



## GREEN INFORMATION SYSTEMS: THE USE OF INFORMATION SYSTEMS TO ENHANCE SUSTAINABLE DEVELOPMENT

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### KEYWORDS

Green Information Systems, Sustainability, Green Information Technology, Research Topics

### ABSTRACT

Nowadays, sustainable development is an important topic in research agendas of many fields of study. Public awareness of interrelated problems such as climate change, peak-oil, high volume of greenhouse gas emissions, loss of biodiversity, potable water pollution, growing landfill areas, and population pressure is growing. Governments and transnational institutions, such as European Union and United Nations, have stated the need of concerted actions worldwide to tackle the problem of environmentally sustainable development, and also have emphasized the role that scientific research has in advancing knowledge for this goal.

Information Systems community has been slow in acknowledging the importance of fostering research under this theme (Watson et al 2010; Melville 2010; Dedrick 2010).

However, there are some signs that research is starting to look in that direction: special issues on Green IT and Green IS in the main journals are coming soon, and presentations of undergoing research under this theme in important conferences such as AMCIS and ICIS have been growing.

In this extended abstract, we first present some key concepts and definitions of Green IS, and next elaborate a list of research challenges for the area.

### IMPORTANT CONCEPTS ABOUT GREEN IS

Watson et al contend that there is a key difference between Green Information Technology (IT) and Green IS. Whereas the first is concerned with the usage of IT equipment with energy efficiency goals, the second refers to “the design and implementation of IS that contribute to sustainable business processes” (Watson et al 2008).

A shift to sustainable business process demands the alignment of business with sustainability goals. (Dyllick and Hockerts 2002), cited by (Watson et al 2010), claim that three sustainability goals co-exist: eco-efficiency, eco-equity, and eco-effectiveness.

Eco-efficiency concerns with satisfying human needs

through progressive reduction of ecological footprints. On the other hand, eco-equity refers to the equity of all nations and generations in access to natural resources. It implies planned and concerted actions for availability of resources for future generations and developing countries. Finally, eco-effectiveness is the most promising goal. It means doing the right thing, i.e. making the choices that make possible long-term prosperity and environmental sustainability. It requires a shift in societal values and business models to transform our current economy.

The first goal, eco-efficiency, has received more attention in the latest years. Indeed, Green IT has been working on the alignment of its business function with this goal. Green IS, on the other hand, can potentially address the three goals, and thus research in this topic is strategically important.

### RESEARCH CHALLENGES FOR GREEN IS

There are many identified opportunities for research in Green IS, and surely there are more underway. Watson et al note that the lack of information to influence “economic and behaviorally driven solutions” for environmental sustainability demand an IS based solution. They propose the creation of a new subfield of IS named energy informatics. This subfield concerns with the analysis, design, and implementation of IS for increasing the efficiency of energy demand and supply. Thus, the nine research challenges they propose are related with the features and the stakeholders of the energy management system they conceptualized. (Watson et al 2010)

Melville proposes a research agenda on IS for environmental sustainability that considers the domain of study and the phenomena involved in the problem. He lists ten research questions that explore not only the phenomena related issues, but also philosophical perspectives to consider, theories that may apply, and appropriate research methods for the problem. (Melville 2010)

Dedrick's research agenda on Green IS is focused on the organizational, economic, and policy issues of IT and carbon productivity. He proposes a model for explaining the impact of IT on carbon productivity, and next lists four topics for research within that model.

The following list of research topics elaborates on the



recent work of the aforementioned authors. The items in the list can be sorted in three groups, considering the object of research: information technology, information systems, and information.

- Understand the interaction of IT and energy use in production process in order to assess the impact on carbon productivity
- Understand the effects of IT investment policies on carbon productivity
- Understand the motivational factors for the adoption of green technologies
- Optimization of IT decisions in organizations in order to attain eco-efficiency goals
- Understand the impact of IS on actions and beliefs about environmental sustainability
- Understand how IS can influence sustainable performance of organizations
- Effective design approaches for developing IS that influence actions and beliefs about environmental sustainability
- Integration of energy supply and demand data in IS to increase eco-efficiency
- Understand what information is needed in the demand side of energy to influence eco-efficient actions of consumers
- Understand what information should be reported to the various stakeholders (suppliers, consumers, governments) to stimulate eco-efficiency, eco-equity, and eco-effectiveness

## CONCLUSION

There is a growing concern worldwide about sustainable development. Governments and transnational institutions have called for research contributions in many domains to address this problem. Green IS is a new and promising research area in the domain of Information Systems that concerns with the use of information systems to achieve the goals of sustainability. Moreover, there are many open challenges for research in this area that deserve the attention of the research community. In this abstract we selected a sub-set of these challenges to illustrate the type of problems we envision for our future work.

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