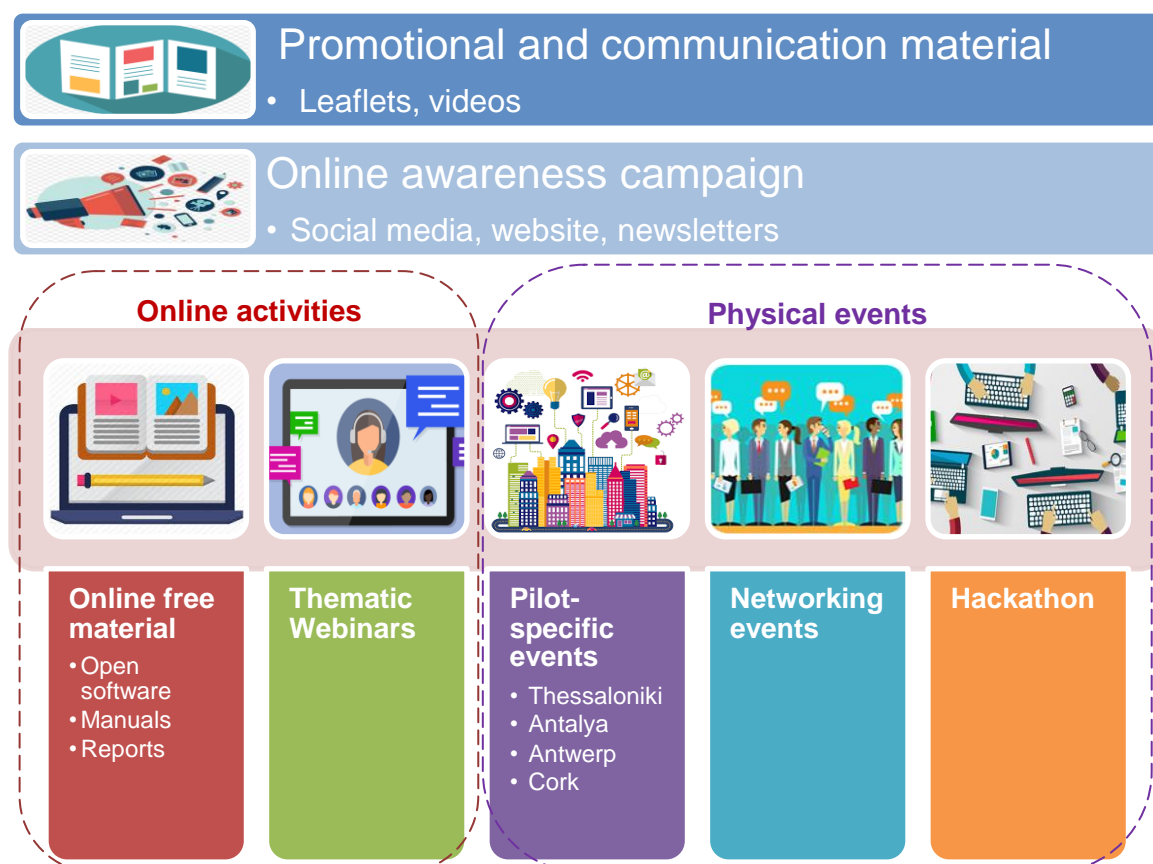


Figure 3-1: The CUTLER ecosystem building strategy and its main components.

4. Promotional and communication material

To start building the project ecosystem, a crucial element is the development of **promotional and communication material** that will effectively communicate the project objectives and outcomes to different stakeholders and attract them to engage in online educational activities and also participate in physical events, seeking for more substantial information and knowledge.

Design of communication material includes the following:

- **Leaflets** providing information on different aspects of CUTLER (e.g. data crawling, analytics, visualization, pilots, etc.), based on a combination of short descriptions and smart visualizations.
- **Videos** efficiently demonstrating the CUTLER technologies as well as the dashboards developed for different pilots. The aim of these videos is to showcase the CUTLER concept and outcomes in a more straightforward and engaging way. These videos will be uploaded to the project website and YouTube channel.

In the following subsections, we briefly present the designed dissemination material. More videos and leaflets will be added during the next period as project outcomes mature and city pilots are implemented.

4.1 Leaflets

Six four-page leaflets have been designed to promote different aspects of the project, aimed at policy makers and other interested stakeholders from the IT industry and the scientific community. The leaflets follow the same look-and-feel and include short informative descriptions and explanatory illustrations on selected topics, also providing useful links to open software and other online project material (e.g. public reports and deliverables). Below, we briefly summarize the content of each leaflet:


- **The CUTLER platform:** this leaflet briefly explains the functionalities offered by the CUTLER platform and the main technologies employed. It provides diagrams of the project concept as well as images of the dashboards developed for different pilots (see Figure 4-1).
- **The CUTLER pilots:** this leaflet briefly presents the four CUTLER city pilots, explaining the real policy problems we are examining in each pilot and how CUTLER is used to assist decision-making (see Figure 4-2).
- **Measuring the economic impact of policy making:** this leaflet briefly presents the methodology developed for measuring the economic impact of policy making, focusing on the various data sources used, the econometric I/O model for estimating the policy impact on local economy, and the visualisation of data and KPIs (see Figure 4-3).
- **Measuring the environmental impact of policy making:** this leaflet briefly presents the methodology developed for measuring the environmental impact of policy making, focusing on the heterogeneous data used, presenting some of the KPIs and models developed for estimating the environmental impact, and illustrating the visualisation of data and KPIs (see Figure 4-4).
- **Measuring the social impact of policy making:** this leaflet briefly presents the methodology developed for measuring the social impact of policy making, focusing on the different data sources examined, the methodology employed for trend detection and historic data analysis of social data, and techniques for effective data visualisation (see Figure 4-5).

- Modelling decision-making processes in public administration:** this leaflet offers information on the methodology adopted in CUTLER for modelling the decision-making processes in municipalities using Business Process Models (see Figure 4-6).

The leaflets are available at the project website: <https://www.cutler-h2020.eu/dissemination/> (under “Leaflets on various CUTLER topics”).

Dashboards


The dashboards created for the project pilots using the platform support advanced visualizations of economic, environmental and social data and relevant Key Performance Indicators.



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The CUTLER Platform

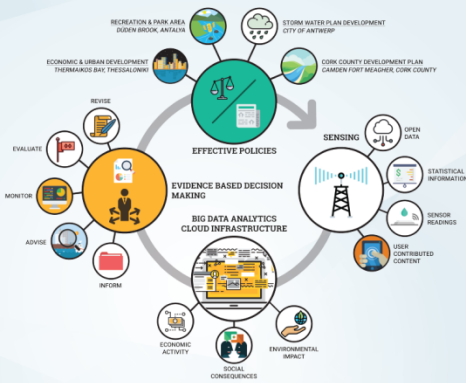
A tool for supporting evidence-based Policy Making in Public Administration

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What is CUTLER?

The main objective of CUTLER is to shift the existing paradigm of policy making, which is largely based on intuition, towards an evidence-driven approach enabled by big data. Focusing on cities with waterfront areas, our aim is to exploit the wealth of data generated by and in the cities on a daily basis (by the public administration, public or private organizations, and citizens) in order to develop an innovative platform that will help policy makers to easily design, implement and monitor urban development policies for coastal cities.



To strengthen city resilience, such policies should effectively balance between ensuring the well-being of citizens, strengthening the local economy, and protecting the environment. To solve this multi-dimensional problem, we use a large pool of past and current data of sufficient scale, representativeness and quality so as to allow the extraction of quantifiable indicators characterizing the complex eco-system (environment, society and economy) around the water element.

The CUTLER Components

- Data crawlers for collection of data from heterogeneous sources**
 - Economic data from national and international statistical agencies or local governments & chambers (e.g. GDP, city taxes, employment, tourist visits, business turnover, household budget surveys, etc.)
 - Environmental data from installed sensor networks and historical archives (e.g. water quality, air quality, flooding, protected environmental zones, etc.)
 - Social data from social media, online participatory platforms, web, user surveys, etc. (e.g. Twitter posts, GDELT events, news article comments, answers to questionnaires, etc.)
- Cloud infrastructure for big data storage & processing**
 - Virtualisation of resources
 - Cloud orchestration to support automation of cloud deployment
- Big data analytics for sensing policy impact**
 - Economic activity (econometric analysis, SVR-based predictions, standard KPIs)
 - Environmental impact (Air Quality Index, modelling of water runoff during rainfall, water pollution, etc.)
 - Social consequences (citizen sentiment analysis, current trend detection, historical analysis)
- Business Process Models (BPM)**
 - Modelling the decision making process of public administrations
 - Enabling scenario planning
- Multi-faceted dashboard to support decision-making**
 - Widget for automatic multi-facet dashboard creation based on available pool of analytics visualisation widgets
 - 5 facets using big data to support the 5 steps of the urban development policy cycle: Inform - Advise - Monitor - Evaluate - Revise
 - Support for different user roles identified by the BPM
 - Multitenant application
 - Protection of personal data and advanced security features

Figure 4-1: Leaflet for CUTLER platform.

The CUTLER dashboard will help estimate the effective impact and the cost-effectiveness of the implementation of a garden street. The tool uses realtime data from sensors that measure precipitation and the flowrate in the sewer system. This will result in more efficient policy making processes and an optimization of the allocation of resources.

Cork County, Ireland

Camden Fort Meagher is a coastal defence fortification originally built in the 16th Century to defend the mouth of Cork Harbour. Cork County Council wishes to develop the site as a viable tourist destination, and increase annual visitor numbers. The Cork pilot focuses on this future development, specifically in relation to policies concerning improving access to the Fort for visitors. Currently, access to the Fort is limited to one local road, and limited parking space on site. During times of peak demand, additional parking in the area is not available and therefore visitor vehicles often obstruct local roads and resident access.



The CUTLER platform will enable the assessment of specific criteria in relation to a policy for improving visitor access to the Fort, with the various site-specific big data sources informing evidence-based decisions on the most environmentally, economically and socially viable location for additional parking facilities. These data sources include: weather data, visitor and revenue data, parking revenue, construction costs, various static GIS datasets, social media sentiment, and user survey data.

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CUTLER

Coastal urban development through the lenses of resiliency

The CUTLER Pilots

How CUTLER assists decision-making with regard to urban development policies in waterfront cities

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CUTLER develops an innovative platform that shifts the existing paradigm of policy making, which is largely based on intuition, towards an evidence-driven approach enabled by big data. The platform helps policy makers in public administrations to easily design, implement and monitor urban development policies for waterfront cities. To test the platform, pilots are organized in four cities: Thessaloniki, Antalya, Antwerp, and Cork.

