PERIKLIS - Electronic Democracy in the 21st Century

Emmanuel Sardis[1(✉)], Panagiotis Kokkinos[2], and Magdalini Kardara[1]

[1] Institute of Communications and Computer Systems/ICCS, National Technical University of Athens/NTUA, Athens, Greece
{sardism, mania}@mail.ntua.gr
[2] Computer Technology Institute and Press "Diophantus", Patra, Greece
kokkinop@ceid.upatras.gr

Abstract. PERIKLIS platform encourages citizen participation and supports sophistication of electronic government services by leveraging the capabilities of location based services, social networks and web 2.0 technologies. In this paper a structured analysis is adopted for identifying the advantages, from the digital transformation of the government transactions and the electoral processes, exploring the notion of society members and the benefits for better life conditions through electronic transactions in a Municipality. Adopting a computing approach for e-government and voting methodologies with an easy setup and completion by its members is investigated, reviewing the availability of services through mobile and web based systems, coupled with geo location services. Furthermore, PERIKLIS proposes a high level e-governance and e-voting solution for a municipality while investigating issues that require further research for exploitation and interoperability with more than one Municipalities.

Keywords: E-government · E-democracy · SOA platform · Web services · Social networks · Voting system

1 Introduction

New trend technologies and their capabilities can assist e-government applications by enhancing user experience and thus encouraging the participation of citizens. In this paper, we present PERIKLIS, a platform that enhances interaction between citizens and between citizens and public services, through the use of mobile and social network technologies.

E-democracy builds online public space in the heart of real democracy and community [1, 2]. Our aim is to harness the power of online internet based tools for supporting the participation of city residents in public life activities, strengthen communities, and build democracy relationships. The integration of ICTs methodologies and tools into governance transactions contributes to informed populations, which are a basis for effective participatory governance. Mobile technologies have reached almost more than 90 % of population usage in many cases, increasing the related platforms and applications for e-government services for cities residents and visitors. Despite the relative infancy of technology especially in developing countries, anecdotal evidence

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suggests that access to government information has a beneficial economic impact [3]. Some developing countries are already engaged in transformation of the governance process through increased citizen participation and are attempting to create an open, transparent environment through convergence of information and services [4].

The e-government sector is beginning to encapsulate new trends and technologies like cloud computing, green e-government, mobile services, whole-of-government approaches that attract the citizen participation and especially the young people residents in cities. Various published studies [5] have ranked the following countries as leaders in e-government during 2011 and 2012: Australia; Canada; Denmark; Finland; France; Japan; Republic of Korea; Netherlands; Norway; UK and Northern Ireland; USA; Singapore; Spain; Sweden; Taiwan.

PERIKLIS platform attempts to create an open, transparent environment for municipalities through convergence of information and services. Reaching these ideas and transforming them into an electronic tool faces a lot of problems. A number of important issues already exist, as Big Data is changing the face of customer analytics, giving organizations new insight into customers' wants and preferences. A similar phenomenon is going on nowadays in the realm of politics and e-government [6, 7]. Many world cases like the 2012 U.S. national elections for the Democratic National Committee leveraged Big Data analytics to better understand and predict voter behavior and alliances [9, 10]. PERIKLIS platform's modules harness the power of social networks, couple them with services for e-government and voting. Also, PERIKLIS platform covers many of the Municipality needs utilizing big data manipulation techniques, statistical analysis and geo-location services. The aim of PERIKLIS platform is to present to the authorities a framework that will help them to develop thinking and planning about the approach that best fits their particular environment and purpose for e-services integration into their municipality.

2 E-Democracy

Information and communication technologies (ICT) present benefits and challenges to democratic development, since they can be used in a crosscutting manner, strengthening initiatives in governance, political parties, election processes, citizen participation, and gender programs.

Democrats and institutions in emerging democracies can be empowered to use ICTs as a tool to enhance the information sharing, efficiency and transparency which are crucial to build and sustain democracy.

Providing access to all city citizens, old people with no internet access but with a mobile phone on their hands, to young people that participate in city areas like schools where only them could investigate and report possible problems, giving voting capabilities between unknown people, residents of a huge area, etc. particularly those in less developed socioeconomic areas in developing and developed nations, presents a related developmental challenge. Many cities around Europe have started promoting and enhancing strategies for using the Internet, and related technologies, but are not withstanding the technological divide which is critical in beginning to narrow the gap and enhancing participation by those currently disconnected either due to economic reasons,

or due to no knowledge to participate in these platforms. In particular, the critical factors that hinder access to Internet and related technologies for the populations are:

- level of technology and infrastructure,
- cost of equipment,
- cultural, linguistic or other social barriers, and/or
- low political will to address these issues.

