

THE INFORMATION SOCIETY TODAY AND TOMORROW – THE MARKET, SERVICES/PRODUCTS, TECHNOLOGIES AND STANDARDS OF COMMUNICATIONS AND IT (CIT)

Prof. Eng. Ph.D. Victor GREU

Abstract

The paper is an introduction for an articles series having as theme the role of market, services/products, technologies and standards of communications and information technology in the information society evolution process. Taking into account this process importance, complexity and dynamic, the main structural features as defined by the EU regulations (the novel impact to all spheres of human activity, with specific elements for enterprise and individual), motion forces and evolution trends, in a systemic approach are estimated. There is also presented an important consequences and phenomena series, which, even in a heuristic approach, now are hardly perceived or subliminal, but which could be amplified or refined by the future.

Keywords: *information society (IS), information age, communication and information technology (CIT), broadband, business intelligence, intelligent home, EU regulations on CIT*

1. The actual context – a world where the CIT benefits are becoming ubiquitous, an aisberg with dimensions and layout which today we can hardly imagine

The human being ancestral temptation to communicate has generated the communications (the telephony exchange has been the first “computer”) and information technology (CIT) – which, in the last decades of XX-th Century, has become a new industrial revolution, a paradigm with more and more complex implications, having as an essence to promote the information as a supreme value in the new era, so called the information age.

The convergence between the communications technology and the information technology is the main feature and a logical necessity of the evolution towards CIT integrated equipments and systems, but this supposes multiple correlations of scientific, technical, financial, commercial and managerial nature.

CIT evolutions represent, at planetary scale, such a complex and dynamic reality, so that the standardization efforts (the only mechanism which provides interoperability, efficiency and a durable development) are manifestly more and more complicate and difficult.

An relevant example is G3 generation of mobile communications, for which the standardization process has lasted for years, while the main standardization centers (ITU, IEEE, ETSI) and also many industry alliances have been implied.

As a proof of its importance and complexity, the main features and the general frame of rising the IS is largely reflected in EU regulations [1], starting from its overwhelming role: ***“the information society is making possible a profound economic and social transformation which is spreading to all spheres of human activity”***.

This way, a summary of the legislation and policy of EU includes: EU approach on the information society; Current general legal framework; i2010 strategy and eEUROPE action plans; Radio Frequencies; Network security; Internet; eCommerce; Payment systems; Data protection; Copyright and related rights in the information society.

Among the priority policies which are promoted by the EU, the industry received, naturally, an essential role: ***“create and promote new information society services and products as well as stimulate timely production of suitable and market-driven standards and specifications”***.

The IS rising impact on companies is eloquently reflected by the statistical data which are requested by the EU to be collected: CIT systems and their usage in enterprises; use of the Internet and other electronic networks by enterprises; e-commerce; e-business processes and organisational aspects; use of CIT by enterprises to exchange information and services with

Even more relevant is the request regarding the education of the individuals as [2].
“Characteristics to be collected for individuals having ever used a computer but not having taken a course (of at least three hours) on any aspect of computer use in the last three years and who have not mentioned as reason their computer skills were sufficient, they rarely use of computers or they engaged in self-study or assistance from others: reason for not having taken a course on computer use: lack of time, course costs, no suitable course on content available”.

2. The main motion forces

The market in general and in the case of CIT in a particular way is generated by human needs nature, which is expressed, from psychological point of view by the Abraham Maslow Pyramid: the needs are growing from base, starting with the physiological ones (eat, drink etc.), continuing with the security, relationship and esteem ones. On top are the personality development ones. This way, starting with the facilities from the “intelligent home”, continuing with the communications services/products (mobile or not), then ending with the “endless” range of the scientific, technical, cultural or entertainment applications (including more than “multimedia”), the main mechanism of CIT developing is generated under the form of offering/consuming the services/products that are “aiming” the human needs.

As a consequence, a palette of applications, with more and more “colours”, will link the technologies potential (the industry) with the market needs. The particular features of this old market mechanism is that CIT has a huge potential to generate, as added value, new „desired” services/products from a given state of the art technology. The Internet and the mobile phone content are perhaps the best examples.

The research, industry and academia represent the most consistent force, because the technologies these are creating provide the real support of the applications, which in fact go beyond the CIT sphere (as electrical and electronic engineering do) when are combined with or modernize other industries in an interdisciplinary approach which is omnipresent in the information age.

Not the last, **the standards** are the mechanisms of regulation with purpose of enabling efficiency, compatibility and durable development of the technologies. The standards role is also clearly stated in the EU regulations [1], as mentioned before, in a correlation market – industry, where ETSI is the coordinating third part.

The multiplication effect is the mechanism which provides the exponential growing of CIT, because it includes all the above mentioned forces by the loop feed-back action (self-propulsion by profit re-investing in the added values and increasing the range of “desired” services/products). **The strategical policies and the tactical decisions, made by the companies and governments** are included in this multiplication effect, having the role of *amplification factor* – as good these orientations are, as high will be this factor. *Notice that the bad or lack of decision could lead to factors smaller than unity.* The decisions and the added values are now better driven by the business intelligence and computer aided design, where again CIT (with proper **information and knowledge**) act as a loop amplifier to optimize the investment. This effect implies many directions: technological, commercial, financial, human and scientific. Maybe the most relevant example is just Microsoft and Bill gates, but maybe other “stars” will follow to be counted: the Internet, Google, the mobile phone etc.

