SMART CITIES COMMUNITIES AND SMART ICT PLATFORM

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ABSTRACT

Smart Cities is a result of the dynamic process which is developed step by step (be recognize and ranked) along six main dimensions: smart economy, smart people, smart mobility, smart environment, smart living and smart governance. Smart ICT Platform is powerful tool that assure access, process, delivery and store information into big data base for using entire cities communities and can ensure all round development and prosperity without compromising on the quality of life, and no smart ICT platform not smart city. Smart ICT Platform involve in production processes for their benefit, use in businesses, contribute immensely towards improving the education system and health system, online public services use in public administration will improve the productivity and quality of the service offered to its citizens, businesses and is an important step for transparent governance. New technologies can protect and preserve a city's environment and provide a healthy living for its citizens and is essential for Smart Mobility. This paper presents the concept and contest of Smart ITC Platform and how this concept can be useful in the context of transition from traditional city to the smart city and some facilities offer to smart cities communities.

Keywords: Smart City, Smart City Communities, Smart ICT Platform, Internet of Thing (IoT), Everything-as-a Service (XaaS), Web-based DSS.

1. INTRODUCTION

Smart Cities can be recognize and ranked along six main domains: smart economy, smart people, smart mobility, smart environment, smart living and smart governance (see fig. no.1). These six dimensions connect with traditional theories of urban growth and development, are based on theories of regional competitiveness, human and social capital, participation of citizens in the governance of cities, transport and ICT economics, natural resources, and quality of life and give us an image of how much have been developed community into smart city.

Information technologies, and especially the Internet, mobile telephony and easy access to Internet of Things (IoT), have enabled the development of the Information Society. Information and communication technologies (ICTs) are used in many fields such as public health, road safety, e-commerce and energy, etc. ICT has a very important role in development traditional city into a smart city. The European Union (EU) development a lot of projects for using ITC facilities in these different fields in order to improve the quality of life of European citizens, and development the large-scale projects in the following fields of activities [2]:

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-The use of ITC for road safety: e-Call, i2010 Intelligent Car Initiative, In-vehicle emergency call system "e-Call", e-Safety;
-The use of ITC for economic commerce:" "Directive on electronic commerce";
-The use of ITC for payment systems: Community framework for electronic signatures, Electronic payment, Relationship between card-holders and card-issuers;
-The use of ITC for research: A strategy for research on future and emerging technologies in EU;
-The use of ITC for energy sector: ICTs to facilitate the transition to an energy-efficient and low-carbon economy ;
-The use of ITC for public health: Telemedicine systems and services.