Also there are thousands of very important organizations, and millions of people, who do not necessarily face these problems and conditions and who reside in emerging democracies. In many countries these are civil servants, members of government organizations and staff, civil-society organization staff and members, teachers and students, employees in all spheres of the private sector, political party members, and more. These people are leaving in disconnected communities from government transactions, but work or are involved with organizations that could and should have to be connected and plugged into social events and transactions.

In most cases the above organizations are disconnected due to not recognizing the importance of getting connected and communicating or sharing information with other residents. The economic resources make them to remain disconnected, or they do not have the related technical and managerial expertise to adequately plan for and procure the needed equipment, systems and services in order to be connected. These are cases and areas where we believe PERIKLIS platform can be very useful and supportive.

As a democracy practitioner [12], PERIKLIS platform provides useful support to enhance democratic development in a society, making its members active, through Internet and related technologies, which will not increase the cost for the end users. The only requirement is a mobile phone from them. Integrating PERIKLIS within society sectors and making practical end users applications provides an add-on for democracy activities into e-activities. In doing so, we inevitably bridge people within these societies from one side of the divide to the other.

PERIKLIS services apply both an in-depth knowledge of the democratic workings of its partners (an involved Municipality) gained over time, the research aspects (Universities involvement) and the technical and project management expertise (involved IT Companies) needed to work with information technology (IT) vendors. In addition, PERIKLIS [12] success is linked to that of the corresponding project and the partners, with the ultimate goal being the development of sustainable systems that will support the community, the Municipality without using expert staff, or costly equipment but instead working with open source tools and cheap IT equipment that will support the democratic processes of the Municipality [13].

3 E-Democracy, E-Voting and E-Participation Status

Organizations like Facebook, internet blogs, the wikis, and a host of other technology based tools are transforming the ways that citizens interact with others and with government. Indeed, technology is transforming our democracy. Sites like the e-democracy.org are creating online communities for presenting and discussing issues about city life problems in UK [23], Zealand, and the U.S. [14].

Software platforms like the "athenabridge" are manipulating online discussions of specific statements/hypotheses, plus related voting tools for quick identify the areas of consensus [15]. European projects [17, 18] for e-government and e-participation models [19] implemented in an electronic format have already been online.

Organizations like the gov2u [20, 22] have a list of related projects executed under the umbrella of e-government and e-participation of EU citizens in related countries. PERIKLIS has evaluated their contributions and is focusing to develop an online platform for the 'Maroussi' municipality as a starting point aiming to grow in more municipalities in future. The aim of e-democracy tools [26] is to provide in more people choices about how they can participate and make them feel that their opinion input makes a real difference in their society, eventually resulting in more trust. Starting from a municipality level this will grow in a government based tools and levels. Social and economic variations between citizens in terms of gender, age, resources and income, geographic location, education, etc. are expected to influence their level of trust in ICTs, a research that PERIKLIS already evaluates and measures in its developed modules covering this aspect for successful project deployment in the municipality area The basic aim is to provide the necessary e-tools for helping the local authorities to communicate with citizens.

In Greece e-government programs like 'Cl@rity' portal [26–28, 31, 32] are examples of ICT involvement in e-democracy activities between municipalities. PERIKLIS provides a more simplified method for attracting residents in a easy for them way through social networks and mobile easy access in e-activities. In the following sections we present the main architecture and components characteristics of PERIKLIS platform.

4 PERIKLIS Platform Characteristics

The objective of PERIKLIS platform is to provide an interaction between citizens and public bodies that leverages the popularity of social networks as well as the capabilities of modern smart phones that will trigger related web services of an internet based web platform which in the other end will support the Municipality e-government transactions and in parallel will inform online the end users with direct analytical and evaluated democracy results. Users are able to login using their existing social network accounts via their smart phones or tablet devices the platform and perform a variety of actions such as gather the opinion of fellow citizens on a specific matter, report a problem, raise awareness or recruit users to their causes. The functionality of the platform is enhanced by a number of data analytics and location based services that bring added value to the platform.

The basic architecture of the platform PERIKLIS is presented in Fig. 1. In the design of PERIKLIS we have followed the principles of Service Oriented Architecture. SOA is an architectural paradigm based on reforming application functions and pieces of information into a "service" that can be accessed through a common interface regardless of the location of the function or of the piece of data. As a result, applications using this paradigm are more adaptable to changes and its components are reusable.

