Overcoming Language Barriers Through an Interactive Platform for Public Engagement

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Abstract

The article discusses the framework for a city visioning platform which can offer a public participation in energy-related actions and support the social acceptance of energy transition. The platform has a dual feature: a. the interactivity of the platform is based on crowd-sourcing tools, open linked data approach, trend mining and scenario building tools to address the gaps in urban planning for energy supply, traffic management and governance practices that have been criticized for being exclusive, top-down and short sighted; b. the platform will act as an intercultural & linguistic mediator by offering the opportunity to the community to interact with people from different cultures in all European languages, stimulation of interest and critical thinking, the opportunity to engage in constructive dialogues and projects, capitalizing on the skills and creativity of the participants.

Keywords: Interactive platform, linguistic mediator, open linked data, energy supply, traffic management

Introduction:

According to the UN (2014) report on population development, 66% of the world's population will live in cities by 2050 (in Europe this figure is already 73%), compared with 3.9 billion today, impacting the conditions for economic growth (see Figure 1).

The potential market is represented by cities above 10.000 inhabitants worldwide (City population, 2015). Europe is the biggest market by number of cities, while Asia and Africa are the biggest markets by population.

Provided the medium term perspective this is paramount since it can be expected that urbanization will continue there and the number of cities will rise.

OVERVIEW	# of cities	Population
EUROPE	8.703	537.471.000
AFRICA	3.921	1.074.777.918
MIDDLE EAST	421	120.642.000
ASIA	7.758	3.861.884.000
N-AMERICA	1.402	357.344.000
S-AMERICA	4.435	495.999.298

Figure 1. World Urbanization

However, many leaders in developing countries will have to cope with urbanization on an unprecedented scale, while those in developed countries face aging infrastructures and large budgets (McKinsey & Company, 2013). Urban change is driven by simultaneous changes in the environment, technology, economy, politics, social practices, infrastructure, culture, etc. (Hodson and Marvin, 2009). Citizen participation in these processes is essential but incumbent institutionalised practice can hamper citizen participation in policy processes. Smart Governance has become a driving force in improving urban areas. Many authors argue that, "by embracing ICT technologies, citizens and their officials can transform the local government, into a more responsive, transparent, and cost-effective entity" (Goldsmith and Crawford, 2014:1).

Currently, the world's population is facing increasing global carbon emissions that endanger the global ecosystem. Experts have foreseen that a large portion of the European energy supply will reach the end of its lifetime within the next two decades. Since 2014 was the warmest year ever registered, new strategies have been built by relevant energy-profile companies to ensure there is enough energy for everyone, by renewing the energy efficiency through solar energy, wind turbines, etc.

Nowadays the economic activity, innovation processes, and growth are influenced by data and networked infrastructures. Therefore, to build upon and gain value from these processes and Big Data, academic institutions, public and private research centres are urged to develop and deploy: Efficient Technologies for sensing, storing, computing; Complex Systems Methodologies for analysing and extracting meaning from data; Suitable Policies and Protocols for the governance of data and processes. (Carbone et al., 2012: 436). A framework for analysis of interconnector projects is proposed by (Puka and Szulecki, 2014: 124-134), including a set of hypotheses that could account for the stall in interconnector development. Their hypotheses relate to inadequate funding, governance and management issues, as well as political discourses and perceptions. Using the

case of the German-Polish border, they draw on document analysis and stakeholder interviews to evaluate their hypotheses.

It is imperative to elaborate energy-effective solutions for managing our increasingly dense interconnected world. The so-called "emerging energy web" is discussed in a paper with the same title and problems are tackled in multiple dimensions - technology, society, economics, law, regulations, and politics, at different temporal and spatial scales. The paper concludes that holistic approaches will enable technological solutions to be supported by socio-economic motivations, adequate incentive regulation to foster investment in green infrastructures coherently integrated with adequate energy provisioning schemes (Ajmone-Marsan et al., 2012: 547-569). Other authors emphasize that globalization and competition between cities have changed the style of city governance, and it is worth mentioning the shift from the managerial style to the entrepreneurial style which is characterized by a strategy for pro-economic growth (Tetsuya Shimomura and Tadashi Matsumoto, 2010).

