

E-Governance State-of-the-Art Survey: Stuttgart, Germany

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Abstract E-Governance or Smart Government is buzzword across Europe to improve interaction between government and stakeholders. Governments both at national and local level are making efforts to transform themselves into a well-connected entity that responds efficiently to the needs of its citizens by developing an integrated back-office infrastructure. Cities are implementing smart and innovative means to improve quality of life and enhance competitiveness. Various measures are being taken to provide transparent, efficient, innovative and responsive government through adoption of various Information and Communication Technology (ICT) tools. Stuttgart, located in south-west of Germany is no exception which started its E-Government initiative a decade ago, has today crossed significant milestones. Various e-services platforms are created to inform and assist citizens and e-transaction platforms are created to reduce the burden on existing staff in various departments. These services have shown remarkable results in management of some areas such as waste, mobility, human resource, etc. These platforms are still evolving and being created and developed after a thorough research, planning and consultative process with various stakeholders. Stuttgart has been successful in extending the reach of services digitally to its citizens and promoting a sense of sustainability. This city takes care of wide spectrum of administrative, political and social services through diverse ICT and Geographic Information System (GIS) platforms. Stuttgart is hub of high-tech auto industry and also known for its advanced ICT industry and highly innovative green technologies. This sense of sustainability is also reflected in adoption of environmental friendly practices which are being supported by befitting e-democracy and E-Governance measures. The objective of this paper is to review process of formation of E-Government services in Germany and the key milestone related to development of E-governance in Stuttgart. An case of best practices in mobility is presented to ascertain if Stuttgart leads its way to be a smart city.

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1 Introduction

The term E-Government is made up of two words, ‘Electronic’ and ‘Government’ which stands today as a synonym for a modern, transparent and efficient administration with Internet as a connecting medium between stakeholders and administration. Municipal, State and National Government use information technology and internet to support government operations, engage citizens and extend government services [1]. It is often referred in context to handling of diverse administrative processes with the help of modern Information and Communication Technology (ICT). The interaction may be in the form of obtaining information, filings or making payments and a host of other activities via the World Wide Web. The European Commission is actively supporting E-Government both at the national level and at its own supra national level. The European Innovation Partnership for Smart Cities and Communities combines ICT, energy management and transport management to come up with innovative solutions to the major environmental, societal and health challenges facing European cities today (<http://ec.europa.eu>).

Germany being a developed country has shown remarkable progress in some of the sub-key indicators though some of the services extended through E-government programmes are still undergoing optimization. Germany has started much early to formulate strategy for E-government and has implemented it at municipality level a decade ago. On September 2006, The German Federal Cabinet adopted the comprehensive strategy focused on the future: Innovations for the Administration (Zukunftsorientierte Verwaltung durch Innovation), which aims to modernize the Federal State Administration, to downsize bureaucracy and improve the quality and efficiency of public sector services. The integral part of the strategy consists of the E-Government 2.0 Program. The programme has been developed in compliance with European Union Action Plan i2010 and utilizes already existing know-how on E-Government [2]. Current E-Government 2.0 programme framework, which is conceptualized keeping in mind the overall modernization of the Public Administration at federal level, has also laid down framework to be implemented at local (municipality) level. The idea is to create a fully integrated E-Government in Germany which connected federal government, federal-state governments and municipal administrations. Germany has made strides in the promotion of E-Governance in the federal government but still lacks the necessary legal infrastructure to further promote E-Government in the lower levels of government and in federal states [3]. This deficiency results in a lackluster showing in the E-Government promotion at the lower level of the government and the federal states.

Various reviews on quality of E-Government services suggest that portals created to serve the purpose of E-Participation extend only as a gateway to the government

website but the portals often do not have interactive tools where public can contribute and share their opinion. These portals do provide information about the opinions of the citizens in decision-making process conducted by government. This paper is an effort to explore the state of the art of E-Government services in Stuttgart metropolitan region and also examine the role of e-Participation to promote inclusion and empowerment. An appraisal of the select best practice, i.e. Sustainable Mobility management in Stuttgart is examined as how it fits to the dimension of emerging smart cities and what challenges and issues it poses on planning a future oriented city. The inferences of this investigation are going to benefit development of emerging cities in developing world where efforts are being made to develop new smart cities. The basis of this paper is designed by providing answers to the following basic questions:

- How various administrative procedures are made available to citizens?
- How the information is disseminated to various departments and how the participation of citizens is ensured?
- How the functioning of administration is made more transparent, efficient, participatory and democratic?
- How management of all these processes has been made understandable to all?

