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Smart Cities and NICT

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Abstract— in the wake of this urban innovation wind, the smart city, nicknamed the "Intelligent city," a model promoted since the growth of digital whose dynamics is based on the use of information and communication technologies. It is a concept based on a holistic approach to the integration of different information systems in sectors such as transportation, health, energy, the cleanliness that should translate into a net improvement in the daily life of the inhabitants. These new information and communications technologies (NICT) Such as big data, Internet of Things are the element that inspired the concept of smart city.
This article discusses the architectural portion of the intelligent city based on the new technologies as well as a first step for a future study on the mobility and the behavior of citizens in the intelligent citiesby based on the Human predisposition to the game.

Keywords— Smart City; Big data; Internet of Things; gamification; Smart cities; Cloud computing ; Intelligent information systems.

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I. INTRODUCTION

Intelligent Information Systems (IIS) can be defined as the system that incorporates intelligence into applications being handled by machines[1]. Intelligent systems perform search and optimization along with learning capabilities.it's the next generation of information systems (IS) developed as a result of technology and database (DB) Integration. IIS embody knowledge that enables them to display intelligent behavior, allows them to cooperate with users and other systems in solving problems, discovering also retrieving and manipulating data and Knowledge. For all IIS to serve its purpose, the information must be available when it is needed. This means that the computer's systems used to store the data and process the information also the security controls that used to protect these systems must work properly.

The thematic track of intelligent information systems will focus on integrating artificial intelligence, intelligent systems and technologies, database technologies and information systems methodologies in order To create new generation of information systems and improve the quality of service.

These new types of information systems embody knowledge that allows them to display intelligent behavior. This allows them to cooperate with users and other systems in tasks such as problem solving and also the recovery and the manipulation of a wide variety of multimedia and knowledge information. These systems perform tasks such as knowledge-oriented inference to discover knowledge from very large data collections and provide cooperative support to users in the analysis of complex data. IIS are also interested in the research, access, retrieval, storage and processing a vast collections of multimedia information and knowledge, as well as the integration of information and knowledge from multiple heterogeneous sources.

II. SMART CITY AND TECHNOLOGY WAVES

A. Smart City

A smart city is defined as the ability to integrate multiple technological solutions in a secure fashion to manage the city's assets – the city's assets include, but not limited to, local departments information systems, schools, libraries, transportation systems, hospitals, power plants, law enforcement, and other community services. The goal of building a smart city is to improve the quality of life by using technology to improve the efficiency of services and meet residents' needs. Through the use of real-time systems and sensors, data are collected from citizens and objects - then processed in real-time[2]

Various models of intelligent cities are presented in the literature. The model [Rudolf Giffinger][3]-an expert in analytical research on urban and regional Development at the Technological University of Vienna-has six levers inorder to talk about a smart city, which are: Smart governance, Smart Citizen, smart economy, smart mobility,living in such intelligent environment also is intelligent. Six levers are defined in a comprehensive way by beams of factors: a typology of the intelligent functions of the city.[4, p. 16].

Fig1. A typology of the city's smart functions.

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The concept of smart city is not a purpose in itself, but a way to achieve objectives, such as maintenance or improvement of the inhabitant's life quality, sustainable development, the economy of resources or even Sustainablemobility. In such an integrated understanding of the smart city concept, smart cities projects are part of a general concept of city modernization. Incorporating new information and communications technologies into the various sectors and services of the city will allow the achievement of those objectives. Generally speaking, the objective of this concept is to promote the most virtuous development possible.

B. Internet of Things

The Internet of Things (IoT) is the network of physical objects, devices, vehicles, buildings and other items, which are embedded with electronics, software, sensors, and network connectivity, which enables these objects to collect and exchange data. The Internet of Things existing Internet infrastructure. Experts estimate that the IoT will consist of almost 50 billion objects by 2020[5] Sometimes IoT is used synonymously with the term Machine to machine (M2M).[6, p. 24].

C. Big Data

Big data presents is a solution that make enable everyone able to access in real time to giant databases.[7] Its a massive volume of both structured and unstructured data that is so large that it is difficult to process using traditional database and software techniques[8].

Despite the "Big Data" became a new buzz-word, there is no consistent definition of Big Data, no detailed analysis of this new emerging technology. Most discussions until now have been going in blogosphere where active contributors have generally converged on the most important features and incentives of the Big Data.[9], [8], [10].