Thessaloniki, Greece

Thessaloniki is improving the quality of everyday life by introducing a controlled parking system for both residents and visitors. The system is monitored by the Municipal Police, which is organizing daily patrols scanning vehicle plates and charging penalty notices. The CUTLER platform will assist policy makers to optimize the controlled parking system by means of: redistribution of parking spots for visitors and residents; evaluation of its environmental impact; introduction of moderations in the financial policy and ticket prices; support to the Municipal Police in efficiently organizing its patrols.



The CUTLER dashboard is visualizing data such as: daily police scans and penalty notices, revenue per parking sector, air pollutants' concentrations, citizen opinions from social media and the city's ImproveMyCity web platform for citizen complaints.

Antalya, Turkey

The City of Antalya is crossed by Düden Brook, which is a natural stretch of water that falls into the Mediterranean Sea. Düden Brook runs through a densely populated urban area and it gives life to its environment either in terms of the natural beauty of protected natural sites or by irrigating agriculture lands. The brook creates two waterfalls, which are important tourist attraction areas. One of them is in the north, at the beginning of the river and is considered as both a natural and archaeological protection site. This area is very important not only for local tourism but also for local residents since it serves as an open recreational and urban and regional green space.



The Municipality of Antalya will use CUTLER as a decision support tool that will help them design policies aiming to increase tourist visits in the waterfall area, while also protecting the environment. The dashboard is visualizing data such as: tourist visits and revenues from tickets, costs of site operation, costs of specific policy measures (like the use of water pumps to maintain water levels throughout the year), water quality and air quality measurements, visitor opinions from social media and on-site user surveys, etc.

Antwerp, Belgium


Climate change is unquestionably one of the major challenges society is facing today. In the dense streets of Antwerp, climate change can lead to intense floods that have a severe impact on the local mobility and economy. The City of Antwerp developed a climate adaptation strategy to make the city more climate resilient and futureproof. This strategy presents possible measures that enhance the city's capability to cope with intense rainfall, like the implementation of green roofs and garden streets.



Figure 4-2: Leaflet for CUTLER pilots.

Dashboards


The economic widgets of CUTLER are delivered in two flavors. The first is a series of custom, independent and interactive dashboards for each city whose manipulation is easily accessible to the user without the need for expert knowledge in executing the arduous economic analysis. The second module is a collection of independent graphical representation elements (e.g. charts, tables, figures etc.) to display the KPIs of interest.



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Measuring the economic impact of policy making

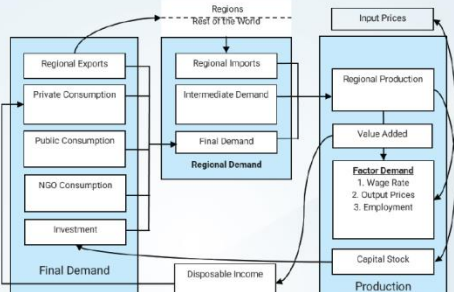
Methodologies and economic KPIs definition for the envisaged policy measures

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Overall Approach

City resilience stems from a robust economy. In order to formulate policies that strengthen the local economy, carefully chosen methodologies are employed in sensing the economic impact of policy implementation. The custom-built economic models articulate data-driven approaches, enabled by large data, for each of the four city pilots (Thessaloniki, Antalya, Antwerp, Cork), utilizing the unique economic characteristics of each region, the available data and the standard paradigm in economic literature to provide robust economic analysis of policy-oriented scenarios. The output of the analysis is included in interactive widgets, which provide visualizations of the Key Performance Indicators (KPIs), in such an approach that alleviates the need of expert knowledge for the interpretation of the analysis.



The main source of economic data collected for each city originates from public institutions and includes regional past and present information in relation to consumption, savings, employment, production, investment and sales.

Models and KPIs

The economic impact assessment is achieved with the formulation and implementation of econometric and machine learning methodologies, producing quantifiable Key Performance Indicators:

Assessment of the economic impact of key selected variables for a variety of policy scenarios

- State of the art models are employed.
- Over 300 equations included to describe each city's economic structure.
- More than 200 variables are used in total.

Estimation of economic resilience indexes

- Resilience of the local economy to different policy scenarios.

Data visualization assisting the decision-making process

- Key economic variables presented in a user-friendly manner to assist policy makers.
- Interactive online forms to assist the non-expert in inserting policy scenarios to the models.


Forecast estimations for better decision making based on machine learning approaches


- Forecasted values of economic variables that are of special interest to the cities' economies.
- Assist scenario planning within a quantitative line.

Figure 4-3: Leaflet presenting the methodology used to measure the economic impact of policy making.

Dashboards

The environmental widget of CUTLER was developed as a custom collection of independent graphical representation elements (e.g. charts, maps, tables, heatmaps etc.) forming independent dashboards for each pilot, to display both straightforward indicators and KPIs for each case.






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Measuring the environmental impact of policy making

Methodologies and environmental KPIs definition for the envisaged policy measures

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Overall Approach

The overall objective of the methodologies developed for sensing the environmental impact is to formulate the environmental models for each of the four city pilots (Thessaloniki, Antalya, Antwerp, Cork) of CUTLER based on: their internal characteristics, the availability of data and the environmental science. The models set the basis for the development of an environmental widget, which in turn assists policy makers during policy formulation, decision making, policy implementation as well as policy assessment, by providing visualizations of meaningful environmental indicators relevant to each specific pilot and by providing visualizations of Key Performance Indicators (KPIs), revealing the environmental impact of the proposed measure or policy for each pilot. The implementation framework for assessing the environmental impact is structured on four levels.

LEVEL 0
Define policy objective, environmental data availability and dimension

LEVEL 1
Determine for each pilot straightforward environmental indicators and types of visualizations

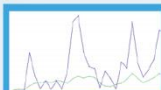
LEVEL 2
Determine for each pilot environmental KPIs that will reveal the environmental impact of the policy and types of visualizations

LEVEL 3
Development of the environmental visualizations


The main sources of environmental data collected for each pilot are sensor networks and historical data, in relation to air pollutants concentration, precipitation and groundwater levels, flooding maps, water quality measurements, conservation areas, coastal waterbody status, sea water levels, weather data etc. Data models were developed to describe these environmental readings and to detect correlations among the different variable types. To determine the relation between the analyzed data and the policy of each pilot case, extensive analytical processes took place, resulting to the definition of straightforward indicators for all cases and the most effective ways to visualize them.

Models and KPIs


The environmental impact assessment is achieved with the formulation and application of environmental models along with pilot-specific, quantifiable Key Performance Indicators. The developed KPIs will facilitate decision making by providing the information needed, in terms of progress towards the intended result of each pilot's envisaged policy. In order to appropriately depict the outcome of the models and the defined KPIs, various visualizations were specifically created.




Modelling environmental impact of garden streets and green roofs as a measure to combat flooding
A rational method and the linear reservoir model based on real-time precipitation and water flow data from sensors.



Assessment of transport's environmental impact in relation to the emissions of transport pollutants based on vehicle speed data
Display of the changes in average yearly emission levels of transport pollutants measure on a specific year that a measure was applied.



Air Quality Index calculations and correspondence to levels of health concern based on its values
Color-coded classification for multiple locations.

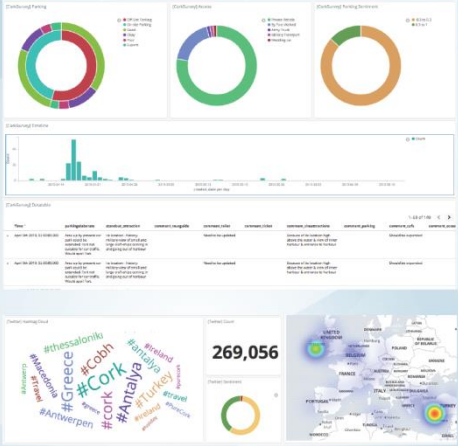


Modelling to identify environmental conflicts between a possible development area and several environmental parameters for impact assessment
Conflict map with 15 environmental layers and distance measuring tool

Figure 4-4: Leaflet presenting the methodology used to measure the environmental impact of policy making.

Dashboards

The social widget of CUTLER incorporates interactive visualizations created for the project pilots to analyze social trend and opinions using Twitter, News Comments, GDELT, Survey data etc.




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CUTLER

Coastal urban development through the lenses of resiliency

Measuring the social impact of policy making

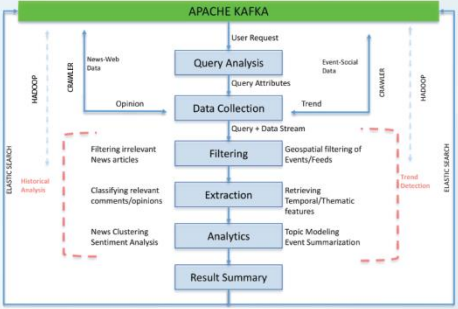
Methodologies and KPIs definition for analyzing public sentiment and trends

cutler-h2020.eu



Overall Approach

The advent of news and social media platforms provides a rich source of accessible data about citizens and society. It captures the behavior of users who communicate or interact on a diversity of issues and topics. It is the intent of CUTLER project to focus on novel methods to sense and predict the social consequences of policies. For this purpose, we harvest data from multi-dimensional sources and develop a methodology for detecting trends and historical analysis that would allow soliciting citizens' complaints, desires, novel ideas and practical suggestions about policy measures. The output of the analytical methodology is included in interactive widgets, which provide visualizations of the Key Performance Indicators (KPIs).



The main sources of social data are comments on online news articles, Twitter feeds, user surveys and user input from online citizen platforms, focusing not only on reactions to current policies in the local area, but also on the historical reaction to similar policies worldwide.

Methodologies and KPIs

The social impact assessment is achieved with the formulation and implementation of information filtering, extraction, and state-of-the-art text mining methods. The developed methods will facilitate decision making by providing to policy makers information about public sentiment and historical analysis with regard to the social consequences of the envisaged policy measures. In order to appropriately depict the outcomes of social analysis and the defined KPIs, various visualizations have been implemented.

- Identification and extraction of most relevant data targeted for Pilot cities and use case scenarios**
 - Geospatial filtering, language identifiers, text pre-processing.
 - XPath evaluation, rule-based extraction, Random Forest Comment Classifier.
- Summarization of public opinion and sentiments to provide easy overview and exploration**
 - Text clustering and topic modelling are the central component for trend detection and historical analysis (LDA, MCR, HMDP).
 - Geospatial characterization and time-aware mining.
 - Language specific Sentiment analysis, relevance ranking, summarization.
- Intuitive visualisation to reveal insights and make sense for users without technical knowledge**
 - Various query methods and interactive mapping such as tag clouds, graphs, geographic and temporal characterization, sentiment classifications.


