

## GUEST EDITORIAL PREFACE

# IT Goes Green: Systemic Approaches to IT Policy Making, Design, Evaluation and Management

*José Rodrigo Córdoba-Pachón, School of Management, Royal Holloway, University of London, UK*

*Jorge Marx Gómez, Department of Computer Science, Carl von Ossietzky University Oldenburg, Germany*

Information and communication technologies (ICTs) have become a utility, something that you pay for when you use. This idea has gained momentum in the current global economic climate where for-profit and non-for-profit organizations have to balance their budgets carefully and in doing so they can pave the way for a new economy. A recent study by IDC (2012) suggests that cloud computing, or the idea that both hardware and software can be paid as a service-on-demand as a has helped organizations of all sizes and all vertical sectors around the world generate more than \$400 billion (in both cost and profits) and 1.5 billion new jobs, with the number of new jobs surpassing 8.8 million.

However, technologies are not only a source of capital gains as new computing infrastructures oriented to services emerge.

ICTs can also help organizations meet increasing environmental and social demands in a global context whilst enabling them to respond efficiently. Of particular importance now is the speed to which ICTs can facilitate the monitoring in real time energy and other resources consumption or depletion, helping managers surf through large volumes of data to identify patterns and trends which could validate the impacts of their decisions.

Both of the above trends in the use of ICTs can impact greatly how managers conceive of, design and implement them. In parallel to new and sophisticated configurations of ICTs, alternative ways of thinking about and managing them are needed so as to help those responsible for their management go green. This special issue of IJITSA aims to facilitate debate and contributions on how the systems approach in its various

forms and applications can help organizations become greener.

We would like to thank authors who submitted their work as we were very fortunate to have a very good number of contributions in several areas. Common to all the submissions received was the idea that by adopting systemic view of both organizations and ICTs (one which continuously looks for connections and their impacts), and reflecting it in the definition or design of frameworks, methods, practices or software applications, a deeper degree of understanding of the implications of practice could be gained. Moreover, going green with ICTs requires a shift in our understanding of organizations as static and isolated entities to one in which their members, their values and their expectations about the future (including what we all want from our planet) continuously come together and can impact the future use of ICTs in daily life.

The first paper by Mathupayas Thongmak, from Thammasat University, Thailand, proposes a systematic framework for sustainable ICTs in developing countries. This is a provoking and comprehensive paper that challenges the isolationist treatment of both green technology and development issues nowadays. We say this is isolationist because we normally hear about both development and technology as dichotomizing feature of those who have not and those who do not, or those who need help and those who have it. The author reconciles this fragmentation by proposing a continuous cycle of learning and doing something about green ICT and development issues.

The second paper by Naoum Jamous, from Otto-von-Guericke University, Germany, focuses on small and medium enterprises (SMEs) and suggests a framework for incorporating Environmental Management Information Systems (EMIS) as a way of helping them monitor, curtail and mitigate the environmental impact of their activities. EMIS is becoming a popular type of information systems in organizations, and a key feature is that it enables managers to continuously learn from and direct their efforts

to implement environmental policies, many of which are proposed by government and other regulators. In the area of EMIS the systems idea finds a new home. It allows stakeholders to map different impacts and relationships between activities and the environment of organizations, and enables them to discuss possibilities and implications.

The third paper by Martijn Smeitink and Marco Spruit, both from Utrecht University, Netherlands, takes a slightly different angle on the provision of information systems to monitor and act on environmental impacts of business activities. The authors develop a maturity model to assess the degree of development of green ICT solutions by considering how they integrate sustainability goals in their implementation in business processes. This model can help organizations map the stage of development where they are and incorporate goals towards progressing to an ideal stage of maturity where ICT is seen as an opportunity. Systems ideas could fuel the debate as to how best proceed to the next stage of sustainability with ICT in mind.

The fourth paper by Adel Alaraifi, Ale-mayehu Molla, and Hepu Deng, all from RMIT University, Australia, focuses on the usage of sensor information system in data centers in order to optimize IT using green principles like resource efficiency. Based on five case studies, a theoretical framework and associated key factors for the assimilation of sensor information systems is given. The developed framework is furthermore tested using a survey of over 100 different data centers and quite interesting conclusions are given. The paper clearly points out the different drivers affecting the usage of sensors in data centers with the goal of using existing resources more efficiently and optimizing installed hardware and infrastructure accordingly.

The fifth paper by Yu-Tso Chen, from National United University, Taiwan, proposes a framework based in strategy management, technology foresight, environmental management system models, value engineering and de-

cision making models. Using that framework, system design for green IT-based services can benefit in becoming greener and furthermore opens new research directions in the fields of environmental management and engineering. The given framework is explained in detail and the associated key requirements as well as the theoretical foundations of the framework are compared with existing approaches like the V&T Network and the N&F Matrix. So the paper clearly gives scientific benefits while also providing additional value to the current state of the art in environmental systems management.

The sixth paper by Matthias Gräuler and Prof. Dr. Frank Teuteberg, both from University of Osnabrück, Germany, and Tariq Mahmoud and guest co-editor Prof. Dr.-Ing. habil. Jorge Marx Gómez, both from Carl von Ossietzky University Oldenburg, Germany, gives insight of the ongoing research project IT4Green. The background of that project is the lack of current Corporate Environmental Management Information Systems to fulfill different tasks and to deal with specific areas of environmental management. In that paper, specifically different strategic and decision support requirements that cannot be met by current solutions are highlighted as well as a description of the actions already done in the project. Specifically the results of a survey containing requirements from workshop and expert interviews are presented and conclusions of these findings are given. Furthermore a high-level description of the proposed CEMIS 2.0 architecture driven by that survey is presented as well.

This special issue is complemented with

a book review by Rodrigo Córdoba, co-editor of this special issue. The book is *Corporate Environmental Management Information Systems: Advancements and Trends*, edited by Frank Teuteberg, in University of Osnabrueck, Germany, and co-editor Jorge Marx Gomez, University of Oldenburg, Germany, and published by Business Science Reference, Hershey, PA, USA, in 2010.

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*José Rodrigo Córdoba Pachón*  
*Jorge Marx Gómez*  
*Guest Editors*  
*IIJITSA*

## REFERENCES

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