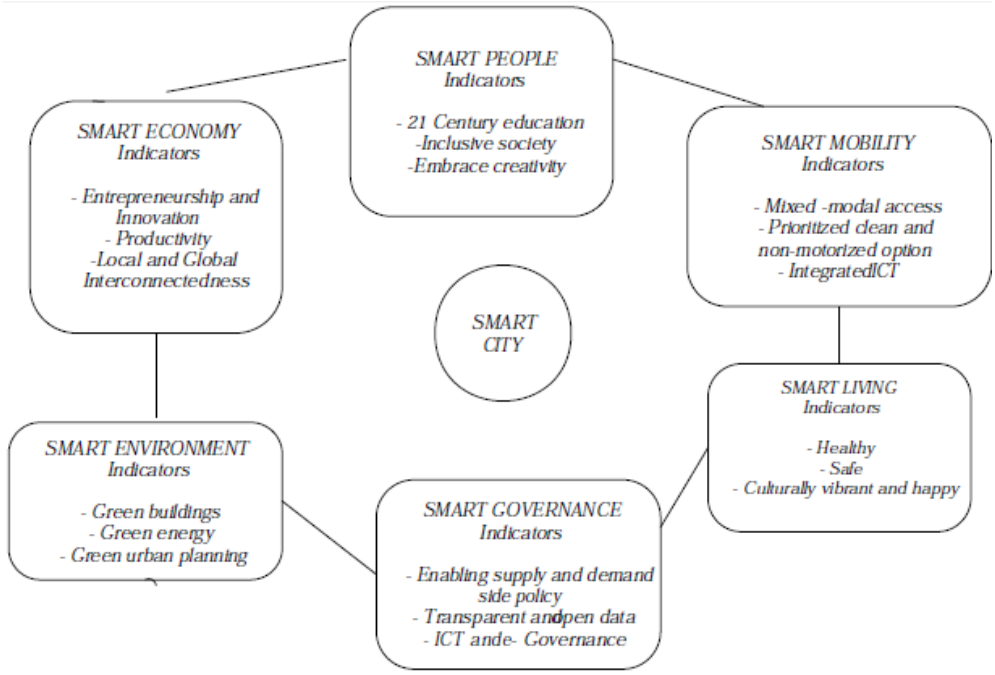

Fig. No.1. Smart City Model

2. SMART CITY AND COMMUNITIES

Competition among cities to engage and attract new residents, businesses and visitors means constant attention to providing a high quality of life and vibrant economic climate. Forward-thinking leaders recognize that although tight budgets, scarce resources and legacy systems frequently challenge their goals, new and innovative technologies can help turn challenges into opportunities. These leaders see transformative possibilities in using big data and analytics for deeper insights by using Cloud for collaboration among disparate agencies, Mobile to gather data and address problems directly at the source and Social technologies for better engagement with citizens. Being smarter can change the way their cities work and help deliver on their potential as never before. City leaders must

provide services that support the social, health and educational needs of citizens. Some directions for developments of new infrastructures and services of relevance in an urban context: broadband, wireless, sensors, data, energy, transport, housing, water, waste, and environment consist: ICT-enabled urban innovations, Smart city developments and Social and economic developments citizen-centric, Renewed government services in a local level, Simulation and modeling of the urban context. Future cities place citizens at the core of innovation process for modernization of urban infrastructures and services such transport, energy, culture, etc., through digital technologies: ultra-fast fixed and mobile networks, the Internet of things, smart grids, data centers, etc. Local authorities have invested and create new infrastructures and services, putting online more and more public services and create new links between citizen that help to build better future cities [5]..

A Smart City is a city well performing in 6 domains and in each domanin was identify a number of components (indicators). To compare the different indicators it is necessary to standardize the values. One method to standardize is by z-transformation (see formular). This method, developed by TU- Vienna University of Thechnology (Department of Spatial Planning) [4], has the advantages to consider the heterogeneity within groups and maintain its metric information. The Indicators by each domains wich has used in PLEEC project (website: www.pleecproject.eu, there are in Table No. 1

Cities in Europe face the challenge of combining competitiveness and sustainable urban development simultaneously and this challenge have an impact on issues of Urban Quality such as housing, economy, culture, social and environmental conditions. City rankings are a tool to identify grade of development by all six axes and identify chances for positioning one city in certain key resources against other cities of the same level. . Due to different interests behind rankings and the indicators and methodological approaches used it is also normal that one city is ranked very different in different rankings. TU- Vienna University of Thechnology (Department of Spatial Planning) [4], [6] , PLEEC project (website: www.pleecproject.eu) has realised a EU Smart Cities Ranking , after further adaptation and elaboration of cities and data accessibility and quality, 77 cities were chosen for the sample of smart city 3.0. [see Table No.2.].

