Evolution of Human Society and of Things Assisted by IoT

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***Abstract* -This paper deals with the impact of IoT on the human society that produces opportunities for exciting innovations. IoT impacts ethical and social aspects towards human society, as individuals and as community, operational and global aspects towards the technical systems. It is a generator of individual and collective advantages that can be expropriated or inhibited for the benefit just a few individuals or groups. IoT must comply with the social right to a no-fake information and so must be protected globally by international laws and policies. Without invading the individual privacy IoT can provide to each person controlled automata, robosats (robot satellites), as extension of the personal sphere of action. It contributes to the globalization as a planetary complex of connected services where the reference system has to be the human society. This paper deals with the prospective impact of IoT on the utilization of electrical energy that can allow an epochal evolution in the structure/operation of power systems and facilitate an efficient constitution of the electrical microgrids. The interaction of the electrical equipment requires their "socialization" that is their improved integration by a revision of their load profiles and behaviors as much as possible.**

Keywords - home automation; microgrids; competence service continuity; cyber security; globalization

I. INTRODUCTION

Human culture develops based on experiences and discoveries. The society both as individuals and as community, survives and makes progress in the science and in the life quality driven by the communication and sharing of its developments for the benefit of the whole community and not just a few individuals or groups. Daily life is continually characterized in the relationship with other individuals by rules, conventions, language, habits. The human society founds its existence in the persistent interaction and so constitutes a dynamic system.

The Internet of Things (IoT) is an emerging structure of physical devices, integrated with actuators, sensors, software, control systems, automations, able to communicate with each other, to monitor the environment, to broadcast collected data. IoT can be an accelerator of the right to access to knowledge.

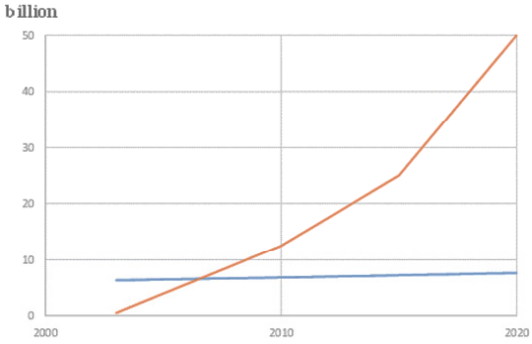

Fig 1. Trend of connected devices versus people living in the world [9].

Databases are to be understood as common goods and platforms are technologies at the service of innovation and must not be the object of hidden powers. It is evident that IoT promotes the constitution of clusters of things involved in persistent interactions (societies of things), such as home appliances, mobile phones, vehicles (IoV) and other countless items [1, 2, 3, 4, 5].

The Internet is the physical network to spread information made up of routers, switches, conductors, optical fibers, computers and other equipment. The web is the smart network application (the soul) that works on the Internet, delivering the information flow.

In ordinary conditions and especially in critical conditions, a prompt availability of all the needed data is essential to decision making. Therefore IoT is able to assist the solution of problems in real-time, offers opportunities to integrate the physical world into a computer-based systems, producing efficient enhancements, welfares, and assisting the human woks [6, 7, 8]. The number of IoT connected devices is fast increasing towards many billion and it is estimated that there will be 50 billion devices by 2020 (Figure 1) [9]. The widespread applications of IoT devices interest the utilizations with remote monitoring capabilities such as the home automation for lighting systems, heating and air conditioning,

secondary microsystem. The form of communication for excellence is a shared language of symbols, sounds or regularized sequences that allow virtually simulating the operations. This makes it possible to generalize individual cases.

Communication develops systems, ability to organize and plan; it is therefore habilitation to program that is power and possibility to implement a will.

A. An Evolution of the IoT: The Robosats (Robot Satellites) of the Personal Primary Microsystem

Each individual can be considered a natural microsystem with the senses, the voice and the limbs (arms and feet) that make up his body; each person communicates and interacts with others and acts autonomously. Therefore, with the hands he uses performing tools that amplify the capacity for action by taking advantage of independent energies. Similarly, to take advantage of independent energies, many other actions are implemented by relating to other people or animals.