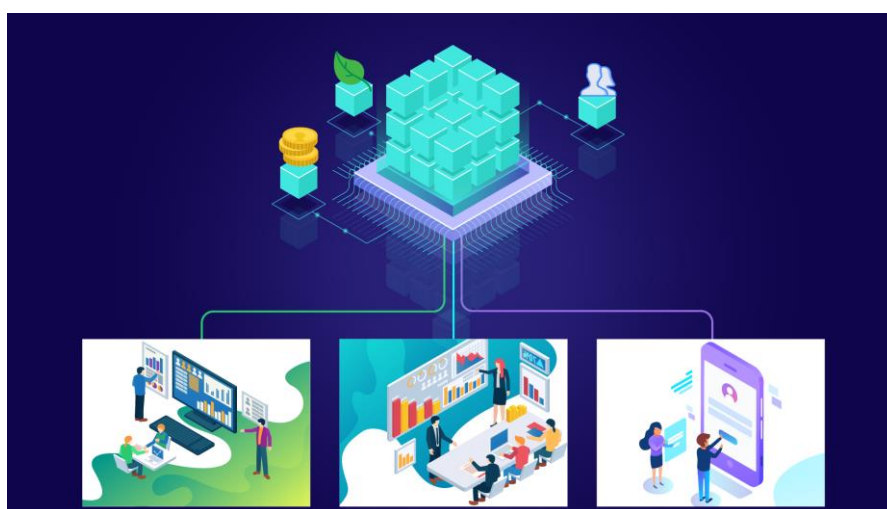


Figure 4-5: Leaflet presenting the methodology used to measure the social impact of policy making.

- **CUTLER dashboard tutorials:** during the next period, more videos will be created to briefly demonstrate the dashboards developed for the different city pilots, presenting their functionalities and explaining how they help policy makers in making decisions related to specific policy measures.

The videos will be available on the project's website and YouTube channel:

- Website: <https://www.cutler-h2020.eu/dissemination/>
- YouTube: <https://www.youtube.com/channel/UCcYkECpg6hpepp8VGdpUKcw>





Coastal Urban Development Through the Lenses of Resiliency

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This work is part of project CUTLER that has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No.770469



Figure 4-7: Some screenshots from the short video presenting the CUTLER concept.

5. Online awareness campaign

Awareness campaigns are one of the most popular ways to raise public interest and educate people about a specific issue. These campaigns should:

- target people who share common interests;
- educate potential target groups about the specific issue or cause; and
- generate a new group of users interested in the specific issue and eager to participate in further activities.

The online awareness campaign undertaken in CUTLER is planned to also follow the above guidelines, by communicating to target audiences (forming our Interest Group) information about the benefits of using big-data technologies to support informed policy and decision making in urban, coastal environments. Our campaign will use **social media and online communication** as a means to attract relevant stakeholders, introduce them to project goals and outcomes and invite them to participate in project events and educational activities focusing on big-data analysis. The recruitment of people forming the Interest Group will take place via the communication channels and networks of project partners, which will be used as a starting point to reach a more broad audience, in the context of this campaign.

More specifically, by effectively using the aforementioned tools, we aim to:

- **Raise awareness about the vision and goals of the project** by undertaking all actions necessary to establish and strengthen the CUTLER brand as an active player in the domain of smart cities and big data processing.
- **Foster technology uptake** by developing and maintaining a community of researchers and big data analysts that will use, develop and maintain a community of stakeholders that will use CUTLER's outcomes towards the achievement of large scale data storage, management, crawling, harmonization, scalable data mining, big data analytics, visual analytics and evidence-driven policy making.
- **Reach out to the end-users** by making sure to establish links of communication with local and regional stakeholders involved in the decision-making process for urban development besides those already involved in the project, NGOs active in the fields of political and social participation and environmental issues and citizens all over Europe.

5.1 Target audiences

Two main groups will be targeted by the awareness campaign, aiming to formulate the CUTLER Interest Group.

- **Decision-makers in public administration**, including governmental agencies, local and regional authorities all over Europe such as regions and municipalities, EU policy making agencies, etc. Governmental agencies could be central, local, and transnational (such as EU), as they need to collaborate with other governmental bodies and agencies, although currently many of the e-government activities are shaped or even directly regulated by national or transnational policy actions. More specifically, this category of target audience includes cities and municipalities across Europe and all over the world that have a history of incorporating new data analysis technologies into their policy making practices.
- **Big-data analysts** from research organizations and big-data fora, who can be interested in leveraging the scientific outcomes of CUTLER. A most prominent

example is the European Big-Data Value Forum. Also, we are going to contact research centers and organizations that are promoting big data for urban planning, in order to help us raise awareness about our effort and the results of CUTLER.

5.2 Messaging

The message that we want to get across to the target audience through the online awareness campaign is two-fold: a) big-data can be used to shift the existing paradigm of policy making, which is largely based on intuition, towards an evidence-driven approach; and b) provide theoretical basis for data analysis methodologies and the positive impact on economy and environment that they may have in a balanced manner.

Shifting the existing paradigm of policy making towards an evidence-driven approach enabled by big data

The CUTLER's main objective is to shift the existing paradigm of policy making, which is largely based on intuition, towards an evidence-driven approach enabled by big data. More specifically, by focusing on cities with waterfront areas, we exploit the wealth of data generated by and in the cities on a daily basis (by the public administration, public or private organizations, and citizens) to develop an innovative platform that helps policy makers to easily design, implement and monitor urban development policies in these cities. The use of big data leads in increased accuracy, efficiency and effectiveness of the decision making process, while it also promotes good governance and transparency.

Big data for sustainable city growth

Policy decisions related to urban development affect simultaneously the society, the economy and the environment. CUTLER implements an innovative big data analytics framework that allows policy makers to assess the impact of policy measures on the three pillars of the city ecosystem and make decisions that effectively balance between ensuring the well-being of citizens, strengthening the local economy, and protecting the environment.

5.3 Tools

To implement the online awareness campaign, the following Internet-based communication tools will be used:

- a) The **project website**¹, containing news & announcements, leaflets and factsheets, videos demonstrating the project's vision and outcomes, public deliverables and reports, links to open software and datasets produced by project partners, etc.
- b) Frequent updates of the project's **social media accounts**, including news, announcements, but also direct links to informative material, i.e.
 - a. Twitter (https://twitter.com/cutler_h2020),
 - b. LinkedIn (<https://www.linkedin.com/in/cutler-h2020/>),
 - c. Facebook (<https://www.facebook.com/cutlerh2020/>).
- c) **Newsletters** to be sent to the Interest Group via e-mail and social media regularly.
- d) **Direct communication** with stakeholders, e.g., with e-mails. All CUTLER partners will approach their relevant stakeholder groups and organizations.

Overall, through our social media channels, we plan to diffuse our message and spread awareness about the benefits and relevance of the technologies of CUTLER for evidence-based decision-making related to urban development policies.

Moreover, an online form is already available on the project website² that can be used by interested stakeholders to register as members of our **Interest Group**. In order to register, the users must enter (apart from personal info, position in affiliate organization, etc.) the CUTLER-related topics that they are most interested in (e.g. *Legal and ethical issues concerning big data use, Data visualization, Big data analytics for sensing the economic impact of policy making*, etc.) as well as the type of data (i.e. economic, societal, environmental) that they are more focused on in their line of work. This information will allow us to group the members of the Interest Group in sub-groups, focusing on specific aspects of the project, thus allowing more targeted and thus effective communication.

5.4 Implementation plan

The following Table summarizes the different steps and components of our online awareness campaign and also provides an indicative implementation time plan.

Actions	Description	Tools	Period
Introducing CUTLER goals and concept	<ul style="list-style-type: none"> - Send e-mails with material (posters, leaflets, etc.) presenting CUTLER. - Invite specific people of the target audience to connect via our social media accounts. - Expand the social media network by asking connected accounts to promote the 	E-mail Project Website Interest Group online	July – Dec. 2020

¹ <http://www.cutler-h2020.eu>

² <https://docs.google.com/forms/d/e/1FAIpQLSc8rP3dx53vk1wZwQwHYqz-kcCrmpj1BDDXiMOgEW4viuU5ow/viewform>

Actions	Description	Tools	Period
	<p>project to their social media connections (e.g., retweet, share posts).</p> <ul style="list-style-type: none"> - Share links to the project web-site and blog in the social media project description field. - Invite people to register as members of the Interest Group. 	<p>registration</p> <p>Social Media</p>	
Send newsletters periodically	<ul style="list-style-type: none"> - Invite subscribers. - Send newsletters with the project background, outcomes and events. 	E-mail	2019-2020, twice per year
Publicize information about specific topics, including:	Mechanisms for the collection of heterogeneous environmental, economic and social data from cities and their citizens	E-mail	Jan. – Dec. 2020 (each month can be dedicated to a specific topic)
	Big data analytics to estimate the environmental impact of policy making	Project Website	
	Big data analytics to estimate the economic activity and economic impact of policies	Social Media	
	Big data analytics to estimate the societal consequences of policies		
	Cloud-based storage and computing infrastructure		
	Business Process Models for modelling the policy-development and decision-making processes of city administrations		
	CUTLER platform for supporting evidence-based policy-making in waterfront cities		
	Legal and ethical issues of using big data for policy making in public administration		
Inform target audience about the project's educational activities (webinars, hackathon)	<ul style="list-style-type: none"> - Send invitations for webinars including: a) their scope, b) scientific field covered in the classes, c) objectives, d) program. - Contact potential participants through the Interest Group and the existing networks of cooperation of project partners 	<p>E-mail</p> <p>Social Media</p>	March-June 2020
	<ul style="list-style-type: none"> - Send invitation for participation in the hackathon, including information about the hackathon concept, the objectives of the contest, the prizes and the program 	<p>E-mail,</p> <p>Social Media</p>	March-June 2020
Spread results from city pilots	<ul style="list-style-type: none"> - Inform various municipal authorities and government agents about the results of system testing and evaluation in the context of the four city pilots - Send invitation for participation in the pilot-specific events that will be organized in 	<p>E-mail</p> <p>Project Website</p>	August-Dec. 2020

Actions	Description	Tools	Period
	each pilot city to demonstrate the use of the platform and pilot outcomes	Social Media	

6. Online educational material

Since training and education are at the core of our ecosystem building activities, we have developed **online educational material** that is freely available to interested parties on the project website. The material targets software developers as well as policy makers with an interest on big data analysis for improved decision-making and can be classified under the following three categories:

- **Open software** developed in the context of the project and currently available at GitHub. This includes software for data crawling, data analysis, data visualization, platform interface, etc.
- **Manuals** focusing on integration of open software components, creation of policy-specific dashboards using the CUTLER interface, etc.
- **Short reports** providing information on different aspects involved in big-data based decision making such as tools and methodologies for modelling the decision making process of public administration bodies, guidelines on handling legal and ethical issues for big data use in public administration, methodologies for evaluating the impact of policy making in terms of the environment, society and economy etc.

