Green Information Systems for sustainable business practices



By

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AGENDA

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- Need for sustainability
- Difference between green IS and green IT
- A framework for identifying opportunities for green IS and green IT
- Aligning corporate and green IS strategies
- A case study on green IS strategies
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Introduction

- Information systems and Information technology have positive and negative impacts on the environment and the eco-sustainability of businesses and societies
- The negative impacts are the emissions and energy inefficiencies of IT systems
- The positive impacts are the reduction of emissions & energy savings in other parts of the organisation

Need for sustainability

- Current trend in consuming earth's resources
  - is unsustainable
  - creating environmental burden
- Environmental burden is a function of population, wealth and technology.
- Larger population more impact on earth's resources
- Wealthier people consume more resources than less affluent people
- Technology is both a cause of environmental burden and potential solution

Need for sustainability

- In IT disposal of equipment is a major environmental problem
  - toxic products in computers & displays.
  - IT industry accounts for 2% of global CO2 emissions
  - Electronic waste a growing problem
- However, IS has been a major contributor to productivity growth on a global scale
- Sustainability requires sustainable business practices
  - IS helps to transition to a sustainable economy

Differences between green IS & IT

- Definitions:
  - Green refers to environmentally friendly processes
  - IT refers to hardware, software & peripheral equipment.
  - IS “combines both the technological components & human activities within the organization as well as the process of managing the lifecycle of organizational IS practices.”
- Green IT practices mostly focused on IT energy consumption of corporate data centers
- Green IS enables environmental management of systems & reinvention of business & production processes.

Differences between green IS & IT

- Green IT addresses issues such as:
  - Designing energy efficient chips
  - Replacing PCs with energy efficient thin clients
  - Use of virtual software to run multiple operating systems on one server
  - Using renewable energy sources to power data centres
  - Reducing electronic waste from obsolete computing equipment.

Differences between green IS & IT

- Green IS helps an organization to:
  - Reduce transport costs with fleet management system & dynamic routing of vehicles
  - Support team work and meetings when employees are distributed, reducing air travel.
    - Supports collaboration, group document management, cooperative knowledge management, etc.
  - Tracks environmental information (toxicity, energy used, water used etc.) on creation of products, their components & fulfillment of services.
  - Monitors & manages a company's emissions & waste products
  - Provides information for making green choices

Differences between green IS & IT

- Green IT refers to ‘first-order’ or ‘primary’ effects: effects of the physical existence of ICT (environmental impacts of the production, use, recycling and disposal of ICT hardware).
- Green IS refer to positive ‘second-order’ or ‘secondary’ effects: indirect environmental effects of ICT due to its power to change processes (such as production, transport or consumption processes), resulting in a decrease or increase of the environmental impacts of these processes.
- Green IS also includes ‘third-order’ or ‘tertiary’ effects: environmental effects of the medium- or long-term adaptation of behavior(e.g. consumption patterns) and economic structures to the availability of ICT and the services it provides.

A framework of sustainability options

- Three sustainability goals:
  - Prevent pollution by minimizing level of emissions, effluents and wastes
  - Product stewardship by reducing pollution & minimizing adverse environmental effects on full lifecycle of product.
  - Use of clean technology that creates no harmful emissions or waste
- Three goals can be applied at 3 different levels
  - Individual
  - Organizational
  - Societal

Table 1: Green IS and IT initiatives

	Individual	Organisational	Societal
Pollution prevention	Flexible printing capabilities Automated energy conservation system	Thin client Virtualisation Telecommuting	Electronic exchange of information: Congestion systems
Product Stewardship	recycling	Reuse components Recycle computers	Government policies Societal norms
Clean Technology	Paperless interaction	Video conferencing Collaboration tools	Open source Smart homes & appliances E-commerce

A framework of sustainability options

- Individual pollution prevention
  - Apply energy setting such as ‘sleep when inactive’.
  - Print on both sides of paper
- Individual product stewardship:
  - Recycle used electronic products
  - IS can facilitate by providing information & creating networks to support recycling
- Individual adoption of cleaner technology
  - Pay bills online
  - News, books in electronic format reduces paper consumption

A framework of sustainability options

- Organizational pollution prevention
  - Thin client that relies on central server for disk storage & applications processing e.g. Verizon (now taken over by MTN) reduced energy consumption by 30 % by replacing PCs in its call centres with thin clients.
  - Server virtualization makes the physical resource (i.e. server) function as multiple logical resources (e.g. multiple operating systems)
- Organizational product stewardship
  - Organizations need to create procedures & information systems to facilitate recycling e.g. Dell allows customers to recycle old printers.

