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Planning for Future Urban Services in the Smart City Era: Integrating E-services in Urban Planning Process

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Abstract: Information and communication technology (ICT) has transformed how we live our lives and the way we interact in different contexts. Benefits of ICT and its upcoming efficiencies (i.e. energy efficiency) are becoming the heart of many public services' reforms which have influenced the time, distance and space concepts. At present, not only there is a lack of clarity about what high-quality ICT-based urban services look like, and an urgent need to articulate a clear vision of 'better' services, but also the integration of this new transformations in spatial urban planning (e.g. service delivery planning) has not been comprehensively considered. Therefore, the main debate in this paper comprises of simplifying the e-services delivery process and architecture and its integration to the spatial planning process. Illustration of the resulted benefits of such integration is another outcome of the paper. This paper aims at developing a conceptual framework of e-services and its impact on urban public service delivery in line with developing an integrated process of e-services and spatial urban planning. The main outcomes of the research are comprised of an integrated conceptual service delivery process as well as strategies to achieve and optimize such integration.

Keywords: Smart City, E-Services, Urban Services Planning, ICT, Planning Process.

INTRODUCTOIN

Information Technology is changing the evolution of cities. Moreover, the notion of "growing" cities, based on implementing correct urban planning, is being replaced with the idea of making a city "smart". The Internet is changing the traditional urban planning model and compelling planners to not only consider the physical planning of a city but also to recognize the use of Information Technology in making the economy, environment, mobility and governance of a city more efficient and effective.

Even though the term "smart city" is relatively novel, the development of a smart city can vary dramatically depending on the approach that is taken in regards to policymaking of urban city growth (Graham & Marvin, 2002). A number of definitions for the term "smart city" exist. One of the more widely used definitions is outlined by experts who define smart cities as cities that utilize information and communication technologies with the aim to increase the life quality of their inhabitants while providing sustainable development (Bakici et al., 2013). From this definition we can see that ICT plays a pivotal role in making a city more adapted to the contemporary needs of its citizens. Other definitions of smart cities may not place such an emphasis on the central role played by ICT, nevertheless many definitions include some reference to the use of ICT for making modern cities more suited to the needs of citizens (Chourabi et al., 2012). To make an example for the case in hand, Caragliu, Bo, & Nijkamp (2009). view cities as smart when "investments in human and social capital and traditional (transportation) and modern (ICT-based) infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory government". Harrison et al. (2010) argue that a city is

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of a smart city or not, it is clear that it is a key driver of smart city initiatives and thus, needs attention from city planners and the various stakeholders interested in sustaining and improving quality of life in urban areas. An important element in the frame of smart city notion is the wide spreading debate of e-services. ICT has caused a revolutionary transformation in urban service delivery in order to make them smart, easy accessible, and available online. Since urban services delivery is the core factor of any urban planning activity, urban planners have the responsibility for understanding and managing the potentials of this ICT oriented transformations, and their direct and indirect impacts and implications in urban planning processes. e-services, as a recent-developed information-based concept, can play an important role in enhancing and optimization of delivering more efficient urban public services which can be implemented to reduce the need of movement and decrease the travel time due to increasing accessibility in obtaining the satisfaction of the users and in general, enhancement of life quality. The main debates in this paper comprise of a survey on e-services architecture concept and current spatial urban planning processes. Furthermore, the integration of e-services architecture process in spatial planning process and the benefit of such integration, for a more efficient service delivery in practice, is another important focus point of the paper. At last but not the least, developing a conceptual framework of e-services and its impact on urban public services delivery in line with delivering integrated strategies are the final expected outcomes.

RESEARCH AIM AND PROCESS

The main aim of the research is to provide recommendations for an integrated planning process with the focus on applying e-services architecture in urban services delivery planning process in order to meet both spatial as well as virtual (online) service provision criteria. Depicted in figure 1 is the process of the research. For this aim, the concept of smart city is surveyed in the frame of the research, as well as its fundamental dimensions. Following the concept of smart city, e-services and applicable processes and architecture are surveyed and simplified. Integration of e- services architecture in planning process is one other main step of the paper. For this aim, the general urban planning processes, as well as services delivery planning processes, are analyzed with aim of optimal integration of e-services architecture in the existing practical process. The main outcome of this paper includes the new integrated planning process in line with benefits and classified strategies for enhancing services delivery through both spatial and ICT oriented measures (Fig. 1).