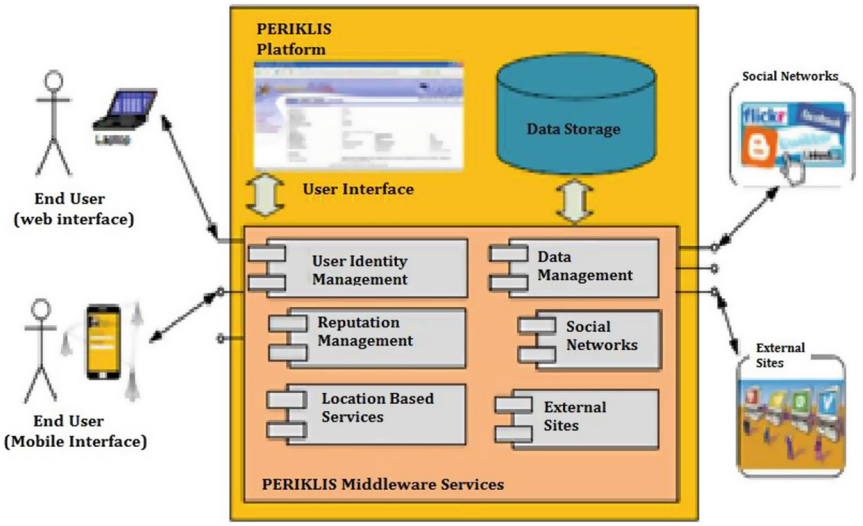

Fig. 1. PERIKLIS basic architecture.

Following the SOA paradigm, PERIKLIS has been designed as a set of loosely coupled services. We have two types of services: the PERIKLIS core services and the PERIKLIS added value services. The main functionality of the platform is implemented by the PERIKLIS Core Services. These services implement functions such as the creation and management of actions and participation information as well as storage and can operate as a standalone entity (i.e. without the added value services described below). Their functionality is exposed through a SOAP API [16].

In addition to the core services, four added value services have been developed in the context of PERIKLIS. The objective of these components is to enhance the functionality of the platform by providing specialized analysis on top of the user generated data (e.g. data analytics, location based analysis), in order to bring some added value to the end users. As explained in previous paragraphs, the platform is highly adaptable and can easily accommodate new services so that it can be used for a variety of e-government applications providing interoperability services and interconnecting more than one Municipality online like a puzzle.

5 PERIKLIS Core Benefits

PERIKLIS provides the following benefits through its platform services and tools [21].

5.1 Democratic Governance

PERIKLIS governance work is emphasizing the political dimension of democratic governance, within four main practice areas:

- constitutional reform,
- society participation
- legislative development,
- local/municipality government, and
- public integrity.

PERIKLIS provides a tracking mechanism for geo-location based notifications and matters that should be noticed and resolved. This technological characteristic can assist municipality related services that are based on geo-location attributes and enhancing the related organizations in it to plan and develop services that will support these reported problems and case studies from residents and city visitors.

5.2 Sustainability

Common practices of e-government ICT systems provide related value to end users, which comes through sharing knowledge and experience among democratic leaders, or documenting and sharing democracy building experience. Technology programming typically involves building systems (websites, databases, communication networks, etc.) and thus requires organizational changes within our partner institutions in order to maintain these systems. These changes drive planning, assessment, implementation and program evaluation.

Sustainability means that development of the Internet or other IT system must happen in parallel with a process of building capacity within the partner organization to support and maintain the system [24]. The partner must form the necessary relationships within its country to meet its ongoing needs for equipment, support and services. This approach needs higher initial investment, and possibly requires a longer-term engagement with the partner organization, as it aligns its staffing and budgeting to meet the long-term commitment of supporting the systems.

In PERIKLIS the Municipality services can be interconnected through the PERIKLIS platform and get online notifications directly for issues that relate to their daily operations. In this way, Municipality services efficiency is increased, bringing value to its municipality citizens, and supporting democratic development.

5.3 Elections and Voting

One of the most interesting PERIKLIS feature relates to elections and voting system, where PERIKLIS users can use smart phones for municipality election observation [28]. Combining a web based environment through a smart phone and locating the position of the user, the PERIKLIS reporting system provides a rigorous observation methodology, where the municipality administrators can enhance the integrity of elections, by alerting authorities to problems early enough to allow remedies. The speed of web based reporting with a usage of social networks combination allows the Municipality partners to publicize an assessment of the quality of polling and tabulation, exposing problematic elections and increasing public confidence in credible elections.

5.4 Municipality Residents Participation

People involvement in their neighborhoods problems is a potent force for dealing with local problems and a huge benefit for democracy. Through research, coordinated planning, and actions, they can accomplish what individuals working alone cannot. This is a nice idea but cannot be completed due to current city conditions. People have no time to do that. Many reasons and fast track life conditions isolate them from this societal involvement.

