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Yulia Wati
Chosun University, yuliawati@gmail.com

Chulmo Koo
Chosun University, helmetgu@gmail.com

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A Presentation of the Green IT Balanced Scorecard from an Environmental Perspective

Yulia Wati
Chosun University, South Korea

Chulmo Koo
Chosun University, South Korea

Abstract
In this paper we introduce the Green IT Balanced Scorecard by incorporating an environmental aspect of technology into the scorecard measurement method. We conceptualized the Green IT balanced scorecard as "a nomological management tool to systematically align IT strategy with business strategy from an environmental sustainability perspective in order to achieve competitive advantage". The objectives of the Green IT balanced scorecard include the measurement of technology performance via the effective integration of environmental aspects, the investigation of both tangible and intangible assets of Green IT investment, the alignment of IT performance and business performance, and the transformation of the results into competitive advantage. This concept offers a new possibility for both practitioners and researchers to translate their sustainable business strategies into Green IT actions.

Keywords: Balanced Scorecard, Green IT Balanced Scorecard, business strategy, IT strategy, Green Technology

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AN INTRODUCTION TO THE GREEN-IT BALANCED SCORECARD

Currently, many organizations have an opportunity to tackle with sustainable development while improving their productivity, reducing costs, and enhancing benefits. However, their lack of environmental skills has resulted in many forms of waste, unused resources, energy inefficiency, and pollution (Watson et al., 2010). Although many companies have previously implemented specific environmental or social management systems in the past decade, these systems have only rarely been integrated into the general management system of the firm. As a consequence, in many cases, these systems are not linked to the economic contributions of the environmental management system (Laurinkevičiūtė, 2008). In order to address this issue, several authors have previously suggested applying the balanced scorecard approach to sustainability (e.g. Bieker, 2003; Elkington 1997; Figge et al., 2002; Johnson, 1998) in order to ascertain that environmental concerns are thoroughly considered in the decisions and activities of the other sectors (Laurinkevičiūtė, 2008).

On the other hand, undoubtedly, a growing environmental consciousness, including investments in environmental technologies, carries with it a source of business risk, particularly to brand, reputation, and shareholder value (Sigma, 2006). Therefore, a measurement on a balanced scorecard should consist of a linked set of objectives and measurements that are consistent and mutually reinforcing (Kaplan and Norton, 1997). Although various approaches to the IT balanced-scorecard have been adopted, IT researchers and practitioners should be aware of their applicability to measurements of environmental technology alignment. The adoption of Green IT could differ from other IT adoption approaches due to the importance of ethical and eco-sustainability considerations in the decision-making process (Molla, 2009). IT adoption is generally motivated by the potential economic benefits associated with the use of a technology, whereas Green IT practices may be motivated by concern for the environment, even if economic benefits might not prove tangible in the short-term (Molla, 2009). Therefore, continuing in this vein, the Green IT balanced scorecard can be viewed as *"a nomological management tool to systematically align IT strategy with business strategy from environmental sustainability perspective in order to achieve competitive advantage"*.

Kaplan and Norton (1997) also asserted that a balanced scorecard must contain the appropriate mixture of outcome measures (lagging indicators) and performance drivers (leading indicators). The needs, demands, goals, objectives, and/or structures of one component should be consistent with the needs, demands, goals, objectives, and/or structure of another component (Oh and Pinsonneault, 2007). Thus, the measures that appear on the scorecard should be integrated thoroughly into the cause-and-effect relationship that describes the trajectory of the strategy. Because the balanced scorecard is a technique for the implementation of strategy, the prerequisite for the companies before they implement a Green IT balanced scorecard approach is described as: "they have committed to environmental responsibility". The objectives of the Green IT balanced scorecard are as follows: *(1) to measure technology performance by effectively integrating environmental aspects, (2) to investigate both tangible and intangible assets of Green IT investment, and (3) to align IT performance and business performance, and transform the results into competitive advantage.*

ENVIRONMENTAL ASPECT OF TECHNOLOGY

To represent technology within an environmental context, some researchers have coined terms such as "environmental technology" or "sustainability technology", whereas others reference concepts such as "green technology (IT)" or "green computing". As the ultimate

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objective of this technology is to provide a win-win solution for both the company and the environment, we defined Green IT as *relating to any computer-based tools (hardware, software, equipments), mechanisms, structures, guidelines, and methodologies as the results of environmental breakthrough at each stage of the technology's life-cycle, including use, design, manufacture, and reuse, refurbish, and disposal of technology in environmentally sound manners (to deliver sustainable values for business, environment, and society, and at the same time, improve the quality of life).*