Some salient points of Stuttgart Mobility Development 2030 (VEK 2030) [www.stuttgart.de] have been listed with focus on cleaner and environmental friendly practices and futuristic sustainable mobility concepts. Some of the key agendas which are being included are intelligent and social use of transport means along with smart control of traffic. There are efforts to promote policies for non motorized mobility, mobility for disabled and elderly as well. A small case of smart mobility management is presented, which is directed towards making Stuttgart a smart city.

2 European E-Governance Framework

European countries started E-Government initiatives, which were mainly focused towards improvement of governance at the national level. Some of the cross-border E-Government activities also took place. The European Commission has laid down a clear vision, policies and objectives to ensure modern and efficient administration. Several programmes have been initiated including i2010 Action Plan that defined the principles and directions of E-Government policy of the European Commission till year 2010. The i2010 project was designed to foster a fully inclusive information society, which is based on the widespread use of ICT in public services, small and medium size enterprises and household [4]. Later, Ministerial declaration on E-Government, which was presented in Malmö, Sweden, has laid down guidelines for development between 2010 and 2015. The next E-Government Action Plan that describes the directions for the period starting at 2011 has been announced by the European Commission under the name Europe 2020 (<http://www.egovap-evaluation.eu/>).

In the beginning, the focus of all these initiatives was to ensure Interoperability and promote the efficient use of ICT for cross-border services to citizens and enterprises in Europe. Delivery of European E-Government Services to public Administrations, Businesses and Citizens (IDABC) was a European Union Programme launched to meet this objective. It aimed at stimulating the development of online platforms delivering public e-Services across Europe (www.wikipedia.org). It used the opportunities offered by ICT to encourage and support the delivery of cross-border public sector services to improve efficiency and collaboration between European public administrations and to contribute to making Europe an attractive place to live, work and invest. IDABC supported the member state to develop clear objective with recommendations to developed solutions and services that enable national and European administrations to communicate electronically while offering modern public services to businesses and citizens in Europe.

3 German E-Governance Framework

Germany, called 'Bundesrepublik' Deutschland in German, is a federal State made up of 16 federal states or so-called 'Länder'. These states are comprised of 300 districts and around 13,000 municipalities. Local authorities are usually in-charge of most government services and considered key contact point for politics, administration and citizens. However, when it comes to E-Government policies, it is national federal government which formulates key policies and takes up a lead position. Therefore, any decision on E-Government policy follows a structure which is implemented at federal, state and local level.

E-Government started getting attention of Germany in the late 1990s when efforts were made by some experts from different segments of German society by formulating memorandum of E-Governance. The memorandum was prepared after inviting input from all stakeholders on common need of electronic administration, electronic democracy and the reorganization of structures and processes. In order to achieve this objective, a careful appraisal of ongoing administrative practices was done where administrative processes could be made more efficient with the help of ICT. A strong need of organizational re-engineering and restructuring of work processes in administration was felt. As a first step, this restructured face of administration was presented to citizen electronically by means of different ICT platforms. An IT supported interface between administration and stakeholders was tested with an idea to provide a chance for citizen to participate in political decision-making (Fig. 1).

As a first step, the task of distribution of information digitally through web was facilitated using web. After carefully analyzing the user's behaviour and how a citizen makes use of this information, integration of network-based systems was envisaged. Some authorities also initiated online transactions using electronic signature. In 1997, the functionality of legally accepted electronic signature for various online transactions was introduced in Germany after carefully assessing all the

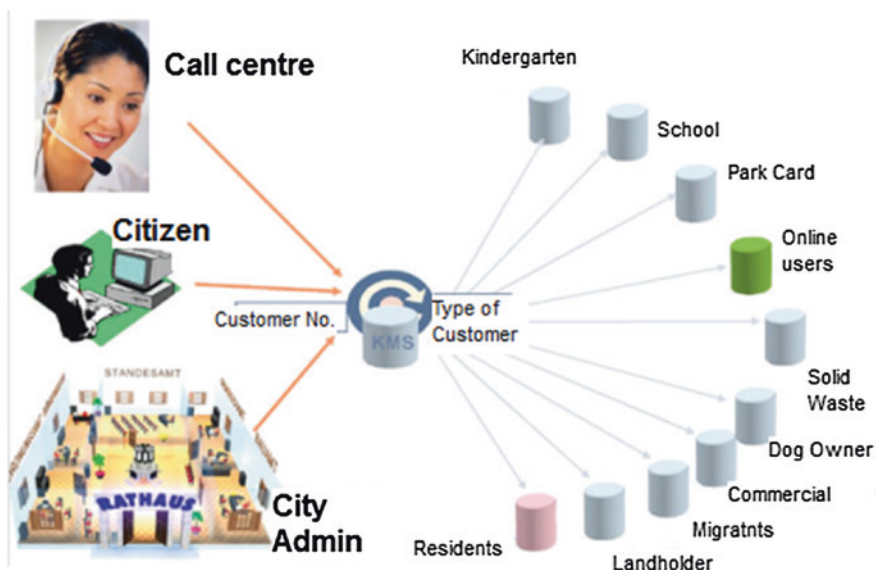


Fig. 1 E-government stakeholders. *Source* Report “Praxis des E-Government in Baden-Württemberg”

security issues. A first significant step on the federal level to facilitate the introduction of IT-solutions in the public sector was the 1997 ratification of the law on electronic signatures in attempt to provide a legal framework for an infrastructure that can be used for many different types of online transactions [5].