PERIKLIS platform enables partners and civil groups to be involved. There is no need for extra effort and coordination activities from their side, everything is covered automatically through this platform and its functionalities. Coordinate training activities, organize focus groups, distributing materials and information for events and problems in the city, but also generating statistical reports that evaluate human transactions is key value for a Municipality that gets automatically feedback from its residents. The available platform technological support in developing civil society can also include assistance with online discussion groups to help sustain networks of activists, and developing secure intranets that incorporate collaboration tools, so member groups can work together in confidence on policy or planning documents.

5.5 Social Media and Mobile Phones

People will only choose and transact with government services that digitally supported. Technology solutions that have been integrated in PERIKLIS platform like social media and mobile platforms [6, 11] integration for direct information transfer in the core platform provide enhanced tools, for information visualization for the end users and citizens participation in democratic governance processes.

5.6 Cooperation Improvement

PERIKLIS will support improved digital capabilities across municipality departments in order to resolve the reported and published problems from citizens. Municipality departments could better cooperate by exchanging direct and online data for geolocation support and reaction [25]. Municipality PERIKLIS digital services will:

- increase support to municipality departments and corresponding services, like roads recovering and service.
- Help departments to improve their digital capability,
- develop extensive support for team leaders and service managers,
- develop digital awareness training for civil servants.

All municipality departments involved in digital services should ensure that they have appropriate in-house digital capability, including the management of their portfolio of digital services. This capability will vary in size and skills depending on the balance of information and services the department is responsible for. For example voting services could be served by only one person that upload a vote case and the same person collects and evaluates the results, but in case of a road reported problem a

dedicated service team (with more than five persons and related materials, dedicated tools, etc.) will be needed. It will typically include a balanced government team design to support the reported issues from the residents.

5.7 Better Life Conditions

Residents will be able to make their city work better. Giving them some responsibility for looking after their part of town is a way of effectively addressing local preferences and priorities. Understandably, boosting citizen participation improves live ability [30]. The city is a source of potential conflict, between residents and government, between different residents groups, but resident's participation in civic affairs can reduce all of these sources of conflict. In particular it can prevent the problems occurred and associated with changes in growth and renewal.

5.8 Strong Democracy

When residents get together, they generate a number of remarkable side effects. One of these is strengthened democracy. Democracy means that the people decide. Political scientists describe our system of voting every few years, but otherwise leaving everything up to government as weak democracy. In weak democracy, citizens have no role, no real part in decision-making between elections.

EU many countries are supporting especially during the last decade the stronger democracy in corporations, institutions and governments. In many cities, this has resulted in the formal recognition of neighborhood groups as a link between people and municipal government, and a venue for citizen participation in decision-making between elections [8].

Providing an automated mechanism, through PERIKLIS platform that brings thousands of different resident's ideas and thoughts for their city problems, in a very friendly way with no extra costs, as social networks do, and advertising to the municipality their thoughts, problems and solutions, is a strong democracy achievement.

6 PERIKLIS Platform

PERIKLIS provides all the above characteristics through a web based environment that works in all platforms that are using Internet. Some related screenshots from its environment are provided in the Figs. 2–3.

The programming of PERIKLIS has used open source tools for development and deployment. Cloud storage facilities and web services SOA interconnections with external services. It is based on a flexible SOA Architecture allowing for the addition of any number of added value services. The system is working as a pilot in municipality of 'Maroussi' in Athens city and already has been interconnected with municipality services for resolving the posted problems from residents [12].

Fig. 2. PERIKLIS web interface

Fig. 3. Mobile interface

7 Conclusions

Technologies abound that could be harnessed to cheaply bring governance services nearer to citizens so that self-serving government activities may be transformed to e-governance service platform. This manuscript presented a framework for harnessing the potential of current developments in mobile and web technologies to provide e-governance services to help residents in a Municipality to participate in governance and democratic activities. The residents by accessing and contributing to their neighborhood problems and supporting the local government services and teams to respond on them, using user friendly web tools from their mobile phones are increasing the democracy rules in their society, providing better city conditions for them. Also through this paper the authors are triggering points that could present research topics, which can be used to adapt e-governance for societal transformations.