Many developing countries skipped the communications infrastructure and leaped to Mobile Telephony. Hereupon, the already investigated concept of M-Governance will help these countries directly to adapt mobile technologies for economic development, social improvement and greater level of civic engagement (Sridharan, 2015: 254-255). The delivery of M-governance for its users or customers is expected to play a significant role in developing countries where the conventional government infrastructure and E-government infrastructure is lacking. The main factors for M-governance are: (a) Wider acceptance in the public sector (b) Smartphone penetration (c) Ease of use for citizens (d) Easier interoperability (e) Bring citizens closer to government (f) M-government services are cheaper to deliver. M-governance can play a very important role in policy formulation and participation by making it citizen centric and by adopting a cooperative model of governance, whereby all stakeholders are given the opportunity to participate. Thereby, governance is made transparent enabling citizens to measure the outcomes and their impact on their quality of life (Ibidem: 251-254).

Our paper is organized as follows: Section 1 explores the current issues that cities face and highlights relevant studies about smart energy and traffic management. Section 2 outlines the goals of our work and discusses the research methodology, whereas Section 3 describes the implementation strategy. Finally, Section 4 lists the results and impacts of the project and Section 5 concludes the subjects discussed in the paper.

2. Methodology

2.1. Goals

The following goals will lead to significant results for urban planning in energy supply through smart governance that makes cities more responsive and involves relevant stakeholder groups to work out new solutions for energy supply and traffic management:

(a). Collaborating tightly with stakeholder groups for further city-oriented strategies to make a promising future for EU small cities and reinforce their citizens and public institutions.

(b). Creating methodologies that enable smart governance by means of ICT, paying particular attention to the availability, quality, usability and interoperability of the datasets. Sharing knowledge about energy efficiency missions in order to increase awareness of the current performances for citizen energy savings and traffic management.

(c). Finding new solutions for smart cities and target cities in particular by attracting investments in renewable energy and by reducing the energy costs and CO2 emissions in a future marked by more technological booms.

(d). Promoting an efficient framework for civic engagement through smart-data governance and measures to assess how well each proposed methodology (open data, linked data, data visualisation, etc.) leads to city responsiveness and smart community.

(e). Developing an interactive framework for strategic visioning based on multilingual methodologies supporting ICT that will drive participation in decision-making, public and social services, transparent governance, and political strategies.

2.2. Research agenda

It encompasses applied and strategic research that will be carried out according to a two-fold plan:

(a). Presenting and adapting concepts of open smart governance adopted by city halls that will reinforce and serve citizens from the web of data perspective - open linked data, knowledge and data reuse and valorisation, urban data visualization and civic engagement paradigms.

(b). Conducting in-depth analyses on how to leverage technology in the smart cities to foster multi-stakeholder engagement and to create public and economic value, on one hand, and sustainability and smart growth on the other hand. In this respect our research agenda addresses social issues like energy supply, traffic congestions, specifically through a vision for energy innovation hub that will crop relevant results and answers by engaging large stakeholder groups, decision makers, cities and citizens in a fruitful dialogue and by making them collaborate in order to answer the following questions

and thereby co-create new knowledge: How to overcome barriers to energy efficiency in order to steer cities in a greener direction so as to build a more energy future independent Urban Europe?; How to diminish fuel consumption, traffic congestions and renew continuously the energy supply in general and, in particular, in the target city (Lugoj in Romania) relying on open linked data?

2.3. Development and innovation agenda

It aims to enable the implementation of smart city strategic visioning platform by mixing elements from ICT developers concerning energy-relevant technologies, experimental development actors such as living lab engineering and specific actors to identify citizen needs through public participation and social acceptance actions. Recent research deals with new concepts and information technologies (IT) that support group decision-making. In this regard, an iDS (intelligent Decision Support) platform can support the activities in a group decision-making and cover collaborative and group decision sessions, as well as individual decision sessions in a way that users on each decision stage are free to collaborate with other users (Cândea and Filip, 2016).Unlike other works that have integrated IoT (Internet of Things) and Social networking to lead to a new paradigm called Social Internet of Things (Kowshalya and Valarmathi, 2016), our platform will offer a scenario building tool based on linked data approaches and visualization methodologies. The energy innovation hub will involve IT developers, academia, city halls, industry actors, etc. to co-create knowledge for energy efficiency, test new solutions (traffic management apps) and enhance the collaboration among stakeholders, by informing and being in permanent contact with the target audience. Social Media integration will demonstrate that people do matter and will play a key role in challenging the community to answer several questions and collecting opinions of citizens and stakeholders from the target cities about energy supply and traffic decongestion - approximately 4000 people will be targeted for the online engagement.