In the following subsections, we briefly present the developed online material. More software, manuals and reports will be available during the next period as project outcomes mature and new outcomes are delivered.

6.1 Open software

The following software is currently available at the CUTLER GitHub organization account³:

- **DataCrawlers:** Python-based data crawler implementations for all economic, environmental and social datasets to be used in the CUTLER city pilots.
- **draxis_gauge_visualization:** This Kibana plugin was created using amCharts, a JavaScript library for data visualizations. It is specifically customized to visualize certain Key Performance Indicators in the form of a gauge diagram.
- **Draxis-map-layers-kibana-plugin:** This Kibana plugin was created using JavaScript and it enables the introduction of map layers using the Open Geospatial Consortium's (OGC) Web Map Service (WMS) protocol. It is specifically customized to include layers in reference to the area of Cork. The controls of the map fall within two categories: a) a list of 16 layers and b) a distance measuring tool.
- **econometric_svr_models:** DUTH provides a custom econometric analysis dashboard and a Support Vector Regression (SVR) analysis dashboard. The econometric analysis web tool allows simulating illustrative policy interventions by giving users the opportunity to assess whether a policy intervention has a positive impact on the city's economy (supported for all four pilot cities). The SVR analysis dashboard provides estimations on the future realizations of sectoral revenues for the new parking system in Thessaloniki and future realizations of revenues and the expected number of visitors for Camden Fort Meagher in Cork.

³ <https://github.com/CUTLER-H2020>

In order to develop the two dashboards, Python 3 - Common Gateway Interface Programming were used leveraging the built-in functionalities of Python3 programming language. The econometric/SVR models used for the analysis were built by using the MATLAB programming language.

- **unikob-comment-classifier:** A classifier module that classifies comments and non-comments. For any given online article, the pieces of text in the comment section are classified by a binary classifier to distinguish between comment and non-comment data and to filter out the comments. Before the classification is done, the text chunks are pre-processed. Firstly, the text chunks are tokenized, and the punctuation is removed. Secondly, domain-specific stop words are removed. These ones are words, which appear often in comment sections. After the preprocessing, a trained random forest classifier is used to retrieve the comment text with associated meta data. Python 2 is used but of course switching to Python 3 is possible with minor changes. The Libraries in use are: nltk, numpy, pandas, sklearn. Usage: Put data files native_comments.csv and area_without_comments.csv into data/ folder. Each data file should have csv format with each line containing an index number and a comment or non-comment. Run main.py to get the classification model and see the performance.
- **imc_cutler_notifier_plugin:** An ImproveMyCity (IMC)⁴ plugin that sends data to the CUTLER IMC importer.
- **Spider:** This Kibana plugin allows creating spider-web (radar) graphs based on chart.js Javascript library.
- **Platform-v1/Configurations:** Component configurations for the first version of the CUTLER cloud platform.
- **Platform-v1/Deployment:** Scripts and templates for automated deployment of CUTLER cloud infrastructure.
- **Front-end:** Front-end component of the CUTLER platform that provides the user interfaces for policy management and the IAMER policy wizard.

CUTLER software components are progressively being uploaded to GitHub. Existing components will evolve with further enhancements and functionalities, while new components will be added during the next development phase.

6.2 Manuals for developers

Several manuals for developers have been developed, which are briefly presented below. The manuals are available at the following link: <https://www.cutler-h2020.eu/software/> (under “Manuals for CUTLER software”).

The manuals will be periodically updated till the end of the project to present new software developments.

6.2.1 User manual for data crawling software

The heterogeneous nature of the data sources used in the CUTLER platform, including environmental sensor readings, official statistics, posts in social media platforms, etc.,

⁴ <https://imc.thessaloniki.gr/imc>

necessitates the adoption of different techniques for data crawling, scraping, and porting. We have used two enabling technologies, i.e. Hadoop and Elasticsearch, to programmatically acquire data at different time intervals (one-time, scheduled and continuous/streaming) using Python, R and Java.

The manual documents the crawlers developed and uploaded at the CUTLER GitHub repository⁵ and describes their execution steps. To support seamless adaptation and uptake by other developers, the manual also provides information about the libraries that are required by a given crawler as well as direct links to the GitHub scripts. This manual mainly provides a guide to confirmed data sources from deliverable D3.3, whereas all of the other crawlers are documented in the CUTLER GitHub repository⁶.

Download link: <https://www.cutler-h2020.eu/download/664>

6.2.2 User manual for CUTLER cloud deployment

The objective of the automated cloud deployment solutions for CUTLER is to facilitate the rapid deployment of the entire CUTLER platform stack, from the cloud infrastructure to the pilot dashboards. This is done in such a way that minimizes the technical knowledge and expertise requirements of the initiator, thus minimizing IT costs to municipalities. There are a number of enabling technologies used to implement this, and open source templates are available that will configure the cloud infrastructure and platform components according to the CUTLER specification. The manual describes the steps required for the deployment. Some manual modification of the templates is required to set configurations (e.g. IP addresses, usernames, passwords) specific to each deployment, but these are clearly described in the manual.

Download link: <https://www.cutler-h2020.eu/download/671>

6.2.3 User manual for CUTLER platform

The CUTLER platform provides a combination of data-driven and model-driven approaches and visual-based decision support for policy making, through a big data processing and visualization environment.

The platform is a multi-tenant solution that integrates the visualization widgets for assessing the economic, environmental and social impact of policy making developed in WP4,5,6 and allows public authorities to define and implement their policies through the lens of the IAMER approach. In each city, different user groups can be defined, including admin, designers and analysers. These users require different features while they are using the platform. The manual describes how to use the CUTLER platform to create IAMER-based dashboards for managing new policies.

Download link: <https://www.cutler-h2020.eu/download/668>

6.3 Reports for policy makers

Several short **reports** (around 10 pages) have been prepared providing information **on different aspects involved in big-data based decision making**. These present an overview of the work done in the project to address the aspect under examination and provide links to additional more detailed material like public project deliverables.

The reports are available at the following link: <https://www.cutler-h2020.eu/short-reports/>.

⁵ <https://github.com/CUTLER-H2020/DataCrawlers>

⁶ https://github.com/CUTLER-H2020/DataCrawlers/tree/master/HadoopDeployment/Flume_Config_Sample

The reports will be periodically updated till the end of the project to describe new developments and outcomes.

6.3.1 Guidelines on legal and ethical issues for big data use in public administration

Any policy-making must be based on evidence and must comply with the applicable legal frameworks. To help achieve this objective, legal and ethical analysis has been conducted by the legal partner KU Leuven. The analysis consists of five **main achievements**:

1. The development of a **methodology** to assist city pilots in complying with the various regulatory frameworks applicable in a given context (A#1);
2. The preparation of a **catalogue** referencing all the datasets used – or potentially used – by city pilots in the context of the project (A#2);
3. The elaboration of a **legal taxonomy** to facilitate the identification of the relevant legislative frameworks and the compliance process (A#3);
4. The **qualification** of the above-mentioned datasets according to the elements outlined in the said legal taxonomy (A#4);
5. The elicitation of **legal requirements** substantiating the otherwise abstract rules stemming from the potentially applicable regulatory frameworks (A#5).

Considered as a whole, the five achievements listed above allow city pilots and public administrations to go from a specific dataset to the relevant rules that must be observed according to the relevant legislation. In other words, they provide a **full-fledged, structured methodology** that streamlines the identification and the implementation of appropriate legal countermeasures to mitigate all the risks posed by the collection and processing of economic, environmental and societal data for smart city applications.

Download link: <https://www.cutler-h2020.eu/download/677>

6.3.2 Methodology for modelling the decision making processes of public administration using Business Process Models

The prerequisite for any evidence-based, that is, data driven policy making is to provide policy planners and decision-makers with exactly the required data at exactly the right state of the policy formulation process. The objective of the methodology presented here is therefore to provide Business Process Models (BPMs) that bridge the big data technology of the CUTLER system with the policy development routines in the pilot administrations. A key requirement of these models is to provide a smooth transition from how administrative staff usually works to slightly adapted workflows with integrated big data applications that are accepted by the administrations.

To secure this outcome the methodology applied here entailed first, the creation of as-is business process models of the standard mid-term to long-term decision-making procedures in the pilot administrations to outline the general institutional arrangements and central actors. The next step was to define the policy objectives of the pilot cases and to define the processes that must be executed to reach these objectives on a strategic, medium abstraction level in order to identify the appropriate entry points for insights provided by big data applications. This was followed finally by creating process models on an operational level defining all human and technical process flows and their interaction which match to the actual working routines in the administrations. The results are business process models that guide policy makers through a new data-driven and therefore evidence-based policy formulation process.

Download link: <https://www.cutler-h2020.eu/download/724>

6.3.3 Methodology for analysing the economic impact of policy making on a regional level – The CUTLER approach

The impact of any policy initiative is key in planning the right mixture of decisions that will shift a community towards growth, prosperity and, ultimately, resilience. This point is especially relevant at the regional level where the available resources are limited. In order to assist the policy making process, the economic widget builds on modern econometric and machine learning techniques, enabled by a huge amount of data, in grasping the functionality of the economy at the regional level. Towards this end, the economy module is capable to provide quantitative measures on the economic impact of policy scenarios, answer questions regarding the right mixture of policies in order to maximize the effect of any investment initiative, and foresee the economic evolution of the region in assisting the business plan process.

The abilities of the economic module are exposed through custom dashboards. The focus of the dashboards is to present the tools in a user-friendly manner and thus to provide user interaction, without the need for expert knowledge on the field of economics. The economic analysis is performed based on users' inputs for a large number of alternative scenarios and the outcome of the analysis is presented in a ready to use manner. In this entire process, the emphasis lies with the economic assessment of the policy-oriented scenario and the forecasting results and not on the methodology. In this way, the non-expert can manipulate easily modern regional econometric and machine learning models in achieving veracious, data-driven policy-making.

Download link: <https://www.cutler-h2020.eu/download/682>

6.3.4 Methodology for analysing the environmental impact of policy making on a regional level – The CUTLER approach

The overall objective of the methodologies developed for sensing the environmental impact is to formulate the environmental models for each of the four pilots (cities) of CUTLER based on: their internal characteristics, the availability of data, and the environmental science. The models set the basis for the development of an environmental widget, which in turn assists policy makers during policy formulation, decision making, policy implementation as well as policy assessment, by providing visualizations of meaningful environmental indicators relevant to each specific pilot and by providing visualizations of Key Performance Indicators (KPIs), revealing the environmental impact of the proposed measure or policy for each pilot.