The use of emerging technologies like mobile applications and web 2.0 computing, has enhanced the interactions between online services and governance services. Providing web tools to these organizations that improve the management of their teams operations, and triggering the reengineering of government systems, their planning and policy making processes have many benefits for the residents. Also, the capability to monitor the implemented policies and recording either the physical or the social changes in the community of a municipality, makes PERIKLIS platform an important tool for every Municipality. PERIKLIS improves the quality of life of citizens and transparently activates and enhances their e-democracy activities. Through this tool every local community can promote aspirational openness, neighborliness, inclusion and integration for all kinds of people and neighborhoods. In parallel provides challenges for building new bridges, increase civic trust and embrace public life.

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References

1. E-Democracy.org. http://www.slideshare.net/netclift/inclusive-social-media-webinar-slides
2. http://www.infohelp.co.nz/politics.html
3. Brewer, E., Demmer, M., Du, B., Ho, M., Kam, M., Nedevschi, S., Pal, J., Patra, R., Surana, S.: The case for technology in developing regions. Comput. Publ. **38**(6), 25–38 (2005)
4. Okoronkwo, M.C., Monica, N.A.: Providing e-governance services to technologically challenged grassroots environments. Int. J. Soft Comput. Eng. (IJSCE) **3**(1), 107–111 (2013). ISSN: 2231-2307
5. http://www.budde.com.au/Research/Digital-Economy-E-Government-Transforming-Services.html
6. Garcia, A.C.B., Vivacqua, A.S., Tavares, T.C.: Designing mobile interaction to elicit alternative solutions for participatory decision-making. In: 14th International Conference Computer Supported Cooperative Work in Design (CSCWD), pp. 461–466 (2010)

7. http://www.ecommercetimes.com/story/Turning-Politics-Into-Political-Science-With-Big-Data-79232.html#sthash.VcY8PtRA.dpuf
8. http://www.rialtas.net/blog/#sthash.vyv93FOc.dpuf
9. Wigand, R.T., Agarwal, N., Osesina, O.I., Hering, W., Korsgaard, M.A., Picot, A., Drescher, M.: Social network indices as performance predictors in a virtual organization. In: Fourth International Conference on Computational Aspects of Social Networks (CASoN), pp. 144–149 (2012)
10. http://www.futuregov.asia/
11. http://gov20.govfresh.com/election-2012-social-media-big-data/
12. http://Periklis.eu
13. Lazovic, V., Durickovic, T.: Democracy in the electronic government era — challenges and opportunities for development in Montenegro. In: 2011 Proceedings of the 34th International Convention, MIPRO, pp. 1365–1369 (2011)
14. http://pages.e-democracy.org/Neighbors_forums
15. http://athenabridge.wordpress.com/
16. Orellana, F., Niinimaki, M.: Distributed computing with RESTful Web services. In: 2012 Seventh International Conference on P2P, Parallel, Grid, Cloud and Internet Computing (3PGCIC), pp. 103–110 (2012). doi:10.1109/3PGCIC.2012.30
17. http://www.isi.fraunhofer.de/isi-de/t/projekte/bb-stoa-e-democracy.php
18. http://www.isi.fraunhofer.de/isi-de/t/projekte/rl-huwy.php
19. Päivärinta, T., Sæbø, Ø.: Models of e-democracy. Commun. Assoc. Inf. Syst. **17**, 818–840 (2006)
20. http://www.gov2u.org
21. Anderson, S., Felici, M.: How democratic will e-democracy be? In: 29th Annual International Computer Software and Applications Conference, 2005. COMPSAC 2005, vol. 1. IEEE (2005). doi:10.1109/COMPSAC.2005.85
22. http://www.gov2u.org/index.php/research-centre/projects
23. http://www.e-democracy.gov.uk/
24. https://www.ndi.org/democracy-and-technology
25. Guo, Y.: Analysis on how to enhance e-democracy through e-government. In: 2011 International Conference on Management and Service Science (MASS), pp. 1–4 (2011). doi:10.1109/ICMSS.2011.5999004
26. http://www.itas.kit.edu/english/projects_henn10_e-d.php
27. http://eparticipation.eu/2012/12/clrity-program-every-government-decision-on-the-internet/
28. Katakis, I., Tsapatsoulis, N., Triga, V., Tziouvas, C., Mendez, F.: Clustering online poll data: towards a voting assistance system. In: 2012 Seventh International Workshop on Semantic and Social Media Adaptation and Personalization (SMAP), pp. 54–59 (2012). doi:10.1109/SMAP.2012.19
29. http://www.diavgeia.gov.gr (Clarity Portal)
30. Web 2.0 to Government 2.0 in Ireland. http://www.rialtas.net/blog/
31. http://www.OpenGov.gr (Open Government Programme)
32. http://eparticipation.eu/2012/12/network-of-ict-collaboration-of-municipalities-of-south-western-greece/