Table No. 1 Domain and Component of Smart City

SMART ECONOMY	SMART PEOPLE	SMART MOBILITY
- Innovative Spirit **- Entrepreneurship** **- Economic image and trademarks** **- Productivity** **- Flexibility of a labour market** **- International ambeddedeness** **- Total**	**- Level of qualification** **- Affinity to life long learning** **- Social and ethnic plurality** **- Flexibility** **-Creativity** **-Cosmopolitanism/Open mindedness** **- Participation of public life** **-Total**	**- Local accessibility** **- International accessibility** **- Available of ICT-infrastructure** **- Sustainable, innovative and safe** **- Transport systems** **- Total**

SMART ENVIRONMENT	**SMART GOVERNNANCE**	**SMART LIVING**
- Attractivity of natural conditions **- Pollution** **- Enviromental protection** **- Sustinable resource management** **- Total**	**- Participation in decision-making** **- Public and social services** **- Transparence governance** **- Total**	**- Cultural facilities** **- Health conditions** **- Individual safety** **- Housing quality** **- Educational facilities** **- Touristic attractivity** **- Social cohesion- Total**

Table No.2 EU Smart Cities Ranking

No	Country	City	Eco	Peo	Gov	Mob	Env	Liv	Total
1	LU	LUXEMBOURG	1	18	56	4	16	4	1
2	DK	AARHUS	2	3	6	3	19	27	2
3	SE	UMEAA	24	5	2	34	1	13	3
4	SE	ESKILSTUNA	21	1	7	24	3	41	4
5	DK	AALBORG	10	11	5	14	14	10	5
73	RO	SIBIU	74	76	62	73	56	73	73
74	EL	PATRAI	59	55	77	77	35	77	74
75	RO	TIMISOARA	70	75	63	72	75	71	76
76	RO	CRAIOVA	75	77	59	75	77	76	77

3. **IBM, CISCO, MICROSOFT, ORACLE SOFTWARE PLATFORMS AVAILABLE FOR URBAN COMMUNITIES**

This leader companies are experimenting with cloud-based computing to lessen the cost and complexity of building smart city IT infrastructure — and if they succeed, it could create smart cities in the future [5].,[7], [8]. Let me say same example. IBM's "SMARTER CITIES" has a software platform to integrate and manage city operations such as police, fire and emergency responders, along with modules to add water and sewer management and transportation and traffic planning to the mix. Cisco has developed cloud computing for some of the connected city projects it has underway around the world [12]. Microsoft "CityNext" platform contains Applications and Sensors that have been broadly divided into two categories: Internal City Applications and External City Applications. Oracle's City Platform Solution has Public Sector CRM**,** Oracle WebLogic Portal, Communications Platform and Webcenter Interaction for integrated multi-channel access, Oracle Database, Oracle Universal Content Management, Data Integrator and Master Data Management for information sharing across city.

IBM "SMARTER CITIES" Platform offer a set ICT solutions such as [9]:

- Social programs solutions for: disability management, employment, pensions, family services, social assistance, Healthcare Reform;

- Healthcare solutions for: Care Management, Asset management and maintenance**,** Fraud and abuse management for payers, Healthcare asset management, Business analytics for healthcare;

- Education solutions for: Framework for smarter education, Business Analytics software for education, School solutions, VCL Solutions for Cloud, Innovation in research, Administrative solutions for education , Asset management for education, Campus solutions for higher education, Enterprise risk management for higher education

MICROSOFT "CityNext" platform , is a global initiative intended to build smart cities around the world, uses technology to enhance quality, wellbeing and safety of citizens. It provides means to engage more effectively and actively with its citizens and enterprises. And lastly, it helps city authorities to reduce costs and resource consumption for their cities." This definition should cover most of the scenarios of a smart city. Microsoft **"CityNext"** platform has a Bottom – Up approach, that start with bottom most blocks, this block will interface with Applications and Sensors primarily and Applications have been broadly divided into Internal City Applications and External City Applications.