It would be interesting to observe that, before the appearance of a new technological revolution – which will be probably based on the biotechnologies that we will learn from the “research” mother nature made for millions of years – the essential role in the CIT “explosion” was played by the simple multiplication and combination of the “bricks” made of logical gates (NAND) and generally of transistors. Now we can see something similar in the WEB world and the story will go on (as history repets itself in spirals).

3. Prominent trends

On short term the **Broadband CIT services and systems development** is the most

In general, the broadband is a huge driving factor of the IS, not only by the internet services, but with all its industry implications in CIT (from optical fiber cables or radio links and cells, which will “weave” all the Earth, to the entire range of support products – as CPU, DSP, FPGA, memories etc.), all increasing as speed and bandwidth will grow (usually exponentially) either with Moore Law or whatever will soon replace it.

One of the early broadband CIT effects was that the new entered on the market, the cable operators, began to occupy an increasing part of the fix telephony services. A similar effect appeared by developing the IP voice services.

The mobile – broadband acces convergence is the dominant trend for the next generation communications, as WiMax, LTE (long term evolution) - G4. In this matter, nowadays complex work of design and standardization is made in order to fundament the new networks concepts, as they must reach revolutionary data speeds of 75-300Mbps and include compatibility with the main previous standards as G2/GSM and G3.

The technological research is aiming to ***increase the processing speed and the integration capacity*** on the chip. As the performance limits of the nano – technologies will be reached, the forecasts for the bio – technologies seems to be promising.

The interdisciplinary research will further extend the CIT impact on society and a relevant combination is the mecatronics, but the future is characterized by presence of CIT in all the domains, as an ingredient, a link and especially as an applications, services and performance multiplier. Some relevant achievements are first provided in the security sphere (defence, emergency, cryptography, public and individual safety etc.), but these are progressively extended wherever the market needs and the price is affordable. A such example is the GPS 24 satellites system, which, from an initially strategic domain (in the seventies), actually entered in the AVL (automatic vehicle location) and other domestic applications.

Developing revolutionary applications – based on state of the art technologies – is covering medical sphere fields (imagistics, nano-surgery, genetic engineering etc.), brain-machine direct communication and also a large diversity of remote services or mobile/distributed systems (home working, e-learning, intelligent home, cloud computing etc).

A very special field is ***home working***, which will radically influence the development of information society, because individuals, companies and governments will use software/communications as remote services which will enable not only distant-work, but many of the social activities and needs (including health care and e-learning).

4. The future that is hidden in the waves and deep of the present

Facing such a complex phenomenon, even a heuristic evaluation, on long term is difficult to do, but, on the other hand, the importance and the planetary magnitude of the process lead to a responsible approach, in which all the implications, either positive or negative, must be identified and analyzed (either these are obvious, hardly perceptible or subliminal).

Even if the future will less or more validate these aspects, in the information age every “information” must be periodically evaluated and correlated with other “informations”, this way producing a new “information” and aiming to progressively decrease the entropy.

As a consequence, the enormous potential of CIT will provide that no planetary information to be neglected – any cm^3 of the Earth (including the live world!) will be “classified”, but equally surprising is that ***the world is not (yet!) prepared to efficiently, rationally and ethically use and disseminate all the information. In this matter, September 11-th 2001 is a big alarm signal!***

The science and technology leverage is a real, but the next aspects are not very noticed:

- The need of new paradigma, models, algorithms or applications, which should capitalize the state of the art technologies (many ideas have long lasted till they no more appeared as impossible, while today there are technologies which wait for new algorithms to maximally use their potential);
- The necessity to process, store and capitalize the huge information volume which is

galaxy (text, images, video etc. – all the new electronic content). Also important is to use the information with added values, in expert systems and other similar revolutionary technologies (as man-machine communication), which tend to transform the informations in knowledges, experiences and even creation.

Challenges for the enterprises:

- Facing a large diversity of options (“offered” by the complex potential of the new technologies), for the strategies to develop and win the market;
- The more and more efficient support (as compensation for the above challenge), providing analytics for optimization through the applications and solutions from the “business intelligence” sphere;
- Green CIT is not only a trend, it is a strategy by which the human activity becomes more efficient by optimizing all the consumptions, by shorting the distances, by cancelling the travellings, by simulations etc.

The effects of development on individual

- encouraging innovation by home working and sophisticated IT services exploit the human most profound and efficient capacity – the creation (being well known that only just a little part of brain potential is used by the average individual);
- also there are a perverse effect, which is associated only with CIT facilities that ease the work without asking intelligence, reduce the physical effort (as some of the domestic appliances from the intelligent home sphere do), or increase the sedentary life (only partial compensated by “mobile” services);

The risks and the vulnerabilities concerning CIT security and its associated applications, in fact covering all the society areas (generated by terrorism, organized crime etc.), represent the “Achile’s heel” for this new era (information age) and that is why they are driving a whole industry and are part of the motion forces which have been above mentioned.

5. Replacing conclusions

It is worthy ***to watch the CIT evolutions and the IS rising***, in order not to lose anything from what this “***vehicle***” could bring us and not to miss every “***dream destination***” to which it could lead us.

We believe that ***CIT can distribute*** not only the profits from e-commerce, e-banking, business intelligence, e-government and so on, but also ***the supreme value of the Pyramid, the information and knowledge which models our personality, stimulates the innovation and multiplies the creating energies.***

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