A framework of sustainability options

- Organisational cleaner technology
  - Videoconferencing
  - Electronic collaboration tools
  - Electronic distributed meetings support communication without carbon footprint of travel
- Societal pollution prevention
  - Advent of electronic networks e.g. EDI supports majority of ecommerce transactions
  - XML supports electronic exchange of information through an open standard
  - Both reduced physical admin documents, thereby reducing pollution
  - Cites such as Singapore & London charge a levy for use of public roads with the aid of information systems

A framework of sustainability options

- Societal pollution prevention
  - ITS optimises public transportation by reducing congestion, improving road safety, and enhancing productivity.
  - Applications include computer aided dispatching of vehicles, automatic vehicle location for public buses, electronic freeway surveillance
- Societal product stewardship
  - Legislation is being used to make recycling of electronic products compulsory.
  - In 2003 European union enacted Waste Electrical and Electronic equipment directive setting collection, recycling, and recovery targets for all types of electrical goods.

A framework of sustainability options

- Societal cleaner technology
  - Open source model good example of cleaner form of production and distribution.
  - Software is developed without requiring physical presence of workers in same physical space.
  - Once developed OSS can flow freely across borders at electronic speed, without the need for wasteful packaging and retail store shelf space.

Framework for organisational sustainability

- Strategic alignment
  - Major corporations need to incorporate sustainability as part of their corporate strategy
  - Eliminating waste increases profitability and organisations need to learn that emission constraints are a part of doing business.
  - Strategic issues to be addressed through:
    - **Aggregation** – reduce costs by combining activities into optimal units for efficiency e.g.. Wal-Mart's green supply chain
      - IS can be used to measure and monitor the costs, emissions, and waste of each phase of a supply chain and packaging alternatives
      - From an IT perspective, aggregation describes actions such as locating servers in a single data center to reduce energy costs.

Framework for organisational sustainability

- Framework for promotion of organisational sustainability: Strategic alignment
  - **Adaptation**
    - Responsive to local stakeholders needs & desires
    - Exploiting the power of IT & IS strategically
    - Sun Microsystem's (taken over by Oracle) "Open Work" initiative , work locally while competing globally
  - **Arbitrage**
    - Achieve absolute economies through evaluating & selecting the best alternatives.
    - From an IT and IS perspective, achieving the most environmentally friendly product by selecting the least polluting vendors.

Case study: Generic green IS strategies

- Exploratory case study with 4 different companies led to conceptualization of ffg. 4 green IS strategies applied at different levels
- Green IS for efficiency
  - Corporate management perceives environmental sustainability as a means to support core business
  - Support & implement prevalent business strategy
  - Enhance efficiency of internal processes to facilitate operational cost reductions
- Green IS for Innovation
  - Companies striving for environmental technology leadership
  - Develop products with superior ecological characteristics
  - Build IS capabilities for environmental management & innovation.

Generic green IS strategies

- Green IS for Transformation
  - Suitable for companies from service industry where core business processes and products are based on IS
  - Organizational transformation driven by Green IS
  - BPR towards a cost & environmental leadership position
- Green IS for Credibility
  - Corporate reputation is a valuable asset.
  - Invest in Green IS initiatives with the goal of reducing environmental impacts
  - Green IS are part of the end product & enable competitive differentiation.

Table 2: Green IS strategies

	Green IS for efficiency	Green IS for Innovation	Green IS for Transformation	Green IS for Credibility
Corporate level: Organizational perspective on Green IS	Green IS are used to reduce costs	Green IS are used to achieve environmental technology leadership	Green IS are used to achieve business leadership	Green IS are used to improve stakeholder satisfaction
Competitive level: strategic goal of Green IS	Implement business strategy	Foster innovation	Reengineering of business processes	Minimize environmental impacts
Functional level: sources of competitive advantage based on green IS	IS support competitive strategies by enhancing internal process efficiency	IS capabilities for environment management &innovation	IS support environmental strategies by decreasing footprint of internal processes	IS improve footprint of the enterprise and of end products

Conclusion

- Information systems as the major force driving productivity growth play a critical role in creating sustainable business systems
- Green IS should be viewed as opportunities for organizations to improve productivity, reduce costs and enhance profitability
- Green IS strategies has the potential for decreasing environmental impacts and creating competitive advantage

Exercise

- What would your university do to increase its sustainability? How might students assist?

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