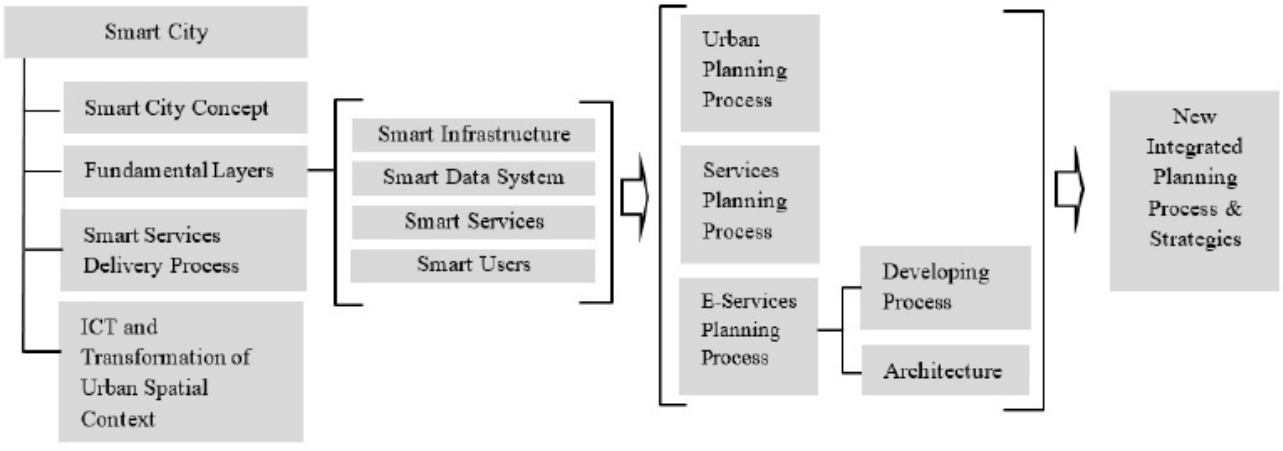

Fig. 1. The Study Framework and Procedure

THE CONCEPT OF SMART CITY

Many cities have now adopted the concept of smart cities regarding of what it means to be smart in social, political, economic or environmental meanings. For instance, Amsterdam smart city initiative emphasizes the importance of collaboration between the citizens, government and businesses to develop smart projects that will change the world by saving energy. Moreover, Southampton City Council uses smart cards to stress the importance of integrated e-services. The city of Edinburg council has formed a smart city vision around an action plan for government transformation (Hernandez et al., 2011). Hence, the concept of "Smart City", providing a solution for making cities more efficient and sustainable, has been quite popular in the policy field in recent years. Although, since the eighties and nineties, the scientific literature has dedicated a lot of attention to the topic of the smart city, with a particular attention to the role of ICTs and their impacts on urban planning and on the structure of urban systems.

For many visionaries in this field, new technologies and the overall information society contributed to the birth of a new economic era in the history of mankind and the concept of the information society has been successfully developed over the last 30 years by a number of distinguished proponents (Bell, 1974) or (Anthopoulos, 2011) or (Jones, 2005). In those academia years, international institutions and think tanks believed in a wired, ICT-driven form of city development. The focus was mainly oriented to the availability and quality of ICTs infrastructure within the urban system. In the contemporary debate, the concept of smart cities is much more related to the role of human capital, social and relational capital using ICTs. In other words, we observe a growing attention to the role of the users and how they utilize communication infrastructures. The smart city seems to be an ideal solution to overcome existing and emerging urban population problems. Although, researchers have also identified challenges with reference to inequality, digital divide and changing cultural habits (Hofacker, 2007). Social adaption of such a system requires changing social habits of citizens in general and city management people in specific (Jones, 2005).

One most cited definition of characteristic of smart city regards to the "utilization of networked infrastructure to improve economic and political efficiency and enable social, cultural and urban development"(Holland, 2008). What is central to the concept of the Smart City and what makes it differ from 'sustainable cities' or 'ECO cities' is the use of Information and Communication Technologies (ICTs) in the process of creating a more sustainable city, but also the availability and quality of knowledge communication and public services. According to the literature, it is possible to define a set of fundamental factors which make a city smart: technology (infrastructures of hardware and software), people (creativity, diversity, and education), and institution (governance and policy). Given the connection between the factors, a city is smart when investments in human/social capital and IT infrastructure fuel sustainable growth and enhance a quality of life, through participatory governance (Nam, 2009).

In other words, our cities are on the verge of radical transformation, a revolution in intelligence comparable in scale to the one that, in its time, brought about industrialization. The smart city, driven by digital technology, is poised to replace the typical networked city of the industrial era, whose success was built on its hard infrastructure, from roads to water supply and sanitation systems, not only as a technological optimum but also as a social and political project. This conviction is shared by many. Coined initially around 2005 to characterize a series of new urban uses of information and communications technology, the expression "smart city" has spread everywhere, in both mass media and specialist literature, and in the discourse of businesses such as IBM and Cisco as well as out of the mouth of the politicians. [1]

In a holistic approach, smart city consist of the main following dimensions. Each of these dimensions is essential, but if one fails the whole smart system will crash down. These dimensions are the backbone of all smart solutions in cities (Fig. 2) (Caragliu, 2009). Here, the critical role belongs to actors and their coordination and participation. A Smart City is affected by a wide range of local, regional, national and global circumstances, which have to be taken in to consideration during its development and implementation (Boyer, 2009).

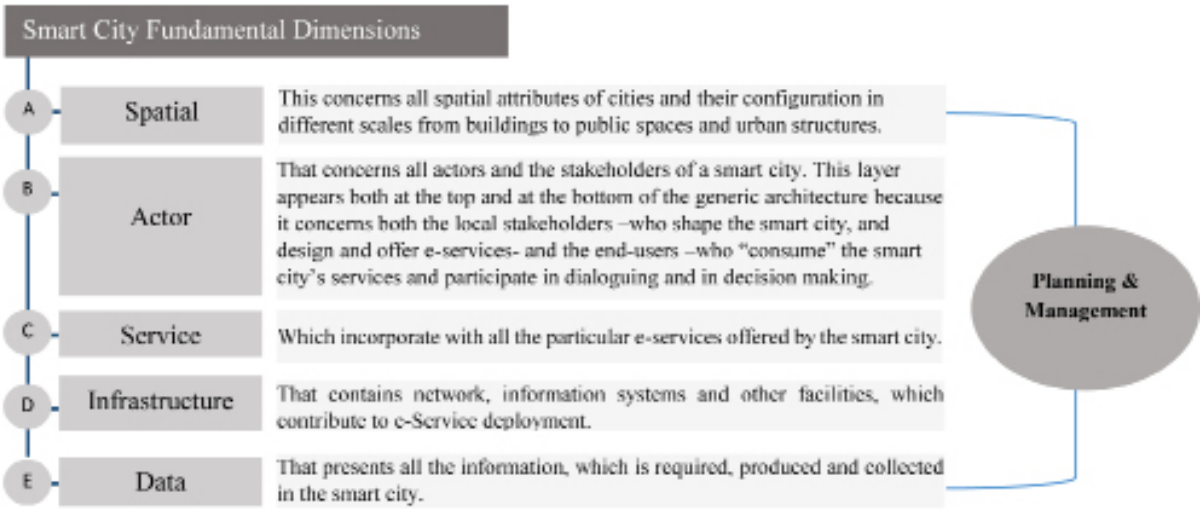

Fig. 2. Smart City Fundamental Layers[2]

In a holistic approach, the success of any smart city is dependent on a comprehensive development with a whole system of actions, interaction, systems and sub-systems. Therefore, a general roadmap which designs the main sub-elements of a smart city is essential.

Step 1. Development of Broadband Networks

When considering the implementation of a smart ICT plan for a city, the first step for any policymaker is to foster the development of a rich environment of broadband networks that support digital applications, ensuring that these networks are available throughout the city and to all citizens (Hofacker, 2007).