Each individual acquiring the ability to act on performing instruments without using the hands, but autonomously through a programmed communication/command, the personal microsystem extends its thinking capacity and the interests of its action by the IoT to new automata such as the smart appliances. These actuators and sensors as new extended limbs can be called robot satellites or "robsats".

The ability for each individual to act independently and with their own command the robsats, acquires them in a new

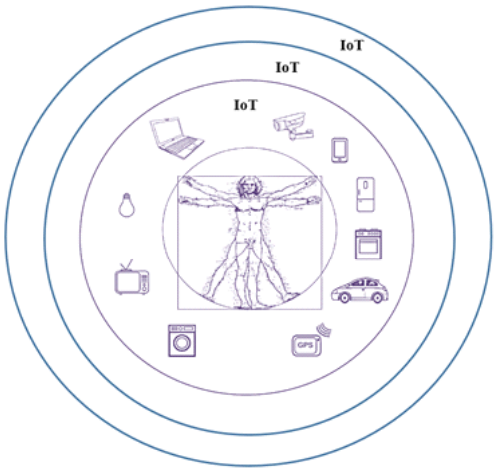

Fig 2. The personal microsystem of each individual must include autonomous and free availability to program its robsats via IoT

own microsystem that opens up to the incardination in new microsystems (Figure 2). Thus new horizons and updated social contracts and modern revolutions are established.

Various appliances are increasingly essential for the daily life of every individual within their habitat and their work. With the expansion of the IoT, these operative tools can now be programmed in a dynamic way, however, as robsats of personal microsystems. This transformation of use makes it possible to convert the same operative instruments from passive aggregates to active smart elements with an increased degree of freedom and action of people.

In conclusion the individual, assisted by advanced technological tools and devices, must not delegate completely his responsibility for decisions and operations, must not accept inaccessible, invariant and closed "systems".

B. Microsystems Superior Level of Personal Microsystem. The Case of the Microsystem Utilization of Electrical Energy

A revolutionary enhancement produced by IoT of peripheral microsystems, as for the home building, is founded on the availability to arrange each microsystem in a superior level of microsystem by the communication. It allows coordinating and synchronizing their operation, emancipating it from the previous random evolution. In this way, it allows constituting a dynamic microsystem. It opens a way to develop an increasingly effective emancipation of the things, no longer passive-slaves, because not intrinsically able to interact, and the acquisition of rights that cannot be claimed before easily. It will permit also unsuspected class actions, forms of special "strikes" and other actions in defense against other dominant groups.

This paper deals with the utilization of electrical energy, as an example of "things" emancipation. The electrical power system (generation-transmission-distribution and utilization) must evolve to adapt to innovations and requires new policies to support powerfully high efficiencies and local generations by renewable energies, actual primary energy target [14]. The distribution of electricity is still inadequate to meet the demands of energetic efficiency and environmental goals; the electric energy utilization requires a revision and different organization. The electrical load areas cannot remain a collection of uncoordinated systems, but have to be organized as interacting microgrids, microsystems that allow pursuing a high efficiency and a reduced impact on the network supply by an persistent internal interaction. They need a comprehensive configuration and at least an efficient management to organize internally and coordinate the users' microsystems. Many regulatory constraints and lack of innovative energetic directives block the necessary improvements [14] and the possibility to organize the load areas in emancipated microgrids. The required aggregation of the utilization power systems at the proper supplying nodes is not permitted by the current rules. Because it is impossible to innovate without regulatory changes; the virtual constitution of microsystems by IoT can help to achieve the necessary changes.

Rather, widespread areas of utilization can organize their uses of electrical energy for demonstrations to claim new energy needs and new rights for the implementation of energy sustainability.

The advent of electric robosats and smart devices allows an epochal event in the structure/operation of power systems.