THE PROFICIENCY AND GLOBAL APPLICATION OF SUSTAINABILITY IN TECHNOLOGY, BUSINESS MANAGEMENT AND REALMS OF KNOWLEDGE

Mohammed Yahaya Ubale, Prof. David Martin & Dr. Seow Ta Wee

Department of Real Estate Management, Faculty of Technology Management & Business
University Tun Hussein Onn Malaysia (UTHM)
hp110058@siswa.uthm.edu.my

ABSTRACT

This paper seeks to unfold the universal use of sustainability in respective disciplines, corporate and disperse multi-dimensional care of resources and assets for present and future endeavors. Sustainability is the ability to endure the lasting upkeep of these assets and resources, which has ecological, profitable, and social magnitudes. Sustainability designates how biotic organisms remain broad and prolific over time, a necessary criterion for the well-being of humans and other creatures. Long-lived and healthy wetlands and forests signify sustainable biological systems. Feasible ecosystems and environments afford vibrant resources and developments.The paper revealed that sustainability has deeply penetrated all segments and circuits of developments in both corporate and environmental machineries. None of the spelt out engagements will forge ahead without sustainability. Hence, sustainability is the spine of both present and future needs for the global lasting up keep as it maintains and improves quality of life support systems/subsystems, decent environmental qualities.

Keywords: Sustainability, Technology, Knowledge, Business, Solicitation and Global perspective

1. Introduction

Sustainability is a dire concern for the globe (Prahalad and Hammond, 2002; The United Nation Global Compact, 2004; Hawken, 2007). Sustainability is an elusive concept, it is essential to migrate from unfolding it to developing tangible mechanisms for upholding and assessing its success (Veleva and Ellenbecker, 2000). Sustainability has established vast devotion in current ages for an operative resolution to the upkeep and incessant development and extension of technologies and knowledge in all endeavors. Jayal et al. (2010) deduced that to achieve sustainability, it necessitates a holistic and or universal assessment traversing in all spheres of disciplines. Trends in developing improved sustainability for scoring methods and processes in predictive models and optimization techniques smear globally. Sustainability can examine the prominence of these subject matters through the lenses of numerous established theoretical viewpoints. Sustainability may constitute a cherished innovation and resource that hint to modest advantage(McWilliams and Siegel, 2001). Sustainability can recover many magnitudes of sustainable performance such as environmental sustainability, economic sustainability, and corporate social responsibility sustainability (Moldan et al., 2012; Schoenherr, 2011; Bartelmus, 2010; Singh et al., 2009; Labuschagne et al. 2005; Veleva and Ellenbecker, 2001). Sustainable development, in addition, means embracing strategies and activities that meet the needs of the global initiative in protecting, sustaining and enhancing the human and natural resources that will be needed in the future (International Institute for Sustainable Development *et al*. 1992).

Fabian Socialist wrote in his book "The Intelligent Women's Guide to Socialism and Capitalism 1928". His assertion under socialism was that, you would not be allowed to be poor, you would be compulsorily fed, clothed, housed, educated and employed whether you like it or not to uphold sustainability. Ruskin John (n.d.) wrote that the first duty of a state is to see that for every child born shall be well housed, clothed, fed and educated… all these are endeavors to ensure sustainability. CBN (2002), contend that absolute poverty indicators such as insufficient necessities and facilities like food, housing, medical care, education, consumer goods, transport etc. propel where there is no sustainability. "Show the light and the people will find the way", was the quoted chant by Nigerian first President, Late Nnamdi Azikiwe signifying the proficiency of sustainability. Human sustainability borders with economics through the voluntary trade magnitudes of economic activity. Moving towards sustainability is also a social contest that necessitates, among other factors, international and national law, urban planning and transport, local and individual lifestyles and ethical consumerism. Ways of living more sustainably can take many forms from controlling living conditions to reassessing work performance or developing new technologies that reduce the depletion of resources. Achieving sustainability will enable the earth to remain compassionate to human life and global challenges. Available online at: http://en.wikipedia.org/wiki/Sustainability.

2. Concept of Sustainability

Sustainability has more than ten meanings. For instance, sustain, mans to maintain, support, or endure. Sustainability has been used in the sense of human sustainability on the Earth and this has instigated the most widely cited definition of sustainability as a part of the concept of sustainable development. Brundtland Commission of the United Nations on March 20, 1987, defines sustainable development as development that meets the needs of the present generations without compromising the ability of future generations to meet their own needs. This requires the reconciliation of environmental, social equity and economic demands or the three pillars of sustainability (2005 World Summit). This view has been expressed as an illustration using three overlapping ellipses indicating that the three pillars of sustainability are not mutually exclusive and can be mutually reinforcing (see figure 1.). The three pillars have functioned as a common ground for numerous sustainability standards and certification systems in recent years. Standards which today plainly refer to the triple bottom line include Rainforest Alliance, Fair trade, and The Common Code for the Coffee Community. The triple bottom line as defined by the UN is not universally accepted and has undergone various interpretations. What sustainability is, what its goals should be, and how these goals are to be achieved are all open to respective interpretations. For many environmentalists, the idea of sustainable development seems to entail environmental degradation. Ecological economist, Herman Daly has asked the use of a saw mill without a forest. From this perspective, the economy is a subsystem of human **society**, which is itself a subsystem of the biosphere and a gain in