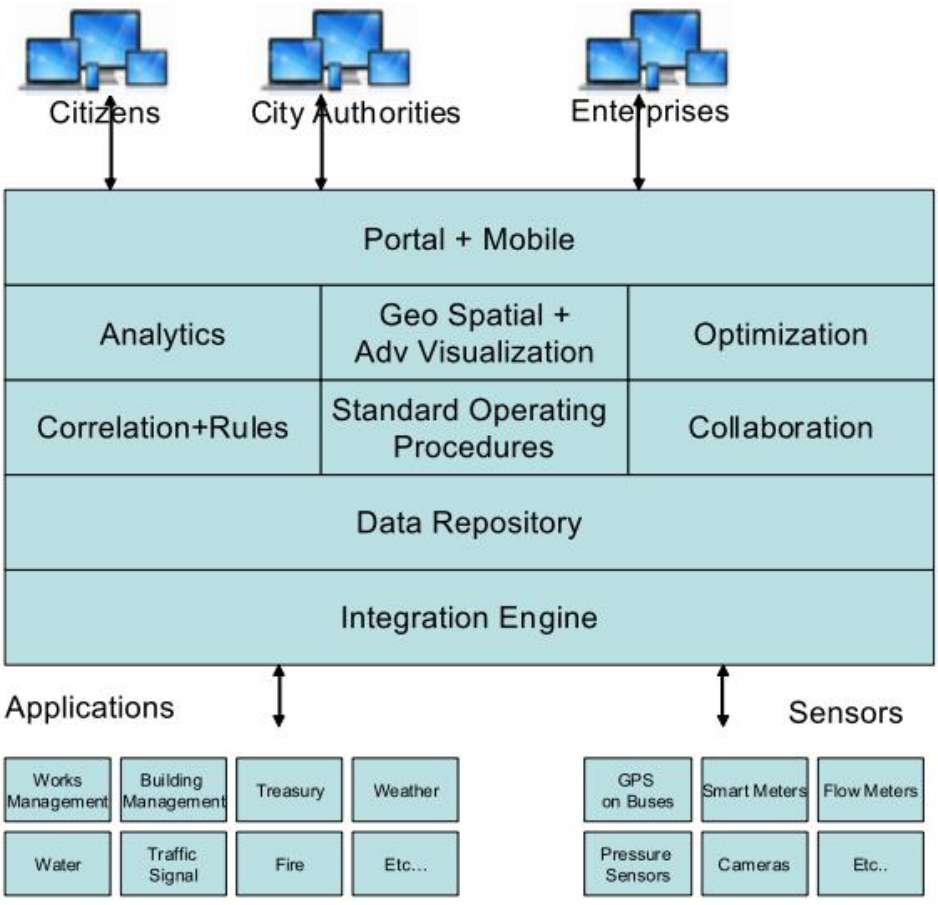

Fig No 2: Microsoft "CityNext" Aims to Build 'Smart Cities' [source [10]]

- **"Oracle's End-To-End Solution"** is Oracle's City Platform Solution based on proven, deployed technologies that increase the organizational reach, flexibility, and effectiveness of local governments that is capable of integrating into and bringing together a disparate heterogeneous set of silos into a set of shared extensible services [11]. This platform has the following facilities: Helps local governments modernize their IT infrastructures, Works within the constraints of existing budgets and legacy IT assets, Includes integrated and extensible data center platforms and ERP suites, Provides industry-standard servers, storage, software, and applications. Oracle Products such Oracle Business Analytics, Oracle's Case Management and CRM Solutions, Oracle's Financial Management has used for Public Sector and National Exchange Information. The benefits are: Provides IT infrastructure modernization, Enables efficiency and transparency, Transforms constituent services

4. IMPLEMENTATION INFORMATION SYSTEMS FOR SMART CITIES COMMUNITIES – GENERAL SCHEMATICS

4.1 Executive Information System

Smart City is a result of a long chain of Decisions, Decision Support Systems (DSS), and many, many large-scale projects which develop traditional city into smart city. The Executive Information System (EIS) is a set of management tools supporting the information and decision-making needs of management by combining information available within the organisation with external information in an analytical framework. An EIS is a type of management information system intended to facilitate and support the information and decision-making needs of senior executives by providing easy access to both internal and external information relevant to meeting the strategic goals of the organization. It is commonly considered as a specialized form of a Decision Support System (DSS).