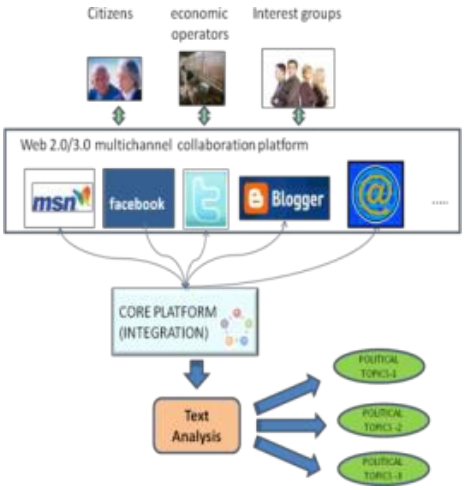

Figure 2. Scenario building tool

Even if opinions are correctly extracted from texts, they need to be aggregated and summarized to be properly analysed. Creating single-document summaries of reviews is recognized to be a difficult task (Pang and Lee, 2008). It is in general limited to the clustering of texts by topics and within each topic; texts are organized by the type of sentiment (Radev et al., 2002). The most popular topic identification technique is Latent Dirichlet Allocation (Blei et al, 2003) and its application to sentiment summarization (Chang and Chien, 2009). To fit into a single document, only prototype texts are selected, hoping that they cover the significant opinions expressed in their cluster. Many sentence selections algorithms are based on information retrieval techniques that identify the smallest subset of opinions such that they cover the whole dataset when used as queries (Cardie et al., 2003). Benefiting from the open linked data, our multi-disciplinary collaboration will enhance a multilingual program in the target cities, offering great opportunities for any citizen to find project partners, participate in groups, workshops, events, and language training seminars, learn about enery-related issues and traffic management, enhance intercultural support (e.g. organization of intercultural events) and resources (e.g. video tutorials, multilingual mobile app) made available by other platform users. The platform allows citizens to share experiences internationally in an online member community about energy measures, traffic management, tips for tourists, language seminars, cultural and intercultural events, etc. (see also Meta Tehnology Council (2013). Moreover, it ovecomes language barriers as translations are performed automatically - when one posts in a language it will be automatically translated to the reader's language and vice versa.

The target groups will offer geographical data (coordinates) of construction sites in a specific city area, and lists of streets affected by the construction site. A team of developers will build an application to improve traffic and reduce consumption of fuel. Municipality officials can use a web platform to update infrastructure projects and set a radius that signals the area affected by these projects. Drivers, in turn, can install a mobile application that will automatically alert them if they are closing in on an area that is affected by road works, allowing them to choose a different route. The ICT developers will build a database of brands and models of cars and each car owner who has the application installed can enter the actual consumption of the car.

3. Implementation

Implementation is based on an active methodology which reduces risk and allows our planning to adapt to changes quickly as follows:

- Management and coordination.

The overall objective is to ensure the academic leadership, to coordinate the technological progress, operational tasks, administration and finances of the project, to communicate with the JPI - Urban Europe funding authorities and to coordinate and supervise the multi-disciplinary team of European partners to realize the deliverables and milestones according to the work plan.

- Policy scenario modelling and urban vision methodology.

It will focus on presenting and adapting concepts of open smart governance adopted by city halls that will reinforce and serve citizens from the web of data perspective. In-depth research will be conducted on how to leverage technology in smart cities to foster multi-stakeholder engagement and to create public and economic value, on one hand, and sustainability and smart growth, on the other hand.

- Software framework and social media integration

Within this work package we establish a software framework which supports the vision building process and integrates the following components: linguistic & intercultural tools, crowd-sourcing tools (through social networking), linked data approach, mobile interface, trend mining, vision building tools and energy-relevant technologies. The next step will be to collect user requirements: define users' requirements together with scientific and city partners of the consortium; prepare software architecture/design: high level architecture design; develop and test the prototype and its deployment for pilot operation.

- Linked data and visual trend mining and visualization

The advanced visualization facility for the interaction with the platform features, and the simulation results will consists of: the visualization of whole policy scenarios, consisting of their structure, content, processes, and

simulation parameters (semantic "policy-pedia"); the role-specific visualization and interaction, supporting different stakeholders and decision makers (policy-wiki); the visualization of stakeholder groups and their representation in "policy social networks".