Step 2. Use of Smart Devices and Agents

The second step for smart city planners to consider when implementing a smart ICT plan for a city is to ensure that the physical space and infrastructures of the city are enriched with embedded systems, smart devices, sensors, and actuators, offering real-time data management, alerts, and information processing for the city administration. Hernández-Muñoz et al. (2011) argues that this embedded intelligence, created by the use of embedded systems and other ICT intensive solutions, is becoming the nervous system of modern economies through making cities smarter.

Step 3. Developing Smart Urban Spaces

Smart urban spaces are areas of a city that leverage ICT to deliver more efficient and sustainable services and infrastructures within that specific area. The spaces can sometimes be as large as entire city districts and these districts can include services like electric car charge points, energy-efficient buildings that use 'smart' meters and smart heating and cooling systems. Wi-Fi hotspots and information kiosks that allow people to connect to the Internet on the move through these districts are also common services available in smart urban spaces. These smart urban spaces comprise a wide range of innovations that can be of enormous environmental and economic benefit to both the district and the city.

Similar to step two, this step allows for the creation of applications, which enable data collection and processing, web-based collaboration, and actualization of the collective intelligence of citizens. The latest developments in cloud computing and the emerging IoT, open data, semantic web, and future media technologies have much to offer cities looking to become smart. These technologies can assure economies of scale in infrastructure, standardization of applications, and turn-key solutions for software as a service (SaaS), which dramatically decrease the development costs while accelerating the learning curve for effective functioning of smart cities (Hatzelhoffer, 2012).

Step 4. Developing Web-based Applications and E-services

The availability of ubiquitous ICT infrastructures like those discussed above, stimulates the development of new services and applications by various types of users, and allows for the gathering of a more realistic assessment of users' perspectives by conducting acceptability tests directly on the infrastructures already in place and functioning in the smart city. Integration of the e-services is a key-factor, enabling the above processes to work together and create environments more efficient in collaborative problem-solving and innovation (Avram, 2011). Innovative entrepreneurs and start-ups should be encouraged and supported to leverage these original technologies and adapt them to offer novel services to the citizens and businesses of the city.

Step 5. Opening up Government Data

Open Government Data (OGD) initiatives, and in particular the development of OGD portals, have become widespread since the mid-2000s both at central and local government levels in Europe and indeed across the globe. Putting information into the public domain can benefit society by creating conditions for more social inclusive service delivery and for more participatory democracy. They also argue that it can stimulate the economy by allowing the possibility for third parties (e.g. individuals, private enterprises, civil society organizations) to create new products and services using public data (Bakici, 2013).

Along with the five essential ICT elements listed before, there are many other factors which play an important role in making a city smart. Many of these factors have been explored in the smart city literature (Bakici, Almirall, & Wareham, 2013;[3] Caragliu, Bo, & Nijkamp, 2009;[4] Chourabi et al., 2012)[5]. However, an important factor that needs further discussion is the role of policy making and city governance. Governance not only involves the implementation of processes for constituents but also for all the stakeholders within a city. Scholl et al. (2009)[6] studied the challenges of key projects within e-government, and found that stakeholders' relations[7] is one of the critical factors to determine success or failure of such projects. If we consider smart city projects as closely related to e-government projects then it is not impossible to wager that stakeholder relations may also play a key role in the success of smart cities.

IMPACT OF ICT ON URBAN SPATIAL CONCEPTS

Where high quality telecommunications links exist, distance constraints can effectively collapse altogether (subject, of course, to the cost of using them and the technical and organizational barriers involved). Because they operate at or near to the speed of light, they overcome spatial barriers by minimizing - or even eliminating - temporal barriers (Table 1). They help to overcome space and time barriers and support the instantaneous or rapid mobility of information, messages, services, capital, images and labor power that are necessary to link widely dispersed sites into fast-moving and integrated economic and social systems (Graham & Marvin, 2002). Such an idea is a potential element to be integrated for urban public services delivery in the frame of smart-city concept.

Table 1. Characterizing Urban Places and Electronic Spaces

Urban Places (Based on Buildings, Streets, Roads, and the Physical Spaces of Cities)	Urban Electronic Spaces (Constructed 'Inside' Telematics Networks Using Computer Software
Territory	Network
Fixity	Motion/flux
Embedded	Dis-embedded
Material	Immaterial
Visible	Invisible
Tangible	Intangible
Actual	Virtual/abstract
Euclidean/social space	Logical space

(Graham & Marvin, 2002)

E-SERVICES AS A FUNDAMENTAL COMPONENT OF SMART CITIES

Smart city brings enormous opportunities and exciting challenges. In general, a metropolitan area can be considered as smart when city operations and services such as healthcare, education, transport, parking, and electricity grid are supported through ICT infrastructure in order to facilitate efficiency and ease of operation. Some valid examples of such services would be looking for a job, applying for a driver‘s license, buying of car and property, change of the address, request for a passport, start of a new business, reporting of a crime, declaration of income taxes, seeking health services, and so on. All such services require execution of several services under an orchestrated coordination. The smart city design must be citizen-centric. Despite the complexity of the city’s systems, the architecture must bring benefits to the people regardless of their ICT abilities (Bawany, 2015).

E-services have previously been defined as those services that can be delivered electronically (Lovelock, 2004) and similarly as provision of services over electronic networks (Deakin, 2014). Boyer, Hallowell and Roth (2002) use the definition, “interactive services that are delivered on the Internet using advanced telecommunications, information, and multimedia technologies.” Lovelock and Wirtz (2004) define service as “an act or performance offered by one party to another…an economic activity that creates value and provides benefits for customers… by bringing about a desired change in, or on behalf of, the recipient.” This definition brings out both the process by which the service is produced and the outcome, in the form of benefits, that the customer receives. Both the service production processes and the outcomes are relevant when we consider e-services, as well. Regarding the service production process, an e-service is created and stored as an electronic code comprised of binary numbers, because it exists in a digital environment. Building on this, we observe that, by definition, the result of translating an act or performance into binary numbers is called an algorithm. Hahn and Kauffman (2002) have also identified e-services with algorithms. Using this idea, we could define e-service as: “an act or performance that creates value and provides benefits for customers through a process that is stored as an algorithm and typically implemented by networked software.” Thus, our definition highlights the distinction between service production (a stored algorithm delivered by software) and service outcome (the desired benefit received by consumers)(Hofacker et al., 2007). The main ICT elements for a smart city are internet technologies and services. ICT infrastructure for Smart City can be established by four progressive phases (Figure 3) (Avram, 2011).