The components of an EIS can typically be classified as:

- Hardware (Input data-entry devices, The central processing unit (CPU), Data storage files, Output devices);
- Software (Text base software, Database, Graphic base, Model base, (DSS));
- User Interface(scheduled reports, questions/answers, menu driven, command language, natural language, and input/output);
- Telecommunication (Transmitting data from one place to another has become crucial for establishing a reliable network);
- Applications (people have applied EIS in many areas, especially, in manufacturing, marketing, sales and finance areas).

EIS is a computer-based system that serves the information needs of the executives and provides rapid access to timely information and access to management reports. They provides Holistic information from a corporate (ERP systems), Business Intelligence (B2B,B2C), Enterprise Information Portals and Knowledge Management System. EIS have user-friendly, supported graphics, provides exceptions reporting and "drill-down" capabilities and are easily connected to the internet and provides drill down., and so on.

In this respect the informational systems of urban cities comprises the next modules:

- The planning of the company's resources (ERP) which is a system that integrates the main economic process that place inside the company (Finances, Human Resources Management, Purchase, Planning and monitoring of the production, Sales). ERP integrate all departments and functions across an organization into a single computer system that contains the entire enterprise's needs. In fig. no.3 we can see a simplified information flows for ERP ;
- Customer Relationship Management (CRM) is design to solve the whole complex of the interactions between the company and its clients. CRM offer the facilities of services through Internet, telephone, ATM/Kiosk etc.
- E-business (online business) assures the access on the web of ERP systems (Business to Business (B2B), Business to Consumer (B2C), Supply Chain Management (SMC)).
- Business Intelligence (BI) applications are a software support for collect stock and adjust data in order to take decisions. BI includes activities such as: Decision Support Systems (SSD); Online Analytical Processing (OLAP), Data warehouse, Data Mining.

4.2 The main implementation schematics

The implementation project is regarded as the main instrument for coordinating the whole implementation process. Within the Implementation Project there can be distinguished six different parts. The introductory part (the project objectives); The analysis of existing information system; The structure of the future system; A flexible scenario for implementing the information system; A check list of the steps to be taken; The management solution.

The introductory part should state the objectives of the project, explain the need for the suggested solution, preset information system's components and show the final goals.

The analysis of the existing information system is made using specific techniques, such as identifying the domains and local domains on which the system works, identifying the main information flow of the domains, studying the data collections and the local and global information of the enterprise, assigning scores to the decision processes involved, creating an inventory of the present IT resources (hardware, software and communication capabilities), identifying the main features and restrictions of the new information system. For this section the designing team works together with the management team of the enterprise in order to choose the best solution. The third part of the implementation Project describes the structure, technical data, layout of the software components, the data resources description.

At his stage it is also decided the functional structure of the future system, while deciding on the necessary qualified personnel, setting the priorities of the identified domains and displaying the structure of the future system's costs (fig. no.3).

The flexible scenario consists of a detailed functional preview of the future system's organizational structure. It also sets of the communications center, the shared memory system, individual compartments and the purpose of each software component.