- Validation and demonstration

It aims to demonstrate the potential of the Smart Paradigm approach and the assessment of results.

- Dissemination

It will focus on creating the awareness among governments and targeted audience through conferences and workshops across Europe and through publications. In addition sustainable strategy to ensure the future exploitation will be developed. The networking tool of the project is represented by three workshops organised in Bucharest, Lugoj and Vienna where relevant producers of energy technologies will be invited, such as representatives of the Ciel et Terre (France), Gaia Wind (UK), HyGear (Netherlands) and Dong Energy (Denmark). Moreover, the project consortium will connect to the other consortia of winning projects by attending the events scheduled by the programme JPI Urban Europe. In order to disseminate information, short presentations of the project and posters will be prepared in all languages of the EU, along with appealing presentations about the project contents, brochures and digital newsletters. Therefore, all consortium partners will contribute to the dissemination through the following activities: provide speakers for national and international conferences; elaborate papers and publish papers; elaborate dissemination material; prepare local press releases.

4. Results

The project will design and implement an interactive platform based on crowd-sourcing tools, linked data approach, trend mining and scenario building tools in order to address the gaps in urban planning for energy supply and traffic management, and governance practices that have been criticized for being exclusive, top-down and short sighted. Our project distinguishes from other relevant smart city projects (Citadel on the Move, 2014 and Living Lab Ghent, 2014) because it analyses a new smart governance concept - open and linked data and a concept for energy supply solution mirrored by an energy innovation hub where developers, academia, and energy-relevant actors engage with the local community and municipality of the Lugoj city to ensure a sense of commitment, more partnerships, to co-create knowledge for future solutions from available datasets and to predict local economic benefits. Moreover, this project could serve future projects, in the sense that our open linked data methodology for the target cities and data visualization paradigm can assist a further research on the topic "Integrated Data Visualization and Decision Making Solutions to Forecast and Manage Complex Urban

Challenges". Moreover, adopting the methodology and concepts for smart governance designed by this project in urban areas will gauge expected impacts such as:

- This smart paradigm will lead to the successful implementation of smart city technologies through collaborative ecosystem of sustainable and future proof innovations that improve life in the city and boost the economy.
- Improving existing planning and reporting mechanisms for energy and transport policies will reduce unnecessary administrative burdens.
- Placing ICT in the city mechanism will maximize the potential of new technological developments and strengthen information sharing and feedback mechanisms for the energy and transport sector since the platform enables instant knowledge sharing and interactive communication across language barriers.
- Engaging entrepreneurs and innovators to encourage and facilitate the use of public authorities' data to build future applications and services that will improve the lifecycle of the Lugoj city.
- Secure the competitiveness of the cities and improve the citizens' quality of life by using cutting edge technology and resource-efficient ways of governing the city.
- Ensure government transparency, accountability and administrative efficiency in the EU city.

5. Conclusion

Our paper describes a smart urban paradigm which is based on an innovative approach, promotes interdisciplinary research & development, and encourages the involvement of stakeholders and citizens through the concept of energy innovation hub, thus bridging gaps between research disciplines, decision makers, cities and transport/energy planners. It will join forces with a municipality – Lugoj and its citizens (approximately 400. 000 inhabitants), relevant business entities (e.g. producers of energy-relevant technologies), as well as suppliers of ICT urban services to increase awareness of the status quo for energy supply and traffic management and to co-create new knowledge that can lead to innovative and proactive solutions for energy efficiency and traffic management.

The smart urban paradigm will enable the modelling of new policy initiatives by taking account of all relevant parameters in the urban policy area. It will enable public administrations to develop growth strategies based on multiple scenarios so they will be in a position to better predict the impact of their policies perceived as inefficient to complex societal problems (e.g. global warming, demographic transformations, congested transport networks, etc.) with multidimensional interrelated aspects by evaluating policy scenarios.

A knowledge database of this smart urban paradigm will consider the vast amount of existing qualitative and quantitative data in member states, and forecasts and lessons learned from models and policies already implemented. It will be flexible enough to be applicable on a European basis and could be extended on a large scale, through a tight collaboration with relevant stakeholders worldwide. I believe that the implementation of this smart urban paradigm will display other novel and thought provoking aspects that could be addressed in a joint paper in the future.

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