Phase 1 – Network Infrastructure

The development of ICT infrastructure, from communication channels to sensors and actuators in physical space remains a huge barrier in taking a smart city initiative. Lack of infrastructure is a significant barrier in achieving smart city objectives (Suresh, 2011).

Phase 2 – Content and Communication

Network infrastructure maintains core services like telephony, internet access, video-on-demand services, instant messaging etc. These services enable smart homes and business.

Phase 3 – Building Intelligence

Intelligent infrastructures like environment systems, mobility and transport systems, smart buildings and smart energy grids can be founded. Wireless sensors can start capture data from designated critical points of city. With the help of sensors, local administrators and decision makers extend their vision through transportation, utilities, energy, water and buildings with providing real-time data.

Phase 4 – E-services to Citizens

With the help of sensors, collected data can be turn in knowledge. Applications can use these data and knowledge to give services in different areas like; information sharing, healthcare, education, entertainment, culture, commerce, security, and finance.

Fig. 3. Four Phase of ICT Implementation (Avram, 2011)

E-SERVICES CONCEPTUAL MODEL

Before focusing on the e-services architecture, a comparison between the traditional and e-service delivery model is essential. This comparison shows the importance and benefits of e-service integration in spatial planning process from different aspects (i.e. quality of access, cost reductions as well as energy efficiency).

Fig. 4. Shows the Conceptual Model of Traditional/ Spatial Service Delivery Model (Graham & Marvin, 2002).

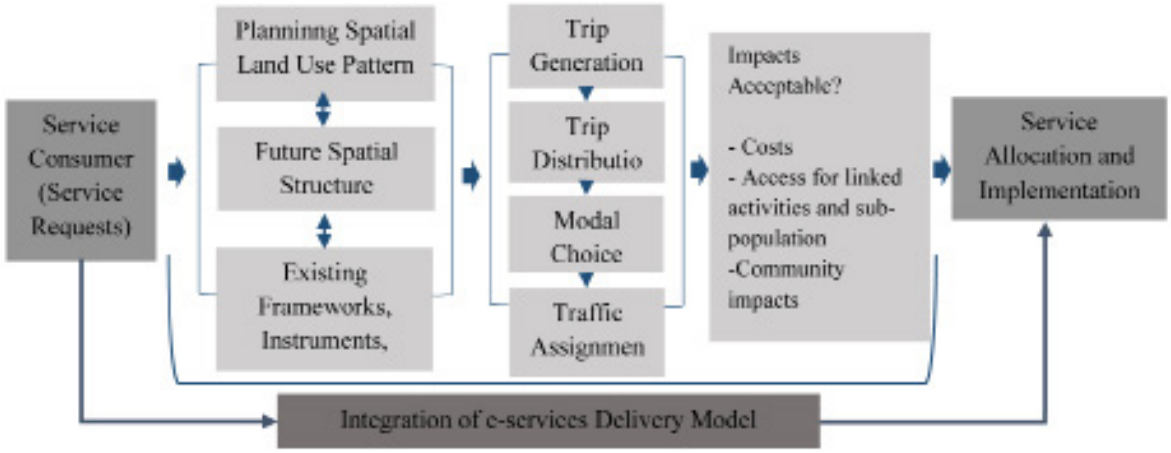

Fig. 4. Traditional Service Delivery and the Possible Location of E-services Model[8]

A Web service forms a distributed environment of objects, called services, in which each of such objects perform a specific task or a set of tasks and can be accessed remotely via standard interfaces. The architecture of Web services is based on principles and standards for connection, communication, description, and discovery. Web service uses a three-tiered model (Fig. 5), defining three actors: service provider, service consumer, and service broker. The main role of these actors is:

- Service Provider

creates, defines and deploys the Web Service. By deploying the Web service it advertise the service to potential users, humans or agents. A service provider creates a Web service (the implementation of) and its service definition and then publishes the service in a service registry (or directory) based on the standard Universal Description, Discovery, and Integration (UDDI) specification. The description of the service must be readable for both, humans and machines, as potential users. The service repositories have the role to collect and organize location and description information and make it available to any clients that need it.

The service repository provides the mechanisms to facilitate the publishing of the services by service providers and to enable service clients to locate the service and the associated binding information. The Web service publishing is the operation to record or advertise into the registry and acts as a contract between Service repository and Service provider.

- Service Broker

maintain the service repository of published services and searches for services that best meet the user requirements and deliver this information to the user. Here the role of Service repository is simple: it must signal the match between the user request (Service requestor) and Service provider (supplier) description. Once found a match is established a direct relationship between the Service requestor and Service provider.

- Service Consumer (Requestor)

is a client (a human or a software agent) that intent to use a service for a specific goal and that addresses a request for that. Once a Web service is published, a service requestor may find the service via the UDDI interface. The UDDI registry provides the service requester with a WSDL (Web Services Description Language) service description and a URI (Uniform Resource Identifier) pointing to the service itself. The service requestor may then use this information to directly bind to the service and invoke it. Bind creates a client-server link between Service requestor and Service provider.

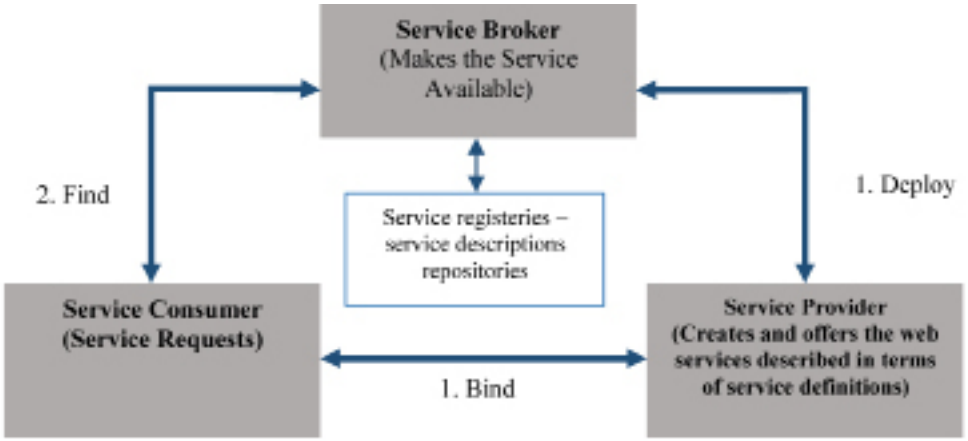

Fig. 5. Web Services Model (Avram, 2011)

Figure 6 shows the whole system process of e-services delivery system including sub-elements as well as action and interactions among the elements. As it is clear in the process, three main core component of this system are general management structure, culture and behavior of users and availability of structure and systems for delivering e-services to user (Chourabi, 2012).

