**Main Points for Intervention of Luis Magalhães, President of the Knowledge Society Agency (UMIC),**

**at the IGF Plenary Session on "Emerging Issues – Cloud Computing"**


I will address cloud computing from the point of view of public policy in this panel, to introduce a few threads for the discussion, along 3 lines: benefits, big challenges, enabling framework.


**First, on benefits.**

The cloud computing facilitates Information Technology support to startup companies which can begin their businesses without having to invest large sums on an initial IT infrastructure and its management. Sustainability of this infrastructure is also a cost that frequently is difficult to face, and the need of creating or acquiring human resources with adequate competencies to run an internal IT system is also very difficult to fulfill most of the times.

Cloud computing may thus decrease the barriers to entry for new businesses. So, it can contribute to speed up innovation, and to enable innovative enterprise in locations where there is insufficient supply of human resources with the necessary qualifications. Of course, provided (and this is a big "provided") there is sufficient and reliable broadband.

For mature organizations, businesses, NGOs, or Government, public universities, hospitals, etc., the promises of cloud computing are reduction of IT costs and rationalization of certain supporting services by economies of scale, such as reliable security of IT resources and more efficient data centre cost sharing.

As an analogy, I could say that cloud computing is today for IT what one century ago for electricity was its provision as a utility instead of requiring a new enterprise to build its own power plant for electrical supply and to run it. As you can just plug on a utility for electrical supply, you could be provided with IT services without having to have them run in your own enterprise. That's for the benefits.


**Second, on big challenges.**

Here I would like to use the form of posing questions, leaving them unanswered because they can be picked up in the debate, and I think my contribution here should remain like that, even though I have some answers for the questions I am posing.

The first questions: Is there a risk of market dominance by the most powerful IT companies, as it has happened for other utilities before? Can it be a global dominance and further amplify inequalities of wealth distribution in the world?

The second group of questions: Does the cloud computing offer of IT services as a utility provide opportunities for innovation as it favors large scale services with some sort of standardization? Will cloud computing contribute to the generative nature of the Internet which together with that of the computer was responsible for incredibly dynamic user driven innovation in the past 30 years? Or will it actually reduce Internet innovative activities?

And the third and last group of questions: What are the effects of cloud computing for the digital divide? As cloud computing services require broadband of considerable speed, will we have a situation where the main factor of digital divide will become the lack of high speed broadband infrastructure? What would be the consequences for developing countries and other deprived regions? What policies could mitigate the negative effects? Usually the introduction of powerful communication technologies reinforces the competitive advantages of attraction of precisely the already most strong centers and the best policy to compensate for this is to foster the very same technologies in the more deprived regions, so what should be the policies to foster broadband infrastructure and cloud computing capacity in developing countries and the most deprived regions?

**Finally, on enabling frameworks.**

I will be very short on this, because this is the kind of issue that most of the people have already talked about.

Like other enabling technologies, cloud computing brings up new problems, and in this case, with a considerable complexity due to the global nature of the Internet. Some of the problems require new enabling frameworks, like the need of appropriate policy and security legal framework, requirements of data and applications portability between different providers, consumer needs in case of bankruptcy or other reasons for the businesses to stop providing services, assurance of confidentiality and secrecy and the associated needs of encryption, the capacity of control over data by its owners (including transfer and deletion of data). And finally, the one thing without which none of the above could be assured: efficient independent auditing systems.

The use of the cloud by SMEs or any other users, but especially SMEs, would require developing advanced competencies in these companies for the procurement processes and for monitoring quality of service so they can actually deal with the suppliers which usually they do not have. These are a different sort of competencies. The companies spare on the IT technologists to manage IT infrastructure, but they will need a considerable higher level of competencies regarding acquisition processes and monitoring of services provision. It may in many cases turn out to be more difficult to resource the required cloud computing procurement and supply control capabilities of the enterprise than to run its own IT systems.

The promises of cloud computing appear reinforced because we have seen a fast improvement of connectivity that brings opportunities to distributed services. On the other hand, concentrated IT services thrive on improved CPU power. But both change with time and they are not absolutely predictable. The pendulum my go in the opposite direction sometime in the future. Besides, in terms of competitive opportunity to enter in the cloud computing services market, it is extremely important to be able to compete on connectivity itself. And that's not just to have Broadband, it is quite a bit more than that. And, as a matter of fact, the situation regarding the opportunity that developing countries will have to participate either as users or suppliers on cloud computing has a lot to do with the capability that can be achieved in terms of available high speed Broadband, low cost, and constantly readily available without interruption.