The implementation framework for assessing the environmental is structured on four levels. The first step was to define the policy objective of its pilot and its environmental dimension and to gather available and relevant environmental data. Next, the straightforward environmental indicators were determined along with the appropriate way to visualize each one. The ensuing process was the definition of KPIs in order to assess the environmental impact of the proposed policy and their visualization through different formats. Last but not least, the development of the environmental widget enables policy makers to access all this concentrated information in ways that are comprehensible and support the entire decision-making process.

Download link: <https://www.cutler-h2020.eu/download/685>

6.3.5 Methodology for analysing the social impact of policy making – The CUTLER approach

In order to assist policy making scenarios in public administrations, a big data analytics methodology for sensing the social consequences of such decisions has been developed, with the objective of detecting trends and opinions that will allow soliciting

citizens' complaints, desires, novel ideas and practical suggestions about specific policy measures. State-of-the-art information filtering, extraction, topic modelling, and sentiment analysis methods have been developed to this end. However, effective data analytics need efficient visualization tools in order to reveal insights and make sense to experts or even users without technical knowledge. Hence, we also introduced a visualization widget and interaction mechanism that sits on top of the social data analytics model.

In this report, we present our approach to analyze and visualize the trends and opinion of the society with regard to policy implementation. In this regard, we showcase the dashboard as an intuitive interface for querying, information filtering, spatio-temporal mapping and visual analytics to detect the trends and provide historical analysis from Twitter feeds, news articles comments, and social events. In this regard, first we describe the architecture of the social analytics used in CUTLER. Then, we present examples of Twitter data analysis using query methods, visual analysis (trends and sentiments), localized spatial mapping, and filtering possibilities. We used similar interaction methods to provide news comment analysis, and social event descriptions for end user exploration.

Download link: <https://www.cutler-h2020.eu/download/717>

7. Thematic webinars

As part of our educational activities, we plan to organize a **series of webinars** to educate interested stakeholders (data scientists but also policy makers with an interest on big data exploitation) on the project's scientific background and the different CUTLER modules.

Webinars are essentially seminars or workshops held over the Internet, and they can be a presentation, discussion, demonstration, or other instructional session. These online seminars turns a presentation into a real-time conversation from anywhere in the world. Webinars allow large groups of participants to engage in online discussions or training events and share audio or documents, even when they are not in the same place as the host or in the same room where the presentation is taking place.

Webinar participants can:

- Communicate using headsets, microphone and cameras;
- Virtually raise their hand to submit a question or answer a question posed by the presenter;
- Type questions to the presenters;
- Share their screen to show something;
- Answer questionnaires or polls during the presentation and overview the results.

Apart from the capability to attend the webinar in real-time, it is also important to be able to watch a video of the webinar at a later time. This allows more people to watch the lecture, while webinar participants can re-watch the lecture as many times as they want. To this end, we plan to record the webinars and then upload videos of these lectures at the project's website and YouTube channel.

The thematic webinars will cover theoretical and practical issues of data-based policy making, addressing issues such as data collection, data indexing and visualization, modelling of policy impact, modelling of decision making process, handling of legal and ethical issues in data processing, creating efficient dashboards to support policy design/monitoring/evaluation, etc. Different partners will be the presenters, depending on their expertise and role in the project.

Well-known webinar software tools like YouTube Live and Skype Group Calls will be examined for implementing the webinars.

In the following subsections, we provide a short introduction of the webinars that we plan to organize, focusing on webinar content, presenters, target audiences, tools to attract participants, etc.

7.1 Creating dashboards to support evidence-based policy making using the CUTLER platform

Tentative title	<i>Using the CUTLER platform to support evidence-based urban policy making: Creation of policy-specific dashboards</i>
Objective:	The webinar aims to present the CUTLER platform and its functionalities to policy makers. Participants will learn how to use the platform to create policy-specific interactive dashboards with multiple facets (based on the IAMER policy cycle) to assist them in making evidence-based decisions with regard to these policies. Examples of dashboards created for the CUTLER pilots will be demonstrated and explained.
Presenter:	

The webinar will be prepared and presented by SAMPAS, the partner responsible for the development of the platform's user interface and platform integration.

Target audience:

The webinar will be addressed to policy makers from municipalities in Europe and Turkey that are interested in using big data and new technologies to enhance the accuracy of their decision making processes.

Tools to attract attendees:

Stakeholders to attend the webinar will be contacted using the existing networks of cooperation of the four pilot partners (i.e. Municipality of Thessaloniki, Metropolitan Municipality of Antalya, City of Antwerp, and Cork County) that include national associations of municipalities (e.g. the Central Union of Municipalities of Greece, the Union of Belgian Cities and Municipalities, etc.) but also contacts established through European associations like the Council of European Municipalities and Regions (CEMR). Social media and emails will be used to disseminate the webinar to potential participants.

Estimated number of attendees:

10-20 participants

Webinar duration:

1-2 hours

Educational material to be offered to attendees:

Manual for platform use, slides, videos demonstrating use of platform, public project deliverables (D8.3, D8.5).

Estimated date of webinar:

September-October 2020

7.2 Crawling big data from heterogeneous data sources

Tentative title *Challenges, tools and methodologies for big data crawling, harmonization and anonymization – An example for heterogeneous environmental, economic and social data used for policy making in municipalities*

Objective:

This webinar presents the tools and methods employed in the CUTLER platform for the collection, harmonisation and anonymisation of heterogeneous data, enabling policy making in the four municipalities involved in the project. The webinar will be open to a diverse technical audience of students, researchers, software developers, and smart city architects from around the world. By taking this webinar, participants will have increased:

- skills to collect and harmonise diverse data types and sources for policy making;
- knowledge of the tools needed for populating a data lake;
- ability to overcome challenges in data collection in a policy making context.

Examples of crawlers developed for the CUTLER pilots will be demonstrated and explained.

Presenter:

The webinar will be prepared and presented by UOULU who is the leader of the data

collection WP.
<p>Target audience:</p> <p>The webinar will be addressed to software developers that wish to acquire master level knowledge in big data acquisition mechanisms and develop data lakes for use in public policy Business Intelligence (BI) within the EU.</p>
<p>Tools to attract attendees:</p> <p>The webinar will be advertised to numerous research and developer communities using the existing contacts of the technical and academic partners. In addition, social media and mailing lists will be used to outreach to online communities like the Finnish Open Data Ecosystem. Finally, contacts will be made with Oulu University's entrepreneurship hub (Business Kitchen) to help us reach a large international pool of young talent, start-up entrepreneurs and business mentors.</p>
<p>Estimated number of attendees:</p> <p>10-20 participants</p>
<p>Webinar duration:</p> <p>2 hours</p>
<p>Educational material to be offered to attendees:</p> <p>Data crawling manual, videos demonstrating use of the platform, slides, GitHub code and Python/R Markdown documents, public project deliverables (D3.1, D3.2, D3.3, D3.4).</p>
<p>Estimated date of webinar:</p> <p>September-October 2020</p>

7.3 Data import in Elastic Search and data visualisation in Kibana

Tentative title	<i>Data indexing and visualization using ElasticSearch and Kibana – An example using economic, environmental and social datasets from Eurostat to support policy making</i>
Objective:	<p>In this webinar, we plan to cover all steps from importing to indexing data in Elasticsearch and build step by step visualisations using default and custom Kibana plugins. Starting with selecting datasets from Eurostat and explaining the necessary data transformations and moving towards into actual usage of Elasticsearch features such as creating index patterns and introducing search queries. We conclude by teaching attendees how to build their own Kibana dashboard. Creating local and global interactive filters and combining different visualisation graphs like bar charts and spider webs will allow the combination of data of different types (e.g. economic and environmental) under a unified presentation.</p> <p>By the end of the webinar, attendees should be able to understand what is required for importing data from Eurostat in Elasticsearch, how to implement a basic Kibana dashboard with filters, and where to find more resources.</p>
Presenter:	The webinar will be prepared and presented by CERTH.
Target audience:	

The webinar will be addressed to software developers, IT personnel of municipalities, researchers and students that wish to acquire master level knowledge in developing dashboards for smart city applications, visualizing a variety of heterogeneous data.

Tools to attract attendees:

Social media and emails will be used to disseminate the webinar to potential participants. The project's website and CERTH's mailing lists will also be used to promote participation.

Estimated number of attendees:

10-20 participants

Webinar duration:

1.5-2 hours

Educational material to be offered to attendees:

Tutorial in HTML and PDF. Open source code.

Estimated date of webinar:

September-December 2020

7.4 Modelling the environmental impact of policy making

Tentative title *Modelling the environmental impact of urban development policies – Challenges & solutions*

Objective:

The webinar aims to present the indicator-based methodology followed in CUTLER, in relation to formulating models to reveal the environmental impact of a proposed measure or policy. Participants will learn how to apply an indicator approach (descriptive and KPIs) on policy formulation, decision making, policy implementation and policy assessment. The process of creating the models for each of the 4 pilots in CUTLER and the technical approach on the development of the environmental widget will be demonstrated and explained. In particular, implemented cases in the context of CUTLER will be presented, such as modelling the environmental impact of installing garden streets for flood prevention, as well as assessment of transport's environmental impact on the emissions of transport pollutants. In turn, the methodology for visualizing such cases in the environmental widget, along with its functionality and features will be demonstrated and analysed.

Presenter:

The webinar will be prepared and presented by DRAXIS, the partner responsible for defining the indicators measuring the environmental impact and implementing the widget for the visualization of the KPIs.

Target audience:

The webinar will be addressed to environmentalists and environmental engineers specializing in modelling and environmental impact assessment, to developers interested in developing innovative technologies and platforms for visualizing big data, and also to data analysts with an interest in big data analytics for providing evidence towards environmental impact assessment.

Tools to attract attendees:

Stakeholders to attend the webinar will be contacted using the existing networks of

cooperation of the consortium partners, focusing on the contacts of the technology providing partners (i.e. CERTH, SAMPAS, UOULU, DELL, UNIKO, DRAXIS) and the business and sustainability partners (i.e. EUD, DUTH, KUL, IMEC, BLP). Social media, emails lists and the CUTLER website will be used to disseminate the webinar to potential participants. Also, DRAXIS, specializing in environmental technologies, will approach stakeholders from its extensive network.

Estimated number of attendees:

10-20 participants

Webinar duration:

1-2 hours

Educational material to be offered to attendees:

Slides of the presentation during the webinar, public project deliverables (D5.1, D5.2 and D5.3).

Estimated date of webinar:

October-November 2020

7.5 Modelling the economic impact of policy making

Tentative title *Modelling the economic impact of urban development policies – Challenges & solutions*

Objective:

The webinar aims at giving a clear understanding of the tools created in assessing the economic impact of policy making. Regarding the econometric input-output model developed in CUTLER, DUTH will present and explain all its functional details and will provide specific examples and case studies for the policymakers. Concerning the developed forecasting tools, DUTH will also explain the technical details as well as specific examples demonstrating their usage.