Fig. 6. Whole System Thinking about Virtual Services Delivery Systems (Jones & Williams, 2005)

Beside the conceptual process of e- services delivery system, several basic steps are essential for its successful implementation. These main steps are delivered in Figure 7. The purpose of any architecture work is ultimately to improve the service delivery according to a set of goals or to follow a specific strategy. For this reason architecture work must also be fully integrated with an organization's ability to deliver services.

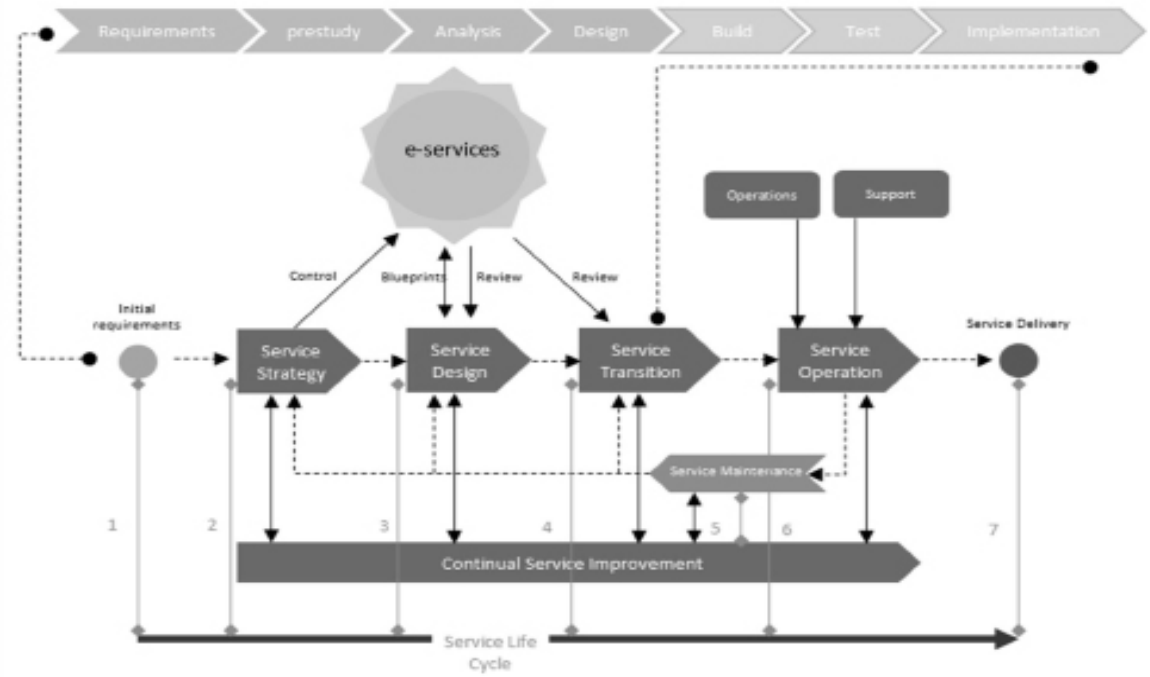

Fig. 7. An Example of E-services Delivery Architecture (Smart Cities, 2011)

The architecture shows the general process of e-services delivery implementation. The steps highlighted in mentioned figure, based on the Smart Cities, will due to the Creation of Municipal ICT Architectures (Chourabi, 2012), and are explained below:

- The starting point of the e-services delivery process is triggered by business requirements and concerns expresses by stakeholders and users. This may, or may not, start the lifecycle of a service depending on decisions taken.
- The service strategy phase, where strategies are worked out and development of the new or changed service begins. The main components here are the service portfolio and the service portfolio management process. This phase delivers some of the controls for the architecture process. If a pre-study is required this activity can be initiated here.
- The service design phase analyzes the designs, develops and evaluates various options. These activities are based on outputs from the architecture process. Hopefully 'blueprints' are available; where these are unavailable, new ones must be produced. A number of iterative refinements between the architecture process and the service design phase may be needed to get a satisfactory outcome.
- The service transition phase is responsible for implementing solutions and making them operational. The main components for this importance are the change management and release management processes. Other vital components are the configuration management process and the configuration management database (CMDB). Ideally the architectural landscape should be represented in this database to make it possible for the architecture process and the change management process to perform at its best. In this scenario, the CMDB should keep records of, and relations between, all registered configured items in the organization.
- The service operation phase is responsible for operating and supporting services at agreed service levels.
- The service maintenance process is responsible for the maintenance of infrastructure components and delivered service.
- This is the endpoint of the process triggered by the retirement of a service, thereby completing the lifecycle of a service.

INTEGRATION OF E-SERVICES ARCHTECTURE IN URBAN PLANNING PROCESS

According to the aforementioned issues regarding the prevalent challenges of urban spatial planning as well as the developing share of ICT in public service delivery, through e-service models and architecture view point, it is necessary to reconsider the planning processes and to identify the areas on which e-services can be directly effective. An important planning processes addressing the core conceptual elements of the research is land-use planning. Land-use planning provides a balanced plan of spaces and places considering the approximated demand with the aim of enhancing service delivery quality. Stuart Chaplin and Kaiser (1979) have provided detailed discussion on the process of land-use planning. The flowchart in figure 8 has been based on their attempt and used in this research to present the influence area of e-services. In this so called traditional land-use planning process the condition of the planning area should be considered which is done through planning study and analysis at the initial stages.