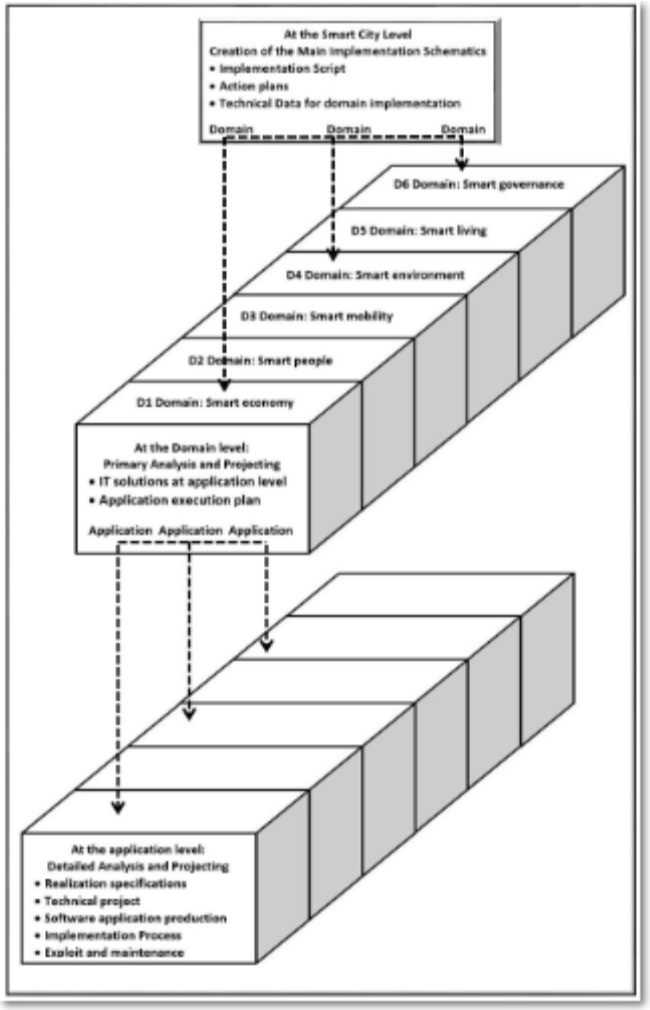

Fig. No.3. General Schematic of Implementation ITC Solution

The technical layout of the system – the Client/Server type – describes the workgroups by type, the shared memory server (File Server) and the communication server. These are all linked together in a network. The technical layout will serve an open system and will include the following types of workstations (fig. no.4): Type Office, Type Data Collection, Type Decision/Dispatch, Type User, The file server and communication server. The workstations will be installed upon the present management system. They will be used by the present personnel who will attend training courses as needed. The number of workstations of each type will be set according to the volume of information, frequency of queries and response terminal needed for supplying information. The system will be an

open one – i.e. from the same terminal someone can access the local resources of the workstation, the resources of the LAN or the resources of the firm's global network. Descriptive charts of these workstations will be enclosed in the proposed IT solution, together with the description of the hardware and software platform.