Presenter:

The webinar will be prepared and presented by Dr Ioannis Pragidis and Dr Vasilios Plakandaras from DUTH.

Target audience:

The webinar will be addressed to policy makers, data analysts, and scientists engaged in regional development and economic modelling.

Tools to attract attendees:

Promotion through organizations engaged in regional development such as Municipalities.

Estimated number of attendees:

20 participants

Webinar duration:

1.5 hours

Educational material to be offered to attendees:

Slides of the presentation during the webinar, public project deliverables (D4.1, D4.2 and

D4.3).

Estimated date of webinar:

September-October 2020

7.6 Modelling the social impact of policy making

Tentative title *Big data analytics for sensing the social consequences of urban policy making – The CUTLER methodology for estimating the social impact*

Objective:

The webinar aims to present text mining and data analytics tools developed for assessing the social impact of policy making. Regarding the social input-output model developed in CUTLER, UNIKO will present and explain all the Web information extraction, trend detection and historical analysis methods and will provide specific examples and case studies for the policymakers. Concerning the developed data visualization tool, UNIKO will present specific examples, demonstrating the query methods, interactive exploration capabilities and decision making scenarios.

Presenter:

The webinar will be prepared and presented by UNIKO, the partner responsible for the analysis and visualisation of social data.

Target audience:

The webinar will be addressed to data analysts, young researchers, Web science students, and policy makers engaged in decision-making scenarios.

Tools to attract attendees:

Social media and emails will be used to disseminate the webinar to potential participants. The project's website and mailing lists will also be used to promote participation. Also, UNIKO, specializing in Web science and technologies, will approach stakeholders from its extensive network.

Estimated number of attendees:

10-20 participants

Webinar duration:

1-2 hours

Educational material to be offered to attendees:

Slides of the presentation during the webinar, public project deliverables (D6.1, D6.2 and D6.3), and the related paper publications.

Estimated date of webinar:

October-November 2020

7.7 Modelling decision making in municipalities – the CUTLER approach

Tentative title *Modelling decision making in municipalities using Business Process Models – The CUTLER example*

Objective:

The webinar aims to present the usefulness of modelling decision-making processes in public administrations by applying **Business Process Modelling** and its notation standard **Business Process Modelling and Notation** (BPMN).

It will first make the case for analysing workflows and decision-making processes and correctly specifying user-requirements before new software applications are chosen, purchased and installed. The webinar will present examples of real-world applications in public administrations that do not pay sufficient attention to the administrative environment. The result of this “underspecification” is missed potential of the technology and discontent of the users.

The webinar will then argue that Business Process Modelling is an adequate methodology to prevent the problem of underspecification. It will go through the single steps of the research and the modelling process and present the technical instruments that can be applied.

In the end, the webinar provides an outlook on how the Business Process Models can be used to further to automate administrative workflows and discusses the advantages and disadvantages of automation in the public administration.

Presenter:

The webinar will be prepared and presented by Holger Haberstock and Dr. Laszlo Kovats from EuroSoc#DIGITAL – the leaders of WP 7 and responsible for modelling the CUTLER Business Processes.

Target audience:

The webinar will be addressed to members of public administrations who are responsible for introducing new IT applications and software solutions to their organization and are confronted with the specific needs and demands of a public entity. It is also addressed to political representatives that want to get a better understanding of what it is necessary to successfully introduce a new software in the public realm.

Tools to attract attendees:

The webinar will be promoted among the four CUTLER pilot partners, in particular. Their networks will be used to address colleagues and co-workers that are not directly involved in the CUTLER project but could well profit from the results of the project. Furthermore, the project partner EUD will mobilise its own network of public administrative employees and politicians and invite them to join the webinar. Eventually, it will be advertised on its own and affiliated homepages and social media channels.

Estimated number of attendees:

~20 participants

Webinar duration:

1.5 hours

Educational material to be offered to attendees:

The attendees will be offered the slides of the webinar as well as the public deliverables of WP7 (D7.1, D7.2, D7.3, D7.4)

Estimated date of webinar:

September-October 2020

7.8 Handling legal and ethical issues for big data use in public administration

Tentative title	<i>Legal issues surrounding the collection and processing of data for policy making</i>
Objective:	The webinar aims to provide the audience with a detailed overview of all the legal challenges arising from the collection and processing of data in the context of a smart city project. Among other, the audience will hear about privacy and data protection, intellectual property and open access issues. Besides, the webinar will also focus on the methodology that has been developed in order to assist city pilots in implementing appropriate legal countermeasures.
Presenter:	The webinar will be prepared and presented by Pierre Dewitte (KUL) and Aleksandra Kuczerawy (KUL).
Target audience:	The webinar will be addressed to policymakers, civil society, city planners and lawyers.
Tools to attract attendees:	Social media and emails will be used to disseminate the webinar to potential participants. The project's website and KUL's mailing lists will also be used to promote participation.
Estimated number of attendees:	20 participants
Webinar duration:	1 hour
Educational material to be offered to attendees:	Public deliverables (D1.1, D1.2, D1.4), slides of webinar presentation.
Estimated date of webinar:	September/October 2020

8. Pilot-specific events

Four **themed events** (one per pilot) will be organized in each pilot city to demonstrate and promote project results to local stakeholders and local communities. The events will be organized during the second phase of pilot implementation (September- December 2020) as one-day or half-day workshops that will allow attendees to:

- be informed about the advantages of using the CUTLER platform to assist policy making;
- see how the platform has been used in a specific pilot to assist policy makers in making decisions related to specific urban development policies, balancing efficiently the consequences of policy measures on the society, the economy and the environment;
- explore the multi-faceted dashboards themselves guided by the policy makers of the CUTLER consortium involved in the specific pilot;
- discuss how they could use the platform to create dashboards that would assist them in making decisions about policies that concern or interest them;
- share experiences about the current policy making practices adopted by their organization, talk about the challenges they are usually facing, and discuss how the CUTLER platform could be integrated in their internal decision making process and what benefits it could offer.

In the following subsections, we briefly present the events that we plan to organize in each pilot city, focusing on their objectives and content, partners involved, target audiences, tools to attract participants, etc.

8.1 Event in Thessaloniki

Tentative event title	<i>Designing, implementing, and monitoring urban development policy measures related to the Controlled Parking System of Thessaloniki using an innovative big-data based decision making tool</i>
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Objective:

This event aims to introduce local decision-makers and citizen organizations from Thessaloniki to the CUTLER project, focusing on how the CUTLER platform is used to assist policy makers in the Municipality of Thessaloniki. The project partners will present the policy measures examined in this pilot (i.e. optimization and supervision of a controlled parking system), explaining the challenges and problems they have been dealing with and the ways in which CUTLER helped them in making more accurate and efficient decisions, backed-up by real data collected by and from the city and its citizens.

The Municipal Police will demonstrate live the use of the multi-faceted dashboard and explain what kind of data they use and what kind of decisions they can make based on this data. Moreover, a hands-on session will also be organized that will allow participants to interact with the dashboard themselves and explore the different facets and visualisations.

A discussion will follow that will analyse the advantages and limitations of the CUTLER tool and explore the ways in which it can be improved or adopted for other policy measures that are of interest to the participants.

Tentative agenda:

- Welcome addresses by city representatives (e.g. mayor, deputy mayor etc.)
- Introduction to the CUTLER project

- The pilot of Thessaloniki: Use of big data for the optimization of the controlled parking system of the city
- Demonstration of the multi-faceted dashboard to assist the Municipal Police in supervising and improving the controlled parking system
- Hands-on session (attendees exploring the dashboard)
- Experiences from other CUTLER pilots
- Short presentation of other related projects (H2020 or other)
- Discussion

Organizer:

The event will be organized by the Municipality of Thessaloniki with the assistance of CERTH and DRAXIS.

Target audience:

The workshop will be addressed to local stakeholders, including municipal policy makers, politicians and data scientists, but also citizen organizations interested in policy co-creation and transparent decision making in public administration. Policy makers will come from both the Municipality of Thessaloniki as well as from other municipalities in the metropolitan area of Thessaloniki and the Region of Central Macedonia.

Tools to attract attendees:

Stakeholders will be contacted using the social media of the Municipality of Thessaloniki (also of partners CERTH and DRAXIS), press advertisements, official invitations and emails. The Municipality will use its existing networks, such as the Central Union of Municipalities of Greece, and established connections with local citizen and business associations to promote the event to interested stakeholders. CERTH will use its network of local academic and business partners to invite people from the local universities (University of Thessaloniki and the University of Macedonia) while DRAXIS will promote the event to its business partners interested in environmental aspects of policy making.

Estimated number of attendees:

30-40 participants

Duration:

Half-day event

Date:

September-December 2020

Venue:

City Hall, Municipality of Thessaloniki (or other suitable venue of the Municipality)

8.2 Event in Antalya

Tentative event title *Big data analytics and evidence-based decision making: Using the CUTLER platform to design, implement and evaluate policy measures for increasing visitor numbers at Düden Waterfalls*

Objective:

This event aims to introduce public administration decision-makers and data scientists from Turkey to the CUTLER project, focusing on how the CUTLER platform is used to assist policy makers in the Municipality of Antalya. The project partners will present the

policy measures examined in this pilot (i.e. measures for increasing recognition of the first Düden Waterfall area and attracting more visitors such as the use of water pumps to maintain the water level throughout the year), explaining the challenges and problems they have been dealing with and the ways in which CUTLER helped them in making more accurate and efficient decisions, backed-up by real data collected by and from the city and its citizens and visitors.

The event will include a live demonstration of the multi-faceted dashboard, during which policy makers from Antalya will describe what kind of data they use and what kind of decisions they can make based on this data. Moreover, a hands-on session will also be organized that will allow participants to interact with the dashboard themselves and explore the different facets and visualisations.

A discussion will follow that will analyse the advantages and limitations of the CUTLER tool and explore the ways in which it can be improved or adopted for other policy measures that are of interest to the participants.

Tentative agenda:

- Welcome addresses by city representatives
- Introduction to the CUTLER project
- The pilot of Antalya: Use of big data to explore opportunities for increasing visitor numbers at the first Düden Waterfall area
- Demonstration of the multi-faceted dashboard developed for Antalya
- Hands-on session (attendees exploring the dashboard)
- Discussion

Organizer:

The event will be organized by the Municipality of Antalya with the assistance of SAMPAS.

Target audience:

The workshop will be addressed to local stakeholders, including municipal policy makers and data scientists.

Tools to attract attendees:

Stakeholders will be contacted using the social media channels of the Municipality of Antalya and SAMPAS, official invitations and emails. The Municipality of Antalya will also use its existing networks and established connections with local citizen and business associations to promote the event to interested stakeholders.