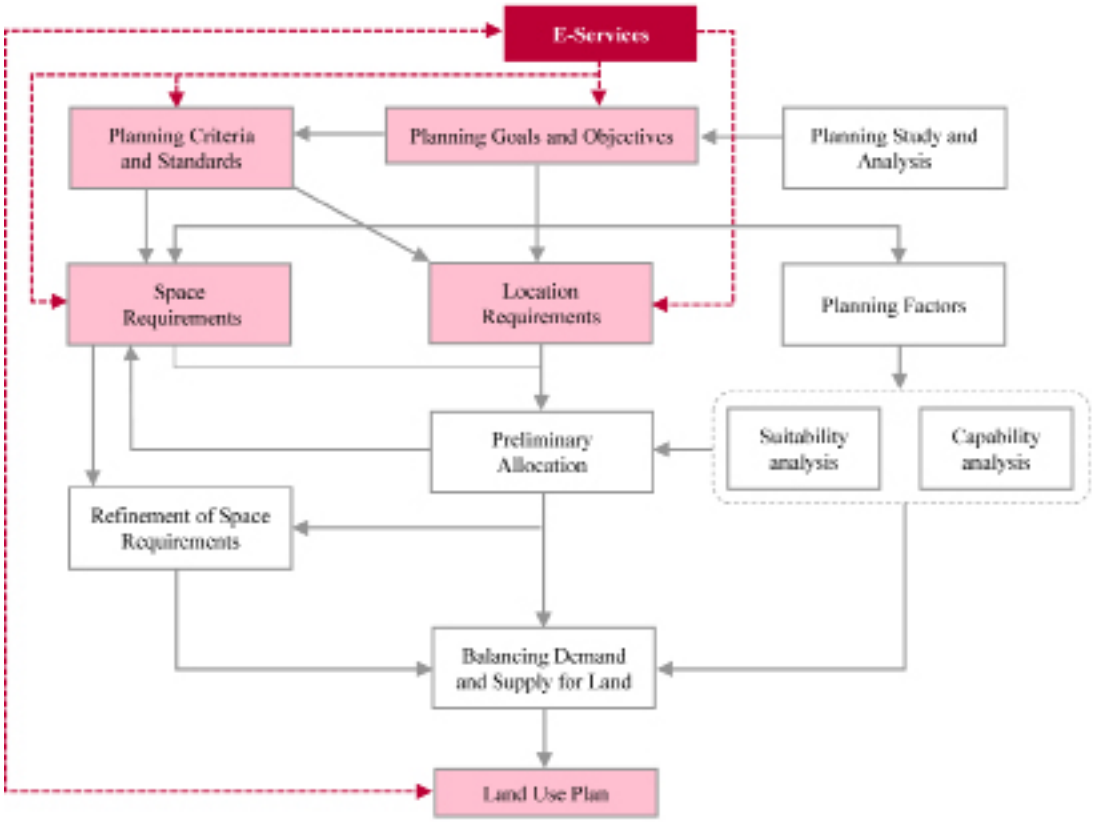

Fig. 8. The Influence Area of E-Services on the Traditional Process for Formulating Land Use Plans (Bawany, 2015)

Goals and objectives and standards are also used to provide the space and location requirements and finally the land-use plan. Referring to the e-services model characteristics, it can directly act on some of these planning actions toward virtually optimizing the land-use plan and service delivery. This happens due to the reduced need for movement and the improved accessibility to services, less costs and even an easier access (Bawany, 2015).

In addition some of the fundamental principles for the integration of ICT to urban services are presented in table 2 which are complementary to the above mentioned diagram.

Table 2. E-services Guidelines

General Guidelines		Description
General Guide Lines for Developing ICT Oriented Social Infrastructure/Public and Community Services	Customer Segmentation	The ICT used has to meet the needs of particular groups using particular services
	Efficiency Benefits of ICT	There is a need to consider the efficiency benefits of ICT. There is a need to both respond to and manage customer expectations and needs. The public should be encouraged to use online services where they are able to do so and it is appropriate to the service, while ensuring that alternatives are there for those who cannot use the cheaper options or wish to complain or do something that requires a higher level of interaction.
	Confidence and Capacity	This requires a strategy to build ICT skills, both formally through mechanisms such as learn direct and informally through the programs. It also requires demand stimulation, informing the public that alternative options are available and considering the incentives mentioned above.
	Communicate Actively and Manage Expectations	The public has expectation gaps: they expect services to be good for them as individuals, but also good value for money and universally available. They also expect services to be high-quality, but have very low expectations for this to be delivered. These two perspectives require strong communication about how services are changing to respond to individual and citizen needs, and communication about where this is working in practice. This is likely to improve public servants' understanding of what services should look like, and what works, too. If the public is to take up the services, they also need to be told that alternative options are available, and which options are more or less cost-effective.
	Design Public Services for an Uncertain Future	It is very hard to predict the course of technological development, and public services must be agile enough to respond as effectively as the private sector to redesign delivery and meet citizens' expectations. Services have to be reviewed regularly, although as ever difficult trade-offs will have to be made between the need for innovation and the costs to the public purse.
	Keep it Simple	ICT solutions can be complex in design, but they can only be effective if citizens find these solutions easy to understand and use. There should be fewer websites, and the many telephone numbers for public services should be streamlined. One webpage design, fewer sites and one public service number will lead to rather more satisfied citizens.
Guidelines for Improvement of System	Take a 'whole-system' approach	There is a need to make decisions about how existing practices might be improved and what impact this will have on the rest of the system.
	Recognize the challenges and learn lessons	Technology may make transactions quicker, but on its own it will not speed up the process of change, as changes rely on good planning.
	Improve Procurement and Relationships with Suppliers	This requires having clear objectives for the supplier and developing a clear shared vision. Furthermore, it means having clear lines of governance and accountability so that there is clarity about roles, regular reviews, evaluation and risk management.

