



Inferring principles for sustainable development of business through analogies from ecological systems

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Abstract The literature in the field of sustainable development (SD) of businesses is piecemeal and diverse. This paper identifies and integrates principles that businesses could use for transformation towards SD. This is done through analogical reasoning from the source context of ecological systems to the target contexts of business socio-economic systems and machine/technology systems. The methodologies of systems thinking and morphological analysis supplement the analogical reasoning. Based on this, twelve principles for sustainable development of business are inferred for business managers and policy makers.

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Introduction to sustainable development of business

Our world consists of islands of prosperity, viz., large businesses and wealthy governments, amidst oceans of deprivation, viz., poverty, social malaise and ecological degradation (UNGC Accenture, 2010). Our ecological

footprint currently exceeds the earth's carrying capacity,³ and continues to increase. Hence, society and businesses should pursue the path of sustainable development (SD). This paper attempts to synthesise principles for SD of businesses for use by professionals, managers and policy makers.

Sustainable development can be defined as "development that meets the needs of the present, without compromising the ability of future generations to meet their own needs" (WCED, 1987—section 3, page 16). Sustainable development of business involves preservation and enhancement of the existing stock of resources — financial, ecological, societal, human, physical, and others — which businesses depend upon quantitatively and qualitatively,

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³ Carrying capacity is the amount of maximum population of a given species that can be sustained in a given environment, indefinitely. This depends on human choices and natural limits in the case of human beings.

and in the short- and long-run (Stiglitz, Sen, & Fitoussi, 2009). Sustainable development of business also involves the reduction of waste and risks in the socio-ecological context (Hanson, Finisdore, Ranganathan, & Iceland, 2010), while meeting the materialistic needs of society at appropriate prices, quality, and timeframes.

Sustainable development of business needs to be measured against the triple bottom line of people (society), planet (ecology) and profit/prosperity (economy) (Elkington, 1998). Historically, the ideologies of feudalism/traditionalism, capitalism, communism, and modernism had their own impact on the triple bottom line (Dresner, 2002). The current questions on sustainability lead to considerable speculation on the sustainable development of business in the future. Key milestones relating to voluntary initiatives for SD of business (WBCSD, 2000) since 1970 are given in Table 1.

Key works on social development of business

The literature on SD of business uses an eco-centric view or an anthropocentric view. The eco-centric view (Naess, 1992), believes that ecological systems are at the centre of all value, and that human systems are embedded in and mirror ecological systems (Capra & Pauli, 1995; Iyer, 1999; Zsolnai & Ims, 2006). The anthropocentric view places human systems above or outside ecological systems and considers it a source of all value. Ecological systems are considered to be of only instrumental, aesthetic, or utilitarian value.

Some of the key themes in eco-centric literature are

- a) Sustainable communities can be built and nurtured based on ecological systems
- b) Voluntary simplicity (Gandhi), small business (Schumacher) and Buddhist style economics may emerge in the future as eco-centric models of business
- c) The model of human nature as selfish and asocial is a poor predictor of real human behaviour

The key principles of the eco-centric view for business are

- a) De-emphasise non-essential consumer goods and emphasise production of essentials for the needy

- b) Respect and restore ecological systems
- c) Involve all stakeholders
- d) Take part in the governance of the commons and finance it
- e) Slow the economic growth rate to sustainable levels

In the anthropocentric view, SD literature is categorised as works related to the ecological bottom line and the triple bottom line perspectives. The literature related to the ecological bottom line consists of the concepts of eco-efficiency (cradle to grave approach) and eco-effectiveness (cradle to cradle approach). Eco-efficiency is achieved when goods and services satisfy human needs, increase the quality of life at competitive prices, and when environmental impacts and resource intensity are decreased to a degree that keeps them within the limits of Earth's carrying capacity (Dirk, Hausmann, Liedtke, & Weizsäcker, 2004). On the other hand, eco-effectiveness excludes the concept of waste. At the end of its life, the output of every process or product is "upcycled" separately either as a technical nutrient in the economic system or biological nutrient in the ecological system (McDonough & Braungart, 2002).

The following six principles are discussed by different authors and organisations related to SD of business from an ecological perspective (CERES, 2011; ICC, 1987; Lovins, Lovins, & Hawken, 1999; McDonough & Braungart, 2002; WBCSD, 2000)

- a) Increase the productivity of natural resources
- b) Reduce the quantity and toxicity of wastes
- c) Increase the stock of natural capital
- d) Rethink the markets with a service based business model and with less material and energy intensity
Design the process and product for its lifecycle impact
- e) Reduce ecological risks

From a triple bottom line perspective, SD of business necessitates the building up of social capital, apart from financial and ecological capital. The themes of triple bottom line literature are ethics, governance, transparency, relationships with suppliers, financial returns, community involvement/development, customer value, fair employment practice, and environment friendliness (Bilgin, 2009; Epstein & Roy, 2003).

Table 1 Key milestones in voluntary initiatives for sustainable development of business (WBCSD, 2000).

Year	Milestone
1975	The company 3M introduced successfully "pollution prevention pays" (3P) initiative
1986	Dow Chemicals introduced the "waste reduction always pays" (WRAP) programme
1991	World Business Council for Sustainable Development popularised the concept of eco-efficiency as a win-win solution for economy and ecology
1992	Rio Summit on SD – Business was also seen as a part of the solution, rather than as a part of the problem
1998	The concepts of eco-effectiveness and triple bottom line were popularised
2002	World Summit on Sustainable Development released top ten successes and failures since Rio meeting
2003	International Sustainable Development Communication Network strengthened to help decision makers on sustainability issues
2005	Millennium Ecosystem Assessment released, which outlined relevance of ecosystem services to business
2007	First investment negotiations forum as related to sustainability held
2008	International Standards Organisation developed the new corporate social responsibility standard
2012	In Rio+20 conference private sector also pledged finance for clean technologies in developing and under developed countries

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