THE CORE CONCEPT OF GREEN IT BALANCED-SCORECARD

The presented Green IT BSC model is comprised of two distinct pillars: *environmental aspects of technology and competitive advantages of Green IT implementation*. These two factors are responsible for the relative significance of sustainable IT vision in the business environment. They also constitute a foundation for the formulation of further metrics scorecards. Several questions that must be addressed before investing in environmental technology are:

1. How can top management get their investment on environmental technologies to return some business value to them?
2. How does top management ensure that investments in environmental technologies are the right decision, not only to comply with government regulations, but also to achieve and transform those investments into competitive advantage?
3. How does top management control the firm's environmental technology investments?

In comparison to IT BSC, Green IT BSC emphasizes the environmental aspects of IT along with the financial perspective, stakeholder orientation, future orientation, and operational excellence (Table 1).

Table 1. Comparison of IT BSC and Green IT BSC

IT-BSC (Van Grembergen, 2000)	Green IT-BSC
Business contribution Mission: to obtain a reasonable business contribution of IT investments	**Financial Perspective** Mission: to investigate the contributions of the Green IT implementations from financial perspective
User Orientation Mission: to be the preferred supplier of information system	**Stakeholder Orientation** Mission: to quantify the efficiency and the effectiveness of Green IT in supporting stakeholders' needs
Future Orientation Mission: to develop opportunity to answer future challenges	**Future Orientation** Mission: to integrate the environmental aspect of technology to achieve a sustainability development
Operational Excellence Mission: to deliver effective and efficient IT applications and services	**Process Perspective** Mission: to optimize the utilization of Green IT during its lifecycle

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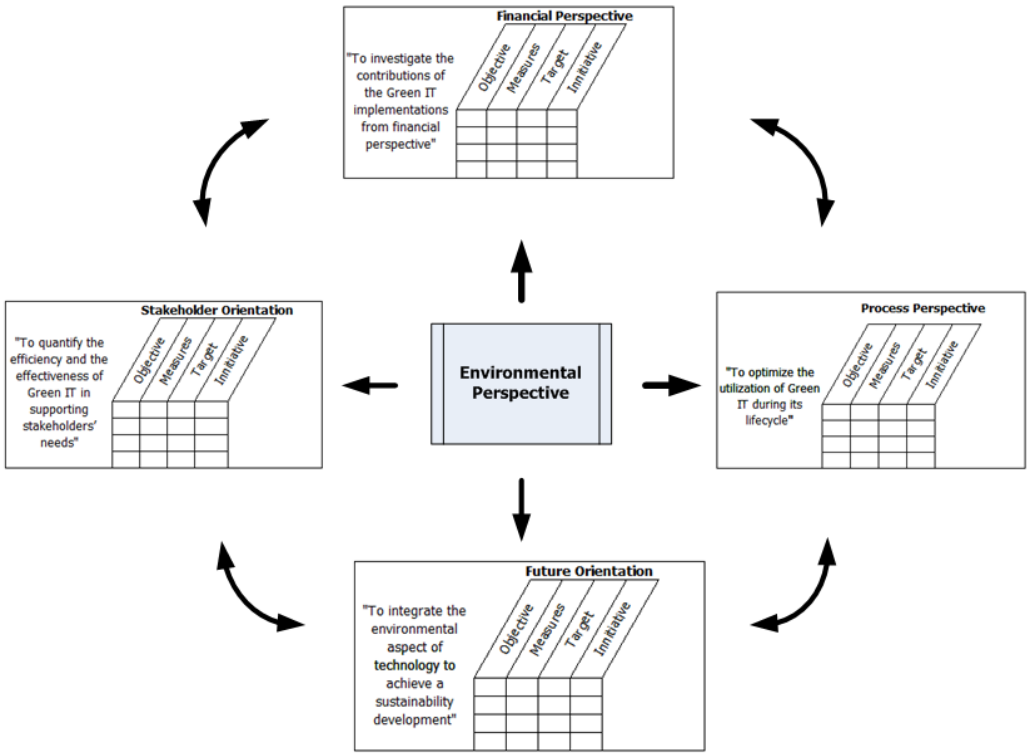

Figure 1.Green IT Balanced Scorecard

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Sprouts
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