

OBSERVING THE INFORMATION AND COMMUNICATIONS TECHNOLOGIES COMPETITION WITH THE TIME

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Abstract

The paper analyzes the opportunity to estimate, at the moment of years passage, the contribution of information and communications technologies (ICT) to the challenging aspects of society evolution, which is presented as a competition with the time, as mankind have to face the fading of resources on Earth, among other factors which will determine the future.

In the above context the paper presents the main challenges and their links with time, as the fast pace of the ICT evolution is strongly influencing the progress of Information Society (IS) toward the Knowledge Based Society (KBS), providing complex approaches, instruments and concepts for an optimal development of all activity fields.

The paper analysis includes the ways these ICT new approaches tend to have a leveraging role in the IS processes, first including innovation and refined knowledge generation.

Finally the paper shows how ICT network centric and cognitive approaches, including further implications of their products, services and principles in IS, represent long term and powerful instruments to optimize the resources management in the complex competition with the time, as time is measuring the fading of resources on Earth with a pace depending of our wisdom to define and implement the mankind stable "progress".

Keywords: *information/knowledge based society, information and communications technologies, alternative energy technologies, stable progress, and cognitive approaches.*

JEL Classification: *L63, L86, M15, O13, O33*



1. What is Another Year?

The eve of the New Year is the period when people use, as a psychological reflex, to think, with a special attention compared with the rest of the year, about what they have done and what is gone be.

What could be special then and ultimately, what is Another Year?

Exploring the Universe scale, a year could be like a grain of sand in the desert, when the wind is blowing.

On the other hand, for mankind a year could be a page, in the written or not history of the Earth.

One could simply observe that the New Year eve is challenging us to philosophical approaches of the recent events, usually along the last year period and beyond! This is a special feature of most human, which could appear in simpler, traditional or more sophisticated ways of thinking and speaking, as a function of people's personality.

Lets suppose that we would be capable to imagine now, using actual information, the New Era of some sort of Mayan Calendar!

This exercise is just similar with our mentioned approach because the actual pace and complexity that information and communications technologies (ICT) have imposed to the mankind evolution in the last 30 years led to an apogee which could be compared, correcting the scale, with the context the Mayan Civilization had in the past.

At that time, that impressive civilization, although having not the actual information, surely had at least an apogee of progress, assuming they did not have some extraterrestrial information.

Still there is a remarkable difference between the compared situations if we observe that now we have to face crucial decisions or chose options not after millennium evolutions, but after very fast evolutions in about 30 of the last relevant 200 years.

To be more challenging, the problem is to find survival forecasts not for a millennium ahead, but for about 50 years, when the Earth resources' fading is possible.

This way we have just arrived to the conclusion that ICT is part of *a global competition with the time*, where the price is humankind life on Earth.

Notice that *the time* is measuring the fading of resources on Earth with a pace depending of our wisdom to define and implement the stable "progress".

Clearly, we intend to shortly estimate only what the actual context (not necessary 2012) of ICT could mean for mankind in the future – not necessary 2013.

It is also pertinent to emphasize that the actual stage of mankind evolution is not exclusively depending on ICT, but, among other technologies and factors, it is an evidence that ICT have an amazing effect on mankind and Earth evolution, by their impressive and dynamic force to change the world we are living in, so the ICT weight is prominent and decisive.

Understanding all the above premises, we see why ICT has a main and complex role in the development of the Information Society (IS) toward the Knowledge Based Society (KBS) [1] [5].

It is impossible to conceive and reach a better future without using and improving the potential, means and benefits of CIT as provider of the IS services.

This point of view is very clear expressed at a European Union high level [3] as:

The EU and the knowledge-based society

The Internet is changing the world we live in. It is a change no less significant than the Industrial Revolution of the 18th and 19th centuries. Over the last two decades, information technologies and the Internet have been transforming the way companies do business, the way students learn, the way scientists carry out research and the way in which governments provide services to their citizens.

We also must agree that the actual “knowledge” is fast increasing in complexity, so it will be more and more difficult and **time consuming** to analyze all its implications on long term and especially to select the optimal solutions [5].

Again we see enough reasons for ICT to be in **a fast and complex competition with the time**.

One thing is still sure, the ICT optimal solutions will have impressive contributions to the new “knowledge”, that is to the stable development of IS/KBS, irrespective the fields (scientific, technical, economic, social etc.).

Another obvious certitude is that all mankind creation activities, first including ICT, must be **innovation centric** and **based on** systemic analyses of **all the possible consequences of IS/KBS development** [9].

2. Exploring and valuing the information technologies and communication results in their race against the time

Starting from the above premises, we must manage the CIT development and services using policies, strategies, tactical decisions, algorithms and eventually soft programs that are based on **very well refined and updated “knowledge”** [5].

It is also important and very difficult to provide that this knowledge will reflect both the rational creation of the humankind and the lessons learned from the nature, where all the ecosystems must remain or “comeback” in harmony.

A crucial observation at this stage of the analysis is that the “harmony” is always just a “goal”, as the evolution processes in IS/KBS are so complex and dynamic.

In other words, the mankind is “navigating” on a stormy weather in a huge “ocean” of events, without even knowing, with precision, for some cases, which are causes and which are effects because of the “loop” processes in the KBS.