Estimated number of attendees:

40-50 participants

Duration:

Half-day event

Date:

September - December 2020

Venue:

City Hall, Municipality of Antalya

8.3 Event in Antwerp

The City of Antwerp wants to link this event to an existing opening-event that will be organized when the garden street in Lange Ridderstraat is finished. Due to a delay in the design process of the garden street, it is possible that this event will take place after December 2020. In that case, the pilot-specific event take place in the context of the “*climate-resilient green roof symposium*” organized every year in the city by Stadslab2050⁷.

Tentative event title	<i>Official opening of the garden street in Lange Ridderstraat Sint-Andries</i>
Objective:	This event will be organized to officially present the new garden street in the Lange Ridderstraat to the citizens and other relevant stakeholders who worked closely together at this project. The demonstration of the CUTLER dashboard will be an important feature during this event. A separate CUTLER booth where people can use the dashboard and get an introduction will be used.
Tentative agenda:	<ul style="list-style-type: none"> • Introduction to the CUTLER project • Presentation of the multi-faceted dashboard to assist policy makers in the development of the Waterplan and the implementation and monitoring of measures like the garden street • Demonstrations and hands-on use of the dashboard
Organizer:	The event will be organized by the City of Antwerp.
Target audience:	The workshop will be addressed to citizens living in the area of the new garden street, visitors, passengers, stakeholders, urban planners and other local stakeholders.
Tools to attract attendees:	Stakeholders will be contacted using the social media channels of the City of Antwerp (and IMEC), official invitations and emails. The City of Antwerp will also use its existing networks and established connections with local citizen and business associations to promote the event to interested stakeholders.
Estimated number of attendees:	50 participants
Duration:	Half-day event
Date:	September – December 2020
Venue:	Lange Ridderstraat, Antwerp

⁷ <https://stadslab2050.be/>

8.4 Event in Cork

Tentative event title *Big data analytics and evidence-based decision making: Camden Fort Meagher and the CUTLER platform*

Objective:

This event aims to present the CUTLER project and its outcomes to the Camden Fort Meagher Designated Activity Company (DAC) and the Stakeholder Working Group, which includes members of the local community and active members of the Fort's conservation group. The pilot leader CORK will present the project to those attending and outline any issues experienced to date and the process that was involved in the formulation of the multi-faceted dashboard. A run-down of the co-creation events and public engagement methods used to date will also be presented, in order to illustrate how this information has informed the dashboard.

The main aim of the event will be to demonstrate how the dashboard can be used to inform future policy on 'improving access to the Fort'. Cork County Council pilot partners will present the CUTLER dashboard to those in attendance and illustrate how this will assist in informing future policy. A discussion regarding the various data sources used to inform the dashboard will also be conducted as part of the presentation. Those attending will then be invited to interact and use the dashboard themselves.

Cork County Council will endeavour to post events and news items relating to the CUTLER project on both the project and organisational social media platforms.

Tentative agenda:

- Introduction to the CUTLER project
- Public consultation and social data gathering process
- Dashboard presentation
- Demonstration and hands-on use of the dashboard
- Discussion

Organizer:

The event will be organized by the Cork County Council with the assistance of BLP.

Target audience:

The workshop will be addressed to the Camden Fort Meagher Designated Activity Company, local stakeholders and members of the Working Group, Policy Makers and Planners from Cork County Council.

Tools to attract attendees:

Stakeholders will be contacted via Cork County Council's mailing list, as well as publicising on social media and official invitations. The Local Authority will also use existing networks and contacts to spread the word regarding the event to attract more participants.

Estimated number of attendees:

30-40 participants

Duration:

Half-day event

Date:

September – December 2020

Venue:

TBC - Camden Fort Meagher, Tea Rooms or County Hall, Cork

9. Networking events and open days

In addition to the pilot-specific events, a **series of networking events** aiming at policy makers, industry and the scientific community on an EU-level will be organized. These focus on promoting and communicating project outcomes through short presentations dealing with different aspects of using big data for policy making, also showcasing how these aspects have been dealt with in the different city pilots.

Moreover, **open days** are planned to be organized by the Coordinator and project partners to allow the general public but also interested stakeholders to get acquainted with CUTLER technologies and achievements. These will include live demonstrations of the CUTLER platform and dashboards and will allow attendees to interact with them.

In the following subsections, we briefly present events that have already been organized as well as our ideas and plans for future events.

9.1 Networking events

Several networking events have already been organized by project partners during the first half of the project, while more events are planned in the second half.

More specifically, DELL secured internal funding to host a **series of events in Brussels** aiming to demonstrate how the CUTLER platform helps European cities to exploit large data sets so as to better manage their administration, improve their decision making and connect with citizens. This commitment from DELL shows the strategic alignment of the efforts within CUTLER that map to DELL's digital transformation journey and focus on digital cities. Three events have been successfully hosted in Brussels promoting the CUTLER project under the banner "**Big Data 4 Policy Making: Big data for evidence-based public policy. How four waterfront cities are using large datasets to learn how to better run urban administrations**". A website with information on the events was also set up (<http://www.bigdata4policymaking.eu/>).

- The first event was hosted in BeCentral, at the heart of Brussels on June 19th, 2018. There was an audience of approximately 30 people representing industry, academic and regional bodies. The speakers at the event were as follows:
 - Filareti Tsalakanidou (CERTH): General introduction of CUTLER. Developing a platform that helps policy makers design, implement and monitor policies for cities that have water integrated into their urban fabric, with a view to safeguarding social cohesion while achieving environmental protection and economic growth objectives.
 - Rebecca Beeckman (ANTWERP): Views from a city administration. Integrating big data to improve the city's climate adaptation policy as a basis for developing and evaluating a strategical water plan.
 - Andrew Byrne (DELL): Technology discussion of the CUTLER platform. Creating a cloud-based big data analytics platform with a data visualization frontend, using secure large scale storage and processing infrastructure.
 - Pierre Dewitte (KUL): Legal aspects of CUTLER.
- The second event was hosted by Ms. Eva Kaili (Member of the European Parliament from Thessaloniki, Greece) in the European Parliament on October 17th, 2018. There were approximately 30 people in attendance, an audience of academic, industry and municipal representatives, with more of an emphasis on representatives from regional and public administration bodies. The speakers at the event were as follows:

- Andrew Byrne (DELL): Technology discussion of the CUTLER platform. Provided an update on the CUTLER platform from the physical infrastructure to the big data platform.
 - Holger Haberstock (EUD): Developing a business process model to integrate big data applications into local political and administrative processes.
 - Georgios Papastergios (THESS): Views from a city administration -Using big data to set up a controlled parking system as part of implementing a smart transport strategy.
 - Pierre Dewitte (KUL): Underpinning legally how public entities handle big data applications.
- The third event was hosted by Dell EMC and EuroCities on April 2nd, 2019. With EuroCities hosting, there was increased representation from regional and public administration bodies. The speakers at the event were:
 - Andrew Byrne (DELL): Creating a cloud-based big data analytics platform with a data visualization frontend, using secure large-scale storage and processing infrastructure.
 - Jun Sun (UNIKO): Using data analytics to detect social media trends, visualize and integrate them into decision making of local governments.
 - Maire Daily (CORK): Interpreting statistical, demographic, sensor and user generated data to improve how economic, environmental and social planning strategies are designed.
 - Pierre Dewitte (KUL): Underpinning legally how public entities handle big data applications.

A fourth event is scheduled for autumn 2019. Also there are discussions to put forward a proposal for further events into the third and final year of the project. In Figure 9-1, photos from these events are shown.



Figure 9-1: Photos from the three networking events on "Big Data 4 Policy Making" organized by DELL in Brussels.

Hosted by **DELLEMC** and **EURO CITIES**

BIG DATA 4 POLICY MAKING

Waterfront Europe - "The River" - Square de Maelie 35, 1050 Brussels
2nd of April | 10:00-12:30

Big data for evidence-based public policy

how four waterfront cities are using large datasets to learn how to better run urban administrations

Join us on 2nd of April at 10:00 in Brussels for the third "Big Data 4 Policy Making" session hosted by Dell EMC and EURO CITIES

Learn about how four waterfront cities – Antwerp, Antalya, Thessaloniki and Cork County – are using large datasets to improve public policymaking. The cities have teamed up with academic and technology partners in a Horizon 2020 research project that looks at integrating big data applications into how cities run political and administrative processes.

[MORE INFO AND REGISTRATION »](#)

You will hear from:





<p>Cork County Council</p>  <p>Darragh O'Suilleabhain EU Project Manager</p> <p>Views of a local authority administration Interpreting statistical, demographic, sensor and user generated data to improve how economic, environmental and social planning strategies are designed.</p>	<p>Dell EMC</p>  <p>Andrew Byrne Senior Research Scientist</p> <p>The technology side Creating a cloud-based big data analytics platform with a data visualization frontend, using secure large-scale storage and processing infrastructure.</p>
<p>University of Koblenz Landau - UNIKO</p>  <p>Chandan Kumar Senior Researcher</p> <p>Big data analytics in social media Using data analytics to detect social media trends, visualize and integrate them into decision making of local government.</p>	<p>University of Leuven</p>  <p>Pierre Dewitte Researcher in Information Technology Law</p> <p>Legal aspects Underpinning: legally how public entities handle big data applications.</p>

Figure 9-2: Invitation to the 3rd networking event on "Big Data 4 Policy Making" organized by DELL in Brussels in April 2019.

On May 19th and 20th, 2020, IMEC will organize its annual partner event, called Future Summits⁸. During this event, a special track is setup for Smart Cities. In this track, we are planning to setup a breakout session to present the CUTLER project to the attendees of the event.

Moreover, on October 8-11th, 2020, the Supernova⁹ conference will be organized in Antwerp. Supernova is a big technology festival, with a tech fair, where IMEC is one of the main sponsors. Both the IMEC booths as well as the breakout sessions reserved for IMEC gives us the possibility to present the CUTLER project to the attendees of the conference.

⁸ <https://www.futuresummits.com/aiflanders>

⁹ <https://www.supernovafest.eu/supernova-2020/>

9.2 Open days

An open day is planned by CERTH for the last months of the project (autumn 2020) to showcase the final project outcomes to the general public, scientific community, IT companies and local policy makers. The event will be organized in the premises of CERTH in Thessaloniki and will involve a short introduction to the project and several live demonstrations of the final versions of the dashboards developed for the four city pilots. The audience will be able to interact with the dashboards to obtain a hands-on experience of the offered CUTLER services. A discussion will also take place allowing the exchange of ideas on how the CUTLER platform can be exploited by local public administrations and how the offered services can be improved, while also exploring more general ideas on how to effectively integrate and combine the layers of citizen-generated and governmental data to provide cities the means to advance from an analog governmental approach to analytics-driven decision-making. Participants will be invited using social media and CERTH's mailing lists (including thousands business/academic partners and stakeholders from Thessaloniki and Greece in general).