All the associated issues to ensure secure transaction were given a top priority. Gradually, after successful implementation of this process, a need was felt to add the functionality of ‘feedback’ in which a user can also communicate to administration and ensure participation in decision-making process. Efforts were also made to reach the communities which are not connected to net but have interest to participate in decision-making process.

3.1 The Media@Komm Project

Esslingen Municipality: Esslingen, a town located southeast of Stuttgart is home to high-tech companies and the automobile industry. Esslingen with a population of 100,000 people is also the administrative center for people living in neighbouring villages. The town came into limelight for its innovative approach to implement online administration and support E-Government and E-Democracy activities.

The purpose of the Esslingen Media@komm project was to improve the participation possibilities of citizen. The employed concept included providing a broad scope of information to citizens as the ground work for an increased democratic participation. The core of the project was a virtual market place in which a company register, a job market and a citizen/investor information service, among other things could be found [6]. The public budget dialogue in Esslingen is one of the first European projects to use an Internet based discussion forum as an instrument to inform and consult the public about the municipal budget [7]. It was noted that citizens participated actively online and provided valuable input to authorities to improve on service and make use of budget.

The first significant project done in this direction in 1998 was MEDIA@Komm project for the development of local E-Government solutions in selected regions. It was envisaged to promote the usage of electronic signature at municipality level. Esslingen town which is a part of Stuttgart metropolitan region was among the top three cities selected to implement the concept of electronic transaction with a budget of 8 million Euros. A pilot project was executed to apply variety of solution for electronic planning, electronic award of contracts, online reminder and access to electronic libraries among others. The foremost concern was on secure mean of data and information exchange (www.esslingen.de).

MEDIA@komm succeeded in its objectives and gave further impetus to development of electronic-based system development in other municipalities with diverse applications. Some of the municipalities came up with innovative and ambitious approach to implement the integrated system at larger scale by teaming up together. Mobile electronic administration which were developed in Berlin and Magdeburg cities is a perfect example of innovation and team effort which further found its ways in Poland and Russia for cross-border transfers [8] (Fig. 2).

3.2 Key Developments

In order to make Germany a leader of electronic governance, a number of public-private partnership (PPP) project were initiated with the help of representatives of enterprises, associations, political parties and political institutions. Global players such as Microsoft, Siemens, BMW, AOL, IBM also played a crucial role to take this efforts to next level. Several academic projects and real-time efforts have been initiated to develop e-Democracy system for decision-making and its integration to the election process. Election of the council of young citizens (Jugendgemeinderatswahl) in Fellbach, under Stuttgart metropolitan regions was one of such actions. Around the same time Electronic Health Card were issued under D21 initiative connecting patients, medical doctors, dentists, hospitals, pharmacies and health insurance companies for smooth exchange of information [9].

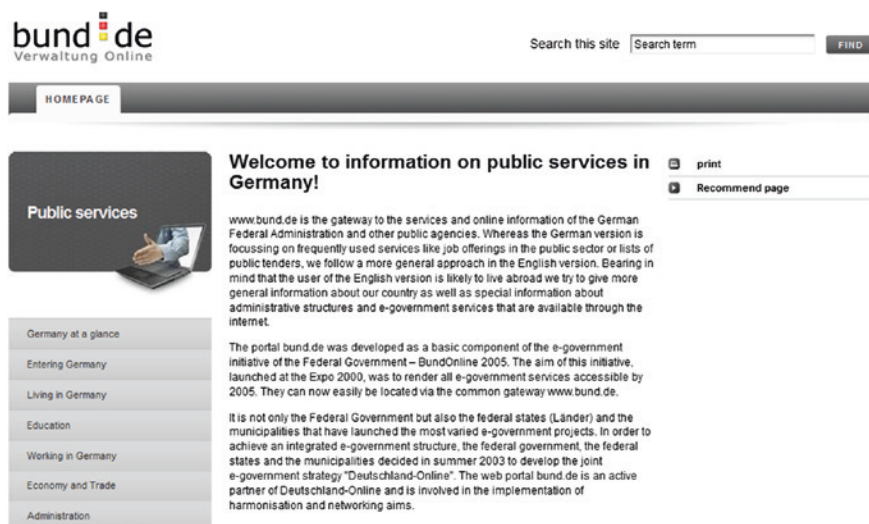


Fig. 2 Portal of federal government

Federal administration came up with another initiative BundOnline2005 for modern, service-orientated enterprise services. The portal bund.de was developed as a basic component of the E-Government initiative of the Federal Government—BundOnline 2005. The aim of this initiative, launched at the Expo 2000, was to render all E-Government services accessible by 2005. The vision was to follow a user centric approach by focussing on citizens and their needs. This initiative was launched with the main objective to modernize the federal public services with electronic delivery capability. After successful completion of this programme in 2005, vast range of services were made available online and two-way dialogue was established with stakeholders. They can now easily be located via the common gateway www.bund.de.