Thus we need for safe “navigation” not only a “GPS system”, as we have to get from ICT not only new products and services, but also some learned lessons from a success story which shined all the world and still does it, although their lights are also fading as all mankind and the Earth too are going to run dry its resources, beginning with fossils, water, food etc.

Still there is an essential question which comes to temperate our optimism toward finding an easy answer to a very difficult problem. The question we have to answer is why ICT could have good solutions for a diversity of problems that mankind and the society have to face now and in the visible future?

We have to also learn that ICT could not have all the answers for all the questions, although the artificial intelligence/expert systems and the robots are more and more close to the human brain, while they are now running to see life on Planet Mars better than ever.

On the other hand life on Earth is depending on a diversity of factors, but we must first, as always, “follow the money”. Notice that this will not “always” prove to be right!

Technically speaking, the market is, in appearance, the main driving factor of ICT, but the diversity and dynamic of their products and services rise some questions around the components of the core that lies behind the market, as human needs, financial interests, political goals, social evolutions/challenges etc.

The most crucial factor we may notice here “beyond” the market is the fading of Earth resources, as we have mentioned before, among them fossil fuels being dramatic and soon expected.

On this line, the renewable energy or alternative energy technologies are subject of the highest priority in developing new technologies.

Unfortunately, recent opinions show that the alternative energy technologies (wind, photovoltaic, biomass etc.) implementation and use speed are far slower than the previous optimistic scenarios have estimated [2]. For example, a realistic level of 10-15% of total installed power is being foreseen for 2025.

An other important large spread opinion of the specialists is that until other mechanisms will become efficient, the power savings is a priority strategy and here is also agreed that human habitudes changes following the bills are less promising than ICT solutions on smart grids, virtual power plants or recent energy market servers [4].

The new paradigm of energy market server is a prove of ICT sophisticated solutions, which could optimize a system including all home appliances design/function, people’s preferences and energy market real-time information on peaks and costs [2].

An important mechanism and example of the NC action is for sure the power/speed/capacity of the chips (processors, storage etc.) challenges.

We must notice that the power consumption is one of the ways the “green ITC” could strongly contribute to the world carbon dioxide print reduction, by the systemic mechanism of NC [10].

More than this, ICT product and services are subject to the green technology design, as in the future, any function, any devices, even any bit/sec will be managed to minimize consumption and then carbon dioxide print.

Beyond the power, the new green ICT design must include optimization of all products and services aiming efficient materials, time, water, footprint and health for applications and users.

Notice that the processors and generally the ITC components are present in all industries and more!

They are everywhere, from smart phones, cars to toys. They are billions and they tend to consume all day long and even night time.

We have just to imagine and then act, about what could mean at a global scale of billions of users and triple devices, foreseen in 2016 at an exadata age [6], to reduce with only 10% de consumption and carbon dioxide print, by only intelligent design and use of ICT products and services for all Earth, as ICT has a “network centric” (NC) action for all mankind activities [7].

The European Union has pledged itself to meet a goal of reducing both EU climate emissions and energy consumption by 20 percent by 2020. The Climate Group made clear [8]:

“ICT can enable greater energy efficiency in other sectors of economy and society, with energy efficiency being the most cost-effective means of making quick climate progress. The Smart 2020 report put the potential saving of 7.8 Gt CO₂ in 2020, in other words, ***15%***”.

Now the picture of ICT race with time became nearly clear, but the solutions that could increase our chances to win are far from being clearly foreseen and globally agreed.

It deserves to mention now, at years passage that our World consist of a diversity of countries, development levels, habitudes and civilizations, which need again “harmony” for an optimal and ***stable progress***.

To exit from this situation, a crucial paradigm will be to add, above the mentioned factors, one that influences them all without being independent of them: improving the education by “refined knowledge” which has the potential to generate innovation and sustainable development.

Following this paradigm step by step, ICT, as the most dynamic field of IS toward the KBS, provide more and more instruments and concepts generated for an optimized development, which soon could become useful, in generalized forms, for other fields too and generally for IS/KBS. Among the most relevant examples could be “network centric” and “cloud”, for which the reasons and mechanisms of action were presented in [7].

As a huge consequence, the ICT progress has the potential to influence all the activity fields, including the “social impact class”: home working; e-Health; e-Learning; e-Government; Social networking etc.

On a further ICT development stage we could observe the proliferation and growth of a new family of approaches, we generally name it “cognitive”, designed to optimize the resources and the development of ICT on real time updated criteria and using environmental information [11].

These impressive approaches of ICT applications include cognitive wireless communications (an intelligent radio spectrum usage), cooperative/collaborative communications, context-aware communications, intelligent (context-aware) services, quality of user experience management, integrated context management, semantic services, smart grid (power plants) networks, ubiquitous healthcare, distant learning, social networks etc.

The new ICT approaches have some cognitive features which could be further developed in order to reveal their potential to become generalized approaches/instruments, in a diversity of forms and applications, useful to leverage the progress of IS and KBS.

Replacing conclusions

We have to notice that ICT and all other mankind innovating activities, although impressive as pace and complexity, are just ***competing***, far for being winner, in a crucial race ***against the time***, a challenging and dramatic “journey” on a stormy weather, having on their side, as the only sure advantage, the miracle of life evolution on Earth till now, arrived at the human intelligence stage, which could be apogee or beginning of decline.

Every day we must remember that *the time* is measuring the fading of resources on Earth with a pace depending of our *wisdom to define and implement the mankind stable progress*.

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