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## TASK MISSING LECTURES

### Reviews: Computing Research for Sustainability (Chapter 1- 3)

#### **Chapter 01: Roles and Opportunities for Information Technology in Meeting Sustainability Challenges**

In this chapter, the author states three main areas where the potential impact for sustainability can be held by IT innovations. These areas are:

- Building infrastructure and systems
- Ecosystems services and the environment
- Sociotechnical systems

The author has given real life examples of potential impact for sustainability. All these examples are IT based projects for example 'Smart Buildings' where the greenhouse gas emission is significantly lower than the traditional buildings.

IT can play big role in the field of ecosystem as well. By using IT, we can now get real time data using sensors and can understand the nature and flow of different gases as well as we can model the earth using computational methods. These tools makes our task easy to make better decision for different resource managements and policies. Smart devices provides information in real time which enables dynamic response for aids and helps both users and researchers. Thus IT helps in sustainability in sociotechnical systems.

All the examples of this chapter (3 in total) actually illustrates that IT has significant impact on sustainability. It also makes the way to discuss more about the impact of IT in sustainability in next chapters and why we should care about them.

#### **Chapter 02: Elements of Computer Science Research Agenda for Sustainability**

This chapter shows main areas of computer science research which are related to sustainability. It also shows the problems of how to implement these opportunities. The 4(four) main research areas are:

- Measurement and instrumentation
- Information intensive systems
- Analysis, modeling, simulation and optimization
- Human centered systems

Technology has progressed in such a level that we have access for all types of electronic devices now a days. This book provides the opportunities to overcome the challenges facing sustainability, the design

and implementation of those information services and software stacks for physical systems for the 1<sup>st</sup> area.

Information intensive systems are needed to solve sustainability related problems. In modern days, systems are complex so we need proper methods to cope with large amount of data. There are 5 aspects for these information intensive systems, at which they can be considered as good methods to deal big amount of data which are complex in behavior.

To simplify or decompose highly interrelated aspects, three topics are stated in this chapter where they can be used to provide models. They are: 1) Developing and using multiscale models, 2) Combination of mechanistic & statistical models and 3) Optimization under uncertainty.

Moreover, human centered approach is one of the key factors where human can play the main role to meet sustainability issues for example natural disasters, gas explosion, oil spills etc. Both individuals and organizations play a main role in meeting these sustainable issues.

### **Chapter 3: Programmatic and institutional opportunities to enhance computer science research for sustainability**

Large scale socioeconomic systems such as financial systems, manufacturing systems have been changing due to the continuous development of the IT sector, this chapter shows the areas where technology innovation and computer science can contribute to the betterment. This chapter says about how the interplay between addressing sustainability challenges and computer science research merits attention. It describes some ways of conducting and managing research so the IT research have an even greater impact on sustainability challenges by programmatic and institutional opportunities.

Advancement in information technology has enabled to bring significant changes in these systems. In this way computer science can contribute a lot in developing and solving sustainability related issues in different ways.