Development of common infrastructures with an objective of integrated E-Government development were met with Deutschland-Online initiative which started in year 2003. The emphasis was to develop Integrated Electronic Services for citizens and businesses and Interconnection of Internet portals. An emphasis was placed on provision of Common standards and Experience and knowledge transfer. Other notable programmes namely 'Federal IT strategy' and 'Broadband Strategy' provided a major boost to improve IT management within the government, as well as providing businesses and household with high end broadband services.

3.3 E-Government 2.0

The programme E-Government 2.0 is worth a mention which laid a special emphasis on E-Participation. E-Government 2.0 or Gov 2.0 refers to government policies that aim to harness collaborative technologies to create an open-source computing platform

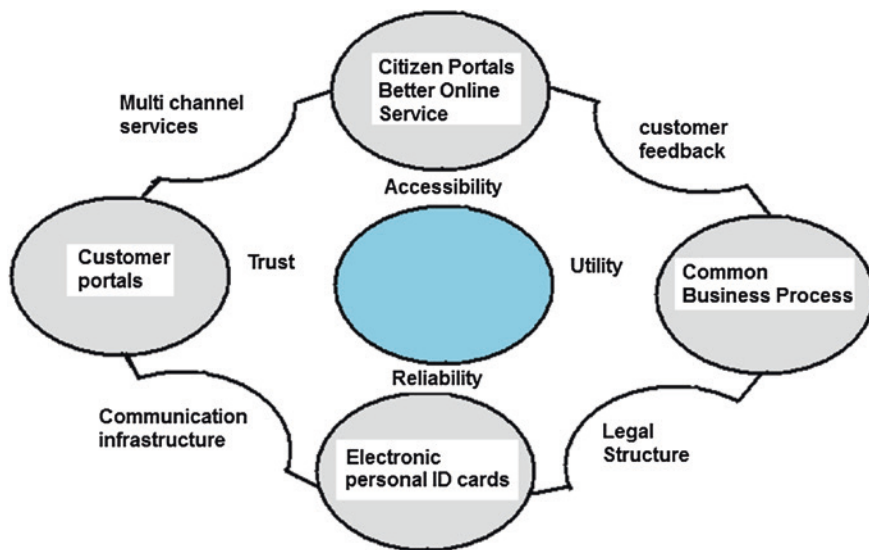


Fig. 3 Need for better transparency and participation. *Source* Interior federal ministry report

in which government, citizens and innovative companies can improve transparency and efficiency. Gov 2.0 combines Web 2.0 fundamentals with e-government and increases citizen participation by using open-source platforms, which allow development of innovative apps, websites and widgets. The government's role is to provide open data, web services and platforms as an infrastructure (www.wikipedia.org) (Fig. 3).

Trust and Reliability of system are key issues which were addressed by provision of strict security measures without compromising the accessibility and utility. In order to meet this objective, several projects have been initiated. Notable of them was provision of electronic identity Card in 2010 to facilitate identification of the owner. This Identity card with microchip contained holders' data in electronic format including biometrical data (digital facial image/fingerprints). The possibility of integrating digital signature was also explored.

Another significant development is 'De-Mail' aimed at facilitating the secure exchange of electronic documents among citizens, businesses and public authorities via Internet. The concept of providing unitary service number 115 was another notable development in which citizen gets a number (115) to contact public administration and gets all the related information.

4 E-Government Framework of State of Baden Württemberg

Stuttgart is the capital of state of Baden Württemberg in Germany. Baden Württemberg (BW), located in south west corner of Germany is surrounded by Switzerland, France and Austria. BW with a population of around 11 million is

third biggest state in Germany in terms of area and also population. BW is considered among world's most successful regions in industry, science, education and culture. There are as many as 1,101 small and medium municipalities (called *Gemeinden*) and 93 of them are relatively bigger city and 312 of them meet the definition of city. Almost all of them have online presence with facility of at least providing online vehicle registration facility, registration of business, population registration and marriage certificate online.