Most scientists and data experts define BIG data according to the following three main characteristics (called 3Vs)[11] which define the need for reliable, relevant and meaningful data to give meaning and economic interest to the analysis and thus a thoughtful and comprehensive decision support.
The data **volume** will reach 40 bytes Zeta by 2020 and will increase by 400 times until now .[12]
A wide **variety** of information (from various sources, unstructured, organized, Open ...), and a certain level of **velocity** to be achieved, in other words, frequency of creation, collection and sharing of this data.
However, Other major V data which draw attention to the top are: validity and volatility.[13]
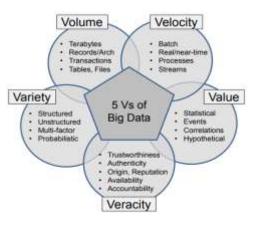

Fig2. 5v of Big Data

D. Cloud Computing

Cloud computing has recently emerged as a new paradigm for hosting and providing services on the Internet. [14] Where the advent the name, this technology has made the abstraction of material constraints possible and gave a virtual dimension to storage.

The concept of the internet of things is a system: connected and interconnected, uniquely identifiable, highly available, interoperable, intelligent and auto-configure open to the programming of the capabilities of its sensors.[15]
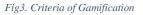
E. Gamification

«Gamification», A generic term used to employ some video game elements (rather than full games) inorder to improve user experience and engaging users in services and applications not only in games [16].

Gamification consists in transposing the mechanics of the game into a non-ludic domain,[17]The process of game-thinking and game mechanics to engage users and solve problems.[18]

Regardless of the type of game, whether it is classical (on board, with cards, with dice ...) or video game, we always have four criteria: Clear objectives, Rules, A feedback A voluntary participation of players[19], a form of commitment in the game (Acceptance of the previous points).

Fig3. Criteria of Gamification

- **Clear objectives:**The game for the individual must be, framed, very clear in its goals: pay attention where we

must focus, know what to focus on, how to do it and how to act. These objectives derive from the meaning, and other objectives that areinferred.

- **Rules:**The rules are limitations on how to achieve the objective or the superfluous obstacles that are added.
- **A voluntary participation of players:** You don't force someone to play. Admittedly, we can play under the authoritarian, threatening to support, but it will no longer be a game, the magic of the mechanics of play disappears, even with an extremely immersive game.
- **A feed-back:**In other words, these are objective indicators of the progress of the goals to be achieved (from this criterion can modify in the layer Gamification look at the new proposed architecture);

III. PROPOSED ARCHITECTURE

Today all organizations face a commitment crisis. It does not matter if they are clients, employees, patients, students, citizens etc. we always find organizations that work hard to motivate their main group to engage in a meaningful way. To do this, the notion of gamification was injected into the old architecture to use it as a key tool in their strategy of digital engagement. This architecture targets a very sensitive sector and suffers from several problems it is the transport sector the main idea is to create a system in which the target population must earn a score to have rewards.

This system must be able to create new obstacles or challenges to be surpassed each time with different levels of difficulty to allow employees to accumulate points to evolve through a thematic adventure. Secondly, the system has to value the progress of a collaborator and shows him that his individual effort has a real impact on his overall performance. In order to highlight it, it is necessary to divide the game into different intermediate stages. Thus the evolution or the passage from one stage to another must be linked to the effort introduced in the previous step. Thirdly the system also must be able to properly manage progress in the experience in the progression in the game must be less and better rewarded to hold motivation through gamification. Also promote human interaction to boost the social relations between collaborators. By encouraging exchange, this friendly competition improves the transport sector. Finally the system must encourage everyone to perform and stand out inevitably passes through a feedback mechanism, but what is all feedback first is a feedback mechanism is feedback to an action, a task that the player has accomplished. In a traditional game, it is used to show the player's progress or other elements necessary to the player's experience.
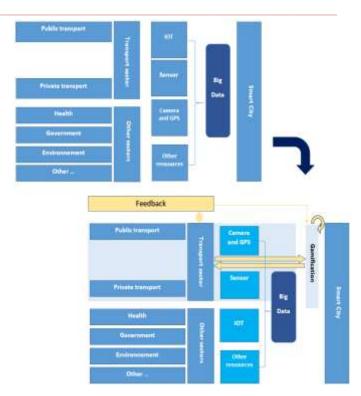

Fig4. Architectures existing / proposed

IV. CONCLUSIONS

The concept of smart city is not an extension of the concept of sustainable development, but rather a tool for the realization and implementation of a sustainability-oriented community. The factors of success of such an approach based in particular on a specific transparent and collaborative governance in which the importance of citizen participation is central. For this in this article we have detailed the state of the art of technological and social components and proposed a new architecture to encourage citizens to participate. Indeed, a smart city is above all made by and for citizens.

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