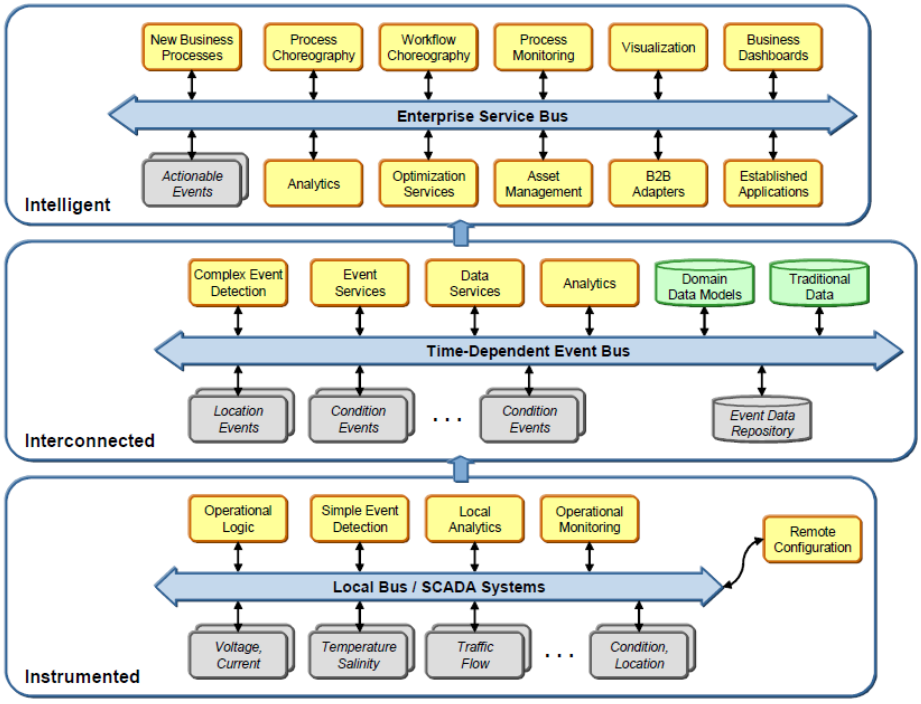

Fig. No.4 The architecture of a Smart ICT Platform

The application layout (the Client/Server component) should describe the applications used in the two levels of the system – the server level and the client (workstation) level. The following types of applications will be included: deskwork applications, database applications, database management, networking and communication systems, applications for assisting activities of the firm. The layout of the system's data resources includes databases and applications designed to offer services for: processing information – i.e., data input, data save, data processing, data transmission, data storing – administration of data bases and the system's resources, development and maintenance of applications.

The IT solution represents the firm's strategy in integrating an information system with specific activities. IT contains a binding between the elements of the projected system's layout and the conclusions resulted from the analysis of the existing system (regarding projects being carried out, proposed projects, projects raising conditions of each other and priorities set by team designated to implement the project). The IT solution will be

presented as a flexible scenario, structured by domains, each of which divided into sub-domains and within these by applications.

For the efficient implementation of the projected solution it necessary that following steps should be taken, in top-down order:

- Identify the necessary applications for each domain: estimating the number and types of necessary workstations, setting priorities by applications, (see fig. no 3 and fig. no.4);
- Building descriptive charts for applications: these charts will be starting points in developing the applications;
- Estimating the efforts, resources and time necessary for developing, information subsystems, by step (logical project, technical project, procedure development, implementation);
- Building the network graph for new project and setting the implementation schedule, according to the priorities set above;
- Configuring the hardware platform of the new system;
- Configuring the all-purpose software platform.

The project's management consists in coordinating the actions taken by different entities involved in the implementation – i.e., coordinating the actions taken by: the firm's managers, hardware and software suppliers, application developers, users within the firm. The ensure that the project's objectives are reached, the following actions are to be taken: creating the technical platform (hardware, software, communications), creating the software applications, collecting data, assuring good communications within the implementation team, good communication between team and individual compartments, training personnel as needed, following the guidelines of the Implementation Project. In the fig. no.8 is the main structure of this project. To estimate the economic efficiency of the new system, a cash flow analysis will be conducted. It has been statistically observed that the average of the management information system has a lifetime of about 2 to 3 years. This is mainly due to frequent changes in the firm's structure and activities and to the rapid development of new platform hardware and software. For this reason, the creation of the Implementation Project (which is actually a project of projects) should not take more than two months and the implementation should not take more than half a year. This is partly possible by implementing the system as a sequence of modules that starts working as soon as they are ready. Thus, the Implementation Project is an activity that is carried out periodically, aiming to redesign the information system while keeping useful components from the existing systems. All above techniques refer to the economic personnel, user of New Information Techniques (NIT). For the personnel/ (economic student) preparing to become an information system designer, this basic knowledge should be completed by a thorough understanding of operating systems, ability to use at least two programming languages, ability to operate data bases, knowledge of analysis – projecting-developing techniques of developing information systems an d applications, understanding of computer network, decision support systems, and the methods to create the Implementation Project.

5. CONCLUSION

Smart City is a city well performing in six characteristics: Smart Economy, Smart People, Smart Mobility; Smart Environment, Smart Governance, Smart Living. Competition among cities to engage and attract new residents, businesses and visitors means constant attention to providing a high quality of life and vibrant economic climate. The city development can be measure by a set of indicators and the metric information obtain by aggregation of respective group (see ranking EU Smart Cities). Smart ICT Platform is a real technical support for development Smart Cities Communities. Smart Cities needs a Smart ICT Platform, modular, flexible, extensible and scalable with relevant capability and capacity which will include ICT trends such : Advanced sensor networks, 3D Internet, Cloud computing applications, E-service, Mobile-Smart device, Security Cloud Computing, Very large Database, etc.

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