(Hahn, 2002)

CONCLUSION

Concerning the revolutionary road of service delivery in urban planning context for future cities, ICT plays a vital role without any doubt. The impact of ICT, in planning for urban services, is vividly recognizable through e-services which are rapidly transforming. Here, there is a necessity of change and upgrade in urban planning practice to integrate virtual elements in the process of services planning to achieve more flexibility and deliver better and easier access to services. Within the frame of the research, such a necessity in line with conceptual integration of the notion of e-services in urban service delivery process was presented with the aim of developing an integrated planning process for both spatial, as well as virtual, service delivery systems. Such integration will provide benefits in different dimensions for users, planners and decision makers as well as efficiencies in processes and energy consumption in urban context, especially in transport sector. As a conclusion, the following table gives an insight on the possible recommendations for integrated development of e-services from different planning dimensions.

Table 3. Integrated Recommendations for Furture E-services

Dimension	Recommendations	
E-services Criteria and Measures	Developing an Integrated Approach/Roadmap for Creating Fundamental Components of E-Services	• Considering the telecommunication infrastructure as a basic infrastructure, such as electricity and gas in development plans • Promote the benefit of the ICT infrastructure and access to internet • Enhance modern & reliable broadband infrastructure with a mixture of both fixed-line and mobile network
	Create the Essential Fundaments for Digital Content	• Promote authorities and citizens to use more digital content • Create the required basis for the security of data as one of the concerns by end users and local authorities
	Develop Programs to Enhance the ICT Skills of the Actors	• Enhancing communication (using appropriate channels, content, and method for sustainable & interactive communication) • Promoting training programs for the citizens as well as the local authorities
	Promoting the Use of E-services	• Develop user friendly, reliable and comprehensive e-services • Using consolidated promotional measures to advertise the further use of e-services • Considering the respective local sociocultural contexts into account
E-services Actors	Create a Participatory Mechanism and Environment for All the Relevant Actors and Stake Holders	• Identifying different influential target groups • Choosing appropriate communication message and channels • Enhancing awareness and knowledge among the relevant authorities & experts Partners have to be sought and found & objectives and the intended procedures have to be agreed on and communicated right from the beginning of the process • Application of the new participatory method like PPP can be put in the agenda • Create an atmosphere that parties complement each other and do not compete
	Enhancing the Awareness and Skills of Providers, Managers, and End Users	• Developing promotional programs for all the relevant target groups and actors • Regular training programs and training sessions • It is necessary to communicate the objectives, structure, processes, and operative procedures continuously (internally and externally via appropriate channels)

	Developing a New Approach	• The roles of the partners should be defined differently from those in construction projects. • Such developments are affected by a wide range of local, regional, national and global circumstances, which have to be taken in to consideration during its development and implementation. • Enhancing the acceptance and participation of all actors
	Clarify the Role Expectations	• It is necessary to formulate clearly the respective mutual expectations in regards to the services and performance.
	Enhancing the Open Culture and Co-creation Approach	• If smart city project is striving for the ambitious objective of incorporating a whole urban society, the resources and processes for an Open Culture have to be provided. All partners involved have to be supported in adapting existing processes and cultures in relation to the project cooperation.
E-services Planning Procedure & Instruments	Setting Clear Planning and Provision Procedures for E-services	• An step by step procedure for local authorities is essential • Clarifying the identification of the roles and responsibilities in the local government • Clarifying the identification and design of the work flow (internally & externally)
	Consideration of the Impacts from Other Dimensions and Scales	• Many fields of action within a city, for which such innovative Ideas/projects are developing solutions, are affected by regional, national and even global circumstances, and they are shaped by them.
	Setting Up a Clear Structure, Regulatory and Statuary Framework	• It is essential to set up a joint project structure with responsibilities and decision-making processes that are transparent both internally and externally with the support of respective regulatory measures.
	Setting Up Regular Reviews, Feedbacks and Constant Improvements	• It is necessary to review the objectives, structures and processes regularly. In long term projects, fluctuating external circumstances, technical and organizational innovations, and changes in the attitude of individual partners are to be expected.
	Developing Clear Link (Vertical and Horizontal) Among Plans and Strategies in Different Scales	• Clear understanding of the legally binding statuary plans/strategy measures and their transmission in the local scale. • Developing a clear vision of the future is an important step forward. • Grand visions have to be divided into smaller, manageable areas. • Objectives and the intended procedures have to be agreed on and communicated.
	Setting Clear Planning and Provision Procedures for E-services	• An step by step procedure • Clear identification of the roles and responsibilities in the local government • Clear identification and design of the work flow (internally and among different actors)

Furthermore, in line with delivering efficient and optimal e-services, it is crucial to integrate e-services architecture process to the urban service delivery planning process with the aim of providing more efficient and flexible services for different target groups. For this aim, the following principles are required to be considered:

- Integration of e-services' right from the beginning of planning proces
- Developing both virtual and spatial options for the users and offering them the opportunity of making a wise choice.
- Increasing public awareness regarding the benefits and efficiencies through e-services, with the aim of creating an evolutionary shift to virtual services, where it fits.
- Increasing awareness of urban planning decision makers about the importance and impacts of e-services in urban management procedures.

ENDNOTE

1. Picon, A.(2015). *Smart Cities: A Spatialised Intelligence - AD Primer.* John Wiley & Sons publish. UK.
2. Source: Author based on Anthopoulos, L.G., & Vakali, A, 2011
3. Bakici, T., Almirall, E., & Wareham, J. (2013). A Smart City Initiative: The Case of Barcelona. *Journal of the Knowledge Economy,* 4(2), 135-148.
4. Caragliu, A., Bo, C. D., & Nijkamp, P. (2009). *Smart Cities in Europe*. Business Administration and Econometrics, Series: Serie Research Memoranda number 0048.
5. Understanding Smart Cities: An Integrative Framework. The 45th Hawaii International Conference on System Sciences, (pp. 2289 - 2297).
6. Scholl, N. J., Barzilai-Nahon, K., Ahn, J. H., Olga, P., & Barbara, R. (2009). E-commerce and egovernment: How do they compare? What can they learn from each other? Proceedings of the 42nd Hawaiian International Conference on System Sciences (HICSS 2009). Koloa, Hawaii.
7. Stakeholder relations refers to four main issues: the ability to cooperate among stakeholders, support of leadership, structure of alliances and working under different jurisdictions.
8. Source: Author based on Kaiser, E.J., & Chapin, F.S, 1995

REFERENCES

Avram, V., & Avram, D. (2011). An Architectural Solution of Assistance E-services for Diabetes Diet. *Informatica Economică*, 15(2).