10. Hackathon

A **hackathon** will be organized during the last months of the project, allowing communities to learn the CUTLER platform hands-on, build new components and win prizes. Provided with consortium mentoring, attendants will leverage the advantage of predictive analytics on economic, social and environmental data to implement their own ideas on how to facilitate decision makers in policy development. Target audiences include student groups and networks, freelancers, hacking communities and start-ups.

The main theme of the hackathon will be:

Smart analysis and intuitive 2D, 3D and Mixed-Reality visualizations of environmental, social and economic data to support evidence-based policy making in public administration at a city level

In the following subsections, we explore our ideas for the organization of such an event.

10.1 The goal – Main theme

The main goal of the hackathon is to create, propose and test new ideas and solutions that complement the already reached solutions developed in the project framework, enhancing ideas the project consortium might have not explored. By joining the CUTLER hackathon, participants are expected to design and create new big data related applications and data visualization services, using data coming from environmental sensors spread across the city, economic data, as well as data collected from participatory platforms and social media users. Each participating team is expected to provide dedicated software that performs efficient data analysis and smart data visualizations.

The hackathon event will take place in the University of Oulu in Finland. There, developers, students, data scientists, AI researchers and enthusiasts about smart policy making focusing on cities will compete with each other to create software that meets the above requirements, by using their programming skills. Also, familiarity with basic IoT and data analysis concepts will be necessary.

Participants will be provided in advance with the data to be used towards this goal, as well with already available open software developed for CUTLER needs, so as to implement their solutions in a timely manner. The hackathon will be a one-day event, during which the necessary software solutions for the aforementioned objectives and tasks are expected to be finished. Moreover, prior to the event, mentoring will be provided to the participants of the contest, along with a thorough introduction to the CUTLER concept, background knowledge, objectives and outcomes.

10.2 Hackathon participants & required skills

The event is suited for both experienced and less experienced developers and AI practitioners who are expected to utilize software and city-related datasets to build plugins for the CUTLER platform. Our target group includes developers working at companies, students, researchers at Universities or the Industry, big data scientists, and policy makers that analyse big-data to support their decision-making processes.

Required skills include:

- machine learning;
- probabilistic data analysis;
- Elasticsearch for data processing;
- Kibana for data visualizations;
- Apache Hadoop ecosystem.

10.3 Venue, date and organizer

The hackathon will take place in the Tellus Innovation Arena at the University of Oulu in October 2020. Tellus Innovation Arena is an open “smart environment” located at the heart of Linnanmaa Campus area (Figure 10-1). It is built for learning, collaboration and events for all open-minded explorers from inside and outside of the university. The selected venue hosts numerous hackathons around the year, and notable past challenges include the first 5G-technology hackathon 5G FWD¹⁰ and the OuluHealth Hack¹¹ (Figure 10-2).



Figure 10-1: Tellus Innovation Arena: a) Tellus Main common area (left) and b) Hackathon taking place in Tellus Park (right) (Source: oulu.fi/tellusarena).



Figure 10-2: a) OULU 5GFWD Hackathon (left) and b) OuluHealth Hack (right) (Source: businessoulu.com).

10.4 Organization details

In the following, we provide some details about the organization of the hackathon event.

¹⁰ <http://www.5gfwd.org/>

¹¹ <https://www.oulu.fi/tellusarena/node/52249>

10.4.1 Hackathon call

First, we will prepare a Call for Participation that will be promoted to possible interested parties to invite them to participate in the Hackathon. This material will include information about:

- the CUTLER project, its objectives and outcomes;
- the available data to be processed and visualised;
- hackathon objectives regarding analysis and visualization of this data;
- participants encouraged to register;
- registration procedure;
- hackathon venue, date and schedule;
- prizes;
- rules;
- organizing committee.

The Call will be disseminated and promoted via the different project dissemination channels (social media, website, mailing lists, newsletters, etc.) as described in Section 5.

The final outcome of the Hackathon challenge will be functioning prototype Kibana-based dashboards supporting policy making with regard to:

- a) The economic and urban development of Thermaikos Bay in Thessaloniki;
- b) The transformation of Düden Brook in Antalya into a recreation area;
- c) The implementation of a WaterPlan in Antwerp; and
- d) The touristic exploitation of Camden Fort Meagher in Cork County.

CUTLER datasets to be used for testing and experimentation will include:

- Economic data for sensing the economic activity;
- Social data for sensing the social consequences;
- Environmental data for sensing the environment;

These data will be coming from the pilot cities of the project but also from international organizations like OECD and Eurostat.

Lastly, information about the **kaggle.com** website (a portal powered by Google that disseminates contests and courses about AI and ML) will be provided, which will play the role of the platform that we plan to utilize for the Hackathon so as the participants can program and create the necessary software. Also, this website can invite and attract many potentially interested programmers and AI enthusiasts to participate.

The data will be uploaded to kaggle.com so as to preserve the data and enable future development beyond the duration of the hackathon.

For the hackathon, we will adopt the “Official Rules” of the Ultrahack Challenge (<https://ultrahack.org/rules#>).

10.4.2 Registration of teams

An online registration form will be developed to allow registration of teams that wish to participate in the hackathon. When registering teams should provide information about:

- Names of the team members;
- Affiliations;
- Short description of the idea they foresee to implement and its added value for the CUTLER platform.

Once this information is provided, a confirmation mail that they have successfully registered will be sent. This receipt will be used to prove their identity, necessary for the Hackathon event.

10.4.3 Mentoring

An important preparation stage for the hackathon will be the mentoring of the teams that will participate in the hackathon so as to be prepared for the contest.

A mentoring committee will be established comprising of CUTLER technical partners with diverse expertise on big data processing (economic analysis, environmental modelling, social analysis, data crawling, cloud, etc.) but also policy makers that offer the perspective of the end-user.

The committee members will act as mentors to the participating teams. Several Skype calls will be organized to discuss the ideas proposed by the teams and provide guidance on basic concepts of big data analysis, while emails will be exchanged to solve possible problems.

10.4.4 Hackathon one-day event

The Hackathon, as a one-day event, will consist of the following stages:

- 1) Welcoming the registered participants;
- 2) Introduction to the Hackathon objectives, rules and evaluation criteria
 - a. Make clear concepts if needed;
 - b. Introduce the platform where the development will take place;
 - c. Introduce the facilities used to store and retrieve the data;
 - d. Answer questions.
- 3) After that, people will present their ideas, which will be written down for evaluation.
- 4) The Hackathon begins at the afternoon, continues during the night and is completed the next day. The participants' ideas will be implemented using different programming languages.
- 5) During the contest, snacks and drinks will be offered.
- 6) Evaluation of the results will take place after the end of the development contest.
- 7) Finally, the committee will declare the winners (the three best developers) and the prizes will be given to them.

10.4.5 Remote participation

We will also explore the idea to allow remote participation for the CUTLER Hackathon. More specifically, we will consider to call participants to register, connect and work by developing software in a remotely manner. This is important, since, in this way, more people from the cities for which we provide data may be able to attend and thus attract and appeal to a greater audience. In addition, remote participation will also enable the involvement of disadvantaged groups and will minimise the overall carbon footprint of the event.

To achieve this, we will prepare remote connection software and then employ it to allow the above mention procedure, i.e., registration, connection and remote contest participation. One possible solution is to use Kaggle.com, which is the platform that will be used by the participants for the development tasks. There, they can upload their code and test it on the datasets provided by the CUTLER project. Also, this platform offers a way to attract contestants.

10.5 Evaluation and awards

A committee will be established to evaluate the results of each contesting team of developers so as to provide awards to the teams with the best ideas and implementation. For a fair evaluation that will be based on rigorous and scientific criteria, the committee will include both: a) technical partners with expertise on big-data analysis and development of dashboards for policy-making, and b) policy makers from pilot partners who will evaluate the quality of the created dashboards as real end-users.

More specifically, the committee will decide which among all solutions meets the established criteria, which will mainly focus on the usability and the practicality of the solution as this is seen from the real end user perspective.

The committee will assign scores for the different criteria to the solution developed by each team. The three teams with the greatest average score will be given awards. More specifically, there will be three prizes:

- 1) 3,000 euros for 1st place;
- 2) 1,500 euros for the 2nd place; and
- 3) 500 euros for the third place.

10.6 Cloud infrastructure

In practice, participants will need servers to store, manage, and process data. If Hadoop is a requirement for the hackathon, DELL could provide a playground with a configured environment. Another option is to see if we can get Azure, Google Cloud, or AWS vouchers/credits.

11. Conclusions

D10.4 presented a strategy for building an ecosystem around CUTLER using variety of communication, promotion and demonstration tools ranging, including both online activities as well as physical events.

To this end, we have designed engaging promotional material in the form of short leaflets and video, presenting various aspects and technologies of the project. This material will be used as part of an online awareness campaign based mainly on social media and email communication, aiming to raise public interest on CUTLER-related issues and educate stakeholders on the opportunities offered by big data analysis for evidence-based decision making with regard to urban development policies in waterfront cities.

With training being at the core of our ecosystem building activities, we have presented a plan including both online activities and events with physical presence. Online activities include a) the creation of educational material such as open software, manuals for using or integrating platform components, and short reports discussing different aspects of using big data to support policy making and the approach adopted by CUTLER; and b) the organization of a series of thematic webinars to educate interested stakeholders (data scientists but also policy makers with an interest on big data exploitation) on the project's scientific background and the different CUTLER modules.

Besides the aforementioned online engaging and educational activities, our ecosystem building strategy includes three types of physical events, i.e. pilot-specific events, networking events and a hackathon. More specifically, we presented detailed plans for the organization of four pilot-specific events to be organized in the four CUTLER pilot cities during the second pilot phase, aiming to demonstrate and promote project results to local stakeholders and local communities.

In addition, a series of networking events aiming at policy makers, industry and the scientific community on an EU-level have already been launched and will continue in the next period. They include a series of events organized by DELL in Brussels, bringing together an audience of academic, industry and municipal representatives and aiming to demonstrate how the CUTLER platform helps European cities to exploit large economic, environmental and social datasets so as to improve their decision and policy making processes.

Moreover, open days will be organized during the final months of the project partners to allow the general public and stakeholders to get acquainted with CUTLER technologies and achievements. Finally, a hackathon will also be organized allowing communities to learn the CUTLER platform hands-on, build new components and win prizes, supported by project partners acting as mentors.

Work during the second period of the project will focus on the implementation of the ecosystem-building strategy described in this deliverable.