"www.Service-bw.de" is the main Service Portal for the State which also connects itself to almost all local authorities. The Portal offers detailed information about administrative services specifically designed for general public, companies and employees in administration. Apart from providing general information, it also extends service to easily access online forms and online services. The procedures are made simple and described explicitly with their service offerings adequately supported by range of electronic forms and online applications (Fig. 4).

'Service-bw' offers access to over 9,000 public authorities and institutions spread across state of Baden-Württemberg. Wide-ranging life situations in over 50 categories are described and connected to around 1,000 concrete administrative services. The use of these administrative process is made simple with the help of large number of useful tips and information. The administrative process worth mentioning are police, environment, justice.

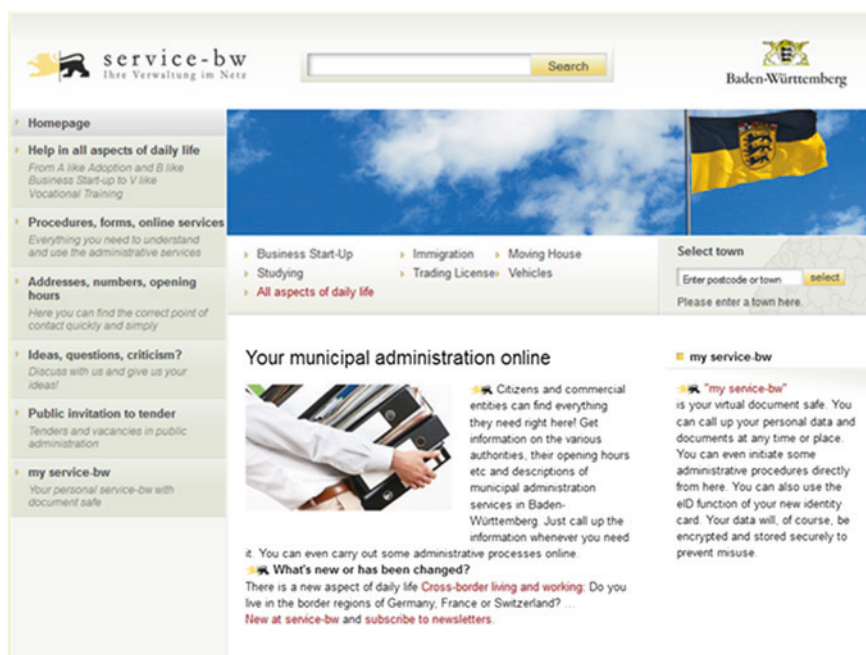


Fig. 4 Service portal of state of Baden Württemberg. Source www.service-bw.de

5 Stuttgart City: Introduction

Stuttgart, the sixth largest city of Germany is spread across hills, valleys and parks with an area of about 210 km². The population of Stuttgart is 5,90,000 while the greater Stuttgart metropolitan Region has a population of 5.3 million (2008). The main city, with a high-population density of 2,850 persons/km², is surrounded by small satellite towns which have relatively low population density. Various surveys conducted on quality of life in German cities indicate that Stuttgart offers best quality of life with highest per capita income among German cities. Being a place of origin of Mercedes and Porsche, it is considered by many to be the starting point of the worldwide automotive industry and is sometimes referred to as 'The cradle of the automobile' (Fig. 5).

Stuttgart is a hub of high-tech auto industry and is also known for its advanced ICT industry. The city offers a conducive environment to develop highly innovative green technologies. Stuttgart's healthy innovation climate is fostering the development of environmentally friendly and sustainable technologies for the future. To meet this agenda, by 2020, Stuttgart plans to produce 100 percent regenerative energy for entire population of Stuttgart without fossil fuel, CO₂ or nuclear means (www.stadtwerke-stuttgart.de). Major emphasis is given to ecological construction combined with high-tech methods and building types which do not emit harmful emissions, use no fossil fuels and are made of recyclable building materials. With this innovative, ecological focus, Stuttgart is a model for future sustainable urban development (Fig. 6).

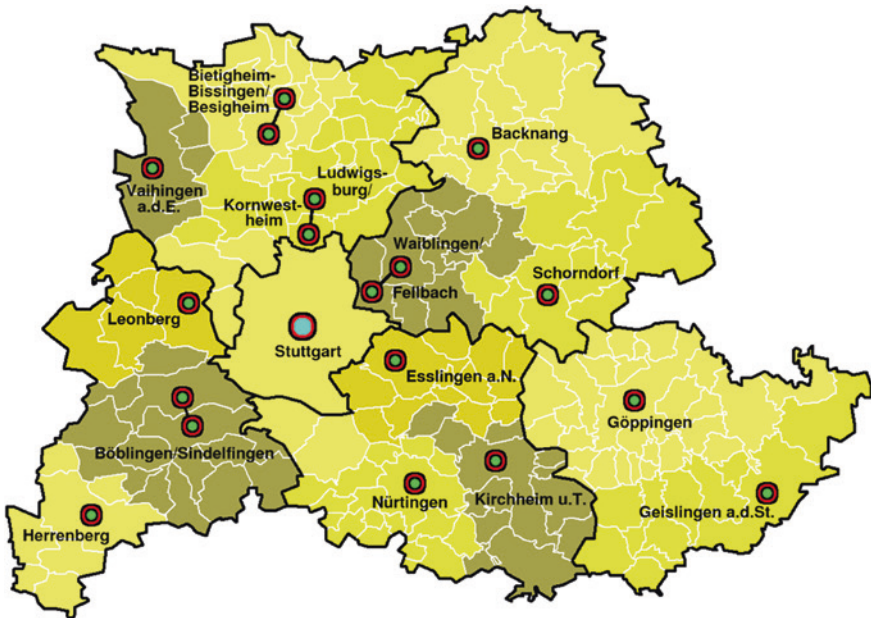


Fig. 5 Stuttgart metropolitan region. Source www.wikipedia.org



Fig. 6 Electric car2go initiative started by stuttgart-based daimler AG

This excellence is reflected in adoption of environment friendly sustainable practices which is also made an integral part of city planning and development. The process to manage these practices is adequately supported by befitting E-democracy and E-Governance measures. Various e-services platforms are created to inform and assist citizens and e-transaction platforms are created to enhance the efficiency of existing staff in various departments dealing with these issues. These services have shown remarkable results in management of some areas such as waste, mobility, human resource, etc. These platforms are still evolving and being created and developed after a thorough research, planning and consultative process with various stakeholders.

5.1 E-Government Framework in Stuttgart

The E-Government Stuttgart initiative which started in the framework of Media@komm project in 2000, has started with an idea of creating an information portal for all administrative services. It was envisaged to integrate also the private and socio-cultural aspects and develop specific applications to ensure online participation of stakeholders. This initiative has crossed significant milestones including establishment of Stuttgart competence centre and content management system 'InfopoolIBS'. The contents and applications are carefully designed keeping in

mind the growing need of cooperation and collaboration among various departments. The applications are developed after thoroughly studying the life of its citizens, changing need of business community and fast changing culture of using mobile devices. The idea was to increase the reach of these services to all age groups digitally and subsequently promote a sense of sustainability.

Today, this centre offers wide spectrum of administrative, political and social services of city through diverse ICT and GIS platforms and extended applications. It offers an electronic channels to inform it's citizens about the service offerings as well as functionality to perform selected administrative tasks online. Different sections are being updated and developed after a thorough research on users' behaviours and usability. Adequate tools are made available for controlled workflows between the management (individual departments) and external partners (companies, non-professional organizations, associations, etc.)

Any online application which is developed caters to the need of specific community or location. They are developed keeping in mind the need of users and how it addresses the typical query of citizens. The applications have a strong link with geographic component but it's made simple and effective. These online services offered by Stuttgart can be categorized in three types for the ease of understanding.

Group 1: All the information about city administration, opening time, transportation, events, emergency services, etc. is made available on city portal www.stuttgart.de and also at the citizen kiosk (Bürgerkiosk). Another extension <http://mobil.stuttgart.de> is developed to cater to the need of growing mobile phone users where application (apps) are developed to provide real-time information on smartphones and PDAs especially useful for mobility part. Efforts are being made to provide free information for multi-lingual users (German, English, French and Spanish) to ensure greater electronic participation.

'Stuttgart-info' section deals with important information about planned and ongoing events, art and architecture, nature, etc. which is constantly being updated. A gamut of information is available at one place which deals with quality of life, city planning, economy and culture. The interactive element of E-Government can be seen in the collaboration platform, 'My Service Stuttgart' where City administration and private organizations such as day care centres or sports clubs work together. The departments which operate under 'my service' section with different level of elaboration are given in Table 1.

The organizations share key information with city administration which often relates to planned events or new offerings. The municipality keeps the information in one place and shares it with registered users of same category. The information is presented differently for city dwellers and for companies, a non-profit organization, a club or similar institution. After a quick registration, user gets access to 'my service' section and avail the listed services. Each citizen is entitled to have an account to Intelligent and dynamic online applications and data entry screens (Fig. 7).

Group 2: The other category is called Electronic citizen service Assistant (eBSA-Elektronisch Bürgerservice-Assistent) which extends the facility of 'online research on the proximity' to user. This is where geographic component also plays

an important role. It is possible to find civic service/facilities in the given proximity such as nearest kindergarten, post-office, library, waste collection point, administrative services, etc., once information about users location is provided. The application often asks the user for its location and proximity orientation i.e. at what point user need this information and proximity requires geographic

Table 1 Departments under ‘my service’ section of Stuttgart city portal

<i>Road and transport</i>	<i>Personal information</i>
Transportation/Parking garage	Information on the birth time
Resident parking permit	Marriage, birth and death certificate
Special parking permit for businesses, social services and all-electric vehicles	Local jurisdiction registry office
Feinstaubplakette (related to environment)	Local jurisdiction city hall
Ideas and complaints	Next, citizens’ advice bureau
Vehicle license plates	Next week market
	Online lost and found
<i>Building and housing</i>	<i>Facts and figures</i>
Information about the living environment	Polling place finder
	Statistics Stuttgart (shop)
	Survey Geodata (shop)
<i>Trade</i>	<i>Tendering and contracting</i>
Trade register information	Tenders
Commercial confirmation	eVergabe (electronic allocation)
<i>Waste and disposal</i>	<i>Sport and leisure</i>
Waste/recyclables container stock position	Sports guide
Waste removal calendar	Play areas
Express bulky waste pick-up	Club guide
Bulky waste pick-up	VHS course registration
Green waste collection	
Ideas and complaints	

source www.service.stuttgart.de (translated)

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Fig. 7 My service section Graphical User Interface (GUI)

component in order to locate nearby Area of interest (AOI) whether it is about finding required activity, service or finding a location of school, hospital or other emergency service. Integration of Geo-referenced data is done in 'InfopoolIBS' which contains information about address, street ID, Gauss-Krüger coordinate system and information about ward, zone, town and city.

In order to facilitate the various administrative functions, various forms are made available online which can be printed or sometimes related CD or printed material can be ordered online. For example, it is possible to get emissions sticker or a resident parking permit from the given facility after filling up online forms which avoids unnecessary trip to the office. Special applications are developed for selected departments where online money transaction/payment facility is also integrated. The secure online money transactions facility is available with electronic signature. A co-operation platform with specially designed web application is provided to business and NGO for information exchange. The access is customized differently for each administrative or civic unit based on the needs of user.

6 Case Study: Mobility Management

As a leader in the automobile field, Stuttgart has provided a major thrust to meet the major challenges posed by the mobility situation. Industry has given new impetus to mobility and are currently developing many revolutionary technologies and processes which will change the way how mobility is managed in future. They are helping to design the mobility of tomorrow with intelligent technical solutions, and new ways to manage the traffic without losing sight of their commitment to the environment.

The Integrated Traffic Management Centre Stuttgart (IVLZ) records the real time traffic situation for every minute without break to avoid congestion and slow moving traffic. This recorded information is processed and analysed for active intervention to regulate both road traffic and the public transport network. IVLZ has been constantly providing input for smooth management of traffic and maintaining punctuality of bus, tram or light railway. The IVLZ collects real time data from following sources:

- Permanently installed measurement points to record incidence of traffic.
- Mobile sensors.
- 700 taxis with GPS.
- City's Civil Engineering Department provide additional information about the traffic situation, in particular on the main arterial routes and at major junctions.
- The traffic surveillance system operated by the Police Department.

The real-time traffic situation can be calculated with the help of current speed of each individual taxi even in the locations where no measurement facility is installed. Any incidents or events likely to affect the traffic situation can be reported directly to the operators in the Control Centre either over the operations control computer or by police radio (Fig. 8).

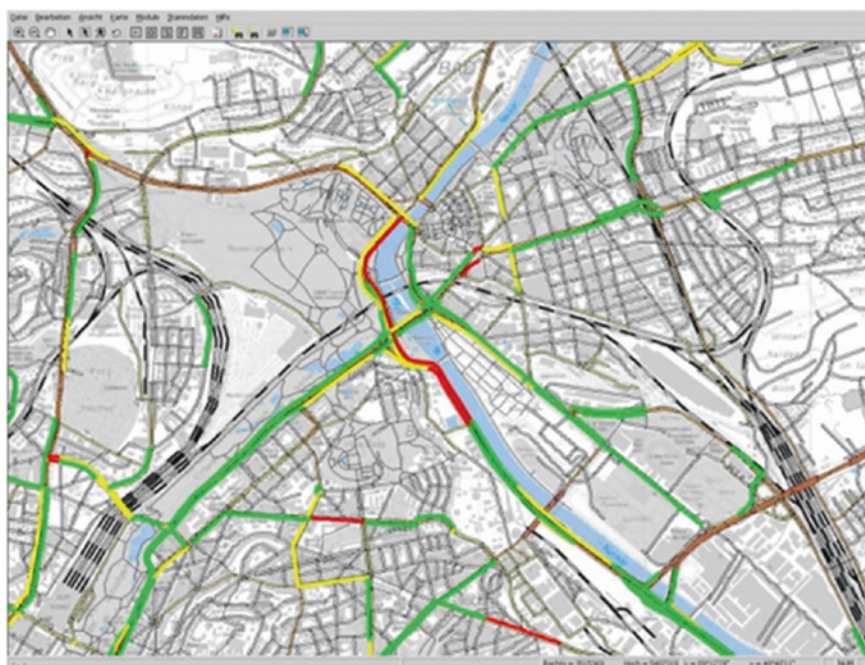


Fig. 8 Real-time traffic situation in north Stuttgart. *Source* State capital stuttgart

The picture shows the realtime traffic situation in north Stuttgart where Red represents congestion, Yellow represents heavy traffic, Green is free-flowing traffic. The dynamic picture created of the traffic situation and the on-going evaluation of data permit evolving critical traffic situations or bottlenecks in the transport system to be detected at an early juncture. The operators working at the IVLZ evaluate all events of relevance for the traffic situation and work as a team to put in place a series of operational measures designed to guarantee a fast response.

Another important element of the overall traffic picture is provided by the Stuttgart transport Authority (SSB) with the help of CCTV cameras, which monitors the situation in the city's bus and tram network. This allows a fast and selective response to delays in the bus and tram timetable. Information on existing or planned construction sites, organized events and occupancy levels in the city's open-air and multi-storey car parks is collated centrally in the IVLZ using specially developed software (Central Traffic Information VIZ).

In order to meet the commitment of sustainability and environment, an integrated system of ticketing is implemented in which a single ticket is valid for all forms of transport. German national railway (Deutsche-Bahn) subsidiary DB offers 'Call a Bike' service to hire bicycle available at 65 locations spread across the Stuttgart city. The first half-hour of cycling is free and bike can be left at any of the stations. The whole process to get the bike can be completed with the help of mobile phone (Fig. 9).



Fig. 9 Call a bike service

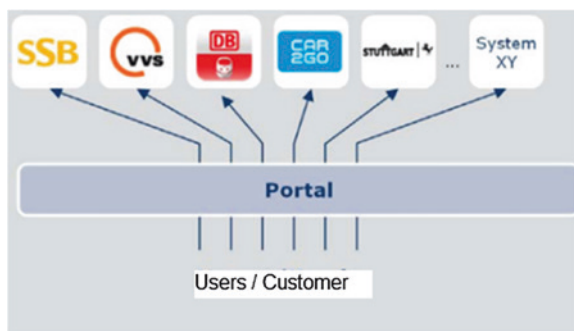
Car2go is a fleet of electric vehicles being operated in Stuttgart with three hundred 2 seater smart Fortwos cars. This programme is started by Stuttgart-based Daimler and now being operated in whole Europe. Stuttgart is equipped with 500 charging points which enables drivers to recharge electric vehicles throughout the city. On their smartphones or the Internet, customers can see where the nearest unoccupied car2go vehicle is located (Fig. 10).

Bicycle and electric car are also integrated with yearly local travel ticket. The yearly ticket holder can have access to these services at anytime to reach the final destination. This move is supported by ministry of Economy and technology till the end of 2015. There are as many as 22 co-operation partner coming from research community, private sector assisting these initiatives.

All these mobility-related information are integrated with use of mobile devices. The car2go trips can be booked and managed by smartphones or on

Fig. 10 Integrated portal for all mobility services.

Source www.stuttgart.de



the Internet, customers can see where the nearest unoccupied car2go vehicle is located. Various other apps are developed to get real time information about delays and unexpected situation. The information about time plans and real-time status of each public transport means such as bus or trams is centrally collected, processed and offered to the users through mobile applications on mobile phones. Development in this direction shows the commitment to the sustainable environment. So far it is ‘walk + public’ or ‘bicycle + public transport’ but in future information about pedestrian, bicycle, car-sharing, rent a bike and taxi would also integrate with improved information about traffic jams.

7 Conclusion

This survey is an effort to decipher the facts which were largely unknown regarding Evolution of E-Governance in its functional aspect in Germany and Stuttgart. It is evident from the survey that Germany has taken a lead in implementation of E-governance at federal level but idea to create a fully integrated E-Government landscape which connects federal government, federal-state governments and municipal administrations still lacks the necessary legal infrastructure. This has affected the development mainly at municipality level which failed at enabling a stronger dialogue between citizens and government. “GIS for Smart Cities” defines Smart City as a 24x7 knowledge based city that communicates, extends real time knowledge to stakeholders with easy public delivery of services, comfortable mobility, conserve energy, environment and other natural resources. Stuttgart seems to be leading in some of the key building blocks of the smart city which deal with Smart mobility, Smart Environment and smart economy. There is also considerable improvement in mobile phone based intelligent Governance with digital infrastructure, maintaining low carbon footprints and sustainable resource management. There are still gaps visible in Integration and transformation aspects along with user-cantered experience and also integration of a wide range of services across a whole government administration.

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