Anthopoulos, L.G., & Vakali, A. (2011). *Urban Planning and Smart Cities: Interrelations and Reciprocities*. Springer-Verlag. Berlin Heidelberg.

Bakici, T., Almirall, E., & Wareham, J. (2013). A Smart City Initiative: The Case of Barcelona. *Journal of the Knowledge Economy*, 4(2), 135-148.

Bell, D. (1974). *The Coming of Post-Industrial Society*. London: Heinemann.

Boyer, Kenneth K., Roger Hallowell, & Aleda V. Roth. (2005). E-services: Operating Strategy - a Case Study and a Method for Analyzing Operational Benefits, *Journal of Operations Management*, 20 (2), 175-188.

Bawany, NZ, & Shamsim, JA. (2015). Smart City Architecture: Vision and Challenges. *International Journal of Advanced Computer Science and Applications*, 6(11).

Chourabi, H., Nam, T., Walker, S., Gil-Garcia, J. R., Mellouli, S., Nahon, K., et al. (2012) Understanding Smart Cities: An Integrative Framework. *The 45th Hawaii International Conference on System Sciences,* 2289 - 2297.

Caragliu, A., Bo, C. D., & Nijkamp, P. (2009). *Smart cities in Europe*. Business Administration and Econometrics, Series: Serie Research Memoranda.

Castells, M. (1996). The *Information Age. Economy, Society and Culture.* Vol I: The Rise of the Network Society, Cornwall, Blackwell.

Chourabi, H., Nam,T., Walker, S., Gil-Garcia, J. R., Mellouli, S., Nahon, K., Pardo, T. a., & Scholl, H. J. (2012). Understanding Smart Cities: An Integrative Framework. 45th Hawaii Int. *Conf. Syst. Sci.,* (pp. 2289–2297).

Deakin, M. (2014). *Smart Cities: Governing, Modeling and analysing the transition*, Routledege.

Graham, S., & Marvin, S. (2002). *Telecommunications and the City: Electronic Spaces, Urban Places*. Routledge.

Harrison, C., Eckman, B., Hamilton, R., Hartswick, P., Kalagnanam, J., Paraszczak, J., et al. (2010). Foundations for Smarter Cities. *IBM Journal of Research and Development,* 54(4).

Hofacker, F., Goldsmith, C.E., Bridges, R., & Swilley, E. (2007). *E-services: A Synthesis and Research Agenda.* DUV. Deutscher Universitäts-Verlag, GWV Fachverlage GmbH, Wiesbaden.

Holland, R.G. (2008). Will the Real Smart City Please Stand Up?, City, 12(3), 303-320.

Hernández-Muñoz, J. M., Vercher, J. B., Galache, L. M., Gómez, M. P., & Pettersson, J. (2001). Smart Cities at the Forefront of the Future Internet. *In J. Domingue,* A. Galis, A. Gavras, T. Zahariadis, D. Lambert, F. Cleary, et al. (Eds.), *The Future Internet Assembly 2011: Achievements and Technological Promises* (pp. 447-462). Budapest, Hungary.

Hahn, Jungpil & Robert Kauffman, J. (2002). *Information Foraging in Internet-Based Selling: A Systems Design Value Assessment Framework,* in E-Business Management: Integration of Web Technologies with Business Models, Michael J. Shaw, Ed. New York: Kluwer.

Hatzelhoffer, L. (2012). *Smart City in Practice: Converting Innovative Ideas into Reality: Evaluation of the T-City Friedrichshafen.* Jovis publications.

Javalgi, Rajshekhar G., Charles L. Martin, & Patricia R. Todd. (2004). The Export of E-services in the Age of Technology Transformation: Challenges and Implications for International Service Providers, *Journal of Services Marketing*, 18 (7), 560-573.

Jones, A., & Williams, L. (2005). *Public Services* and ICT - FINAL REPORT How can ICT help improve quality, choice and efficiency in public services?, The Work Foundation, London, UK.

Komninos, N., Pallot, M., & Schaffers, H. (2013). Special Issue on Smart Cities and the Future Internet in Europe. *Journal of the Knowledge Economy*, 4(2), 119-134.

Komninos, N. (2006). The Architecture of Intelligent Clities: Integrating Human, Collective and Artificial Intelligence to Enhance Knowledge and Innovation. The *2nd IET International Conference on Intelligent Environments*. 1 (1), 13-20.

Karadağ, T. (2013). *An Evaluation of the Smart City Approach.* The Graduate School of Natural and Applied Sciences of Middle East Technical University.

Kaiser, E.J., & Chapin, F.S. (1995). *Urban Land Use Planning.* University of Illinois Press.

Lovelock, Ch. & Jochen, W. (2004). *Services Marketing: People, Technology, Strategy* (Fifth ed.): Prentice Hall.

Martins, J. (1978). *The Wired Society, Prentice-Hall*, USA.

Nam T., & Pardo T. A. (2009). Conceptualizing

Smart City with Dimensions of Technology, People, and Institutions, proceedings of *the 12th Annual International Conference on Digital Government Research.*

Roland, R.T. & Kannan, P.K. (2003). E-service: A New Paradigm for Business in the Electronic Environment, *Communications of the ACM*, 46 (6), 37-42.

Schaffers, H., Komninos, N., Pallot, M., Trousse, B., Nilsson, M., & Oliveira, A. . (2011). *Smart Cities and the Future Internet: Towards Cooperation Frameworks for Open Innovation.* In: Domingue. J et al. Future Internet Assembly. Heidelberg: Springer-Verlag. 431-446.

Smart Cities. (2011). *Creating Municipal ICT Architectures - A reference guide from Smart Cities.* Available: http://www.smartcities.info/creating-municipal-ict-architectures-reference-guide-smart-cities. Last accessed 8th Aug 2016.

Stuart Chapin, F., & Kaiser, E.J. (1979). *Urban Land Use Planning,* University of Illinois Press, 1979.

Suresh P. (2011). Understanding Challenges in E-governance. SETLabs Briefings a journal published by Infosys labs, Business innovation through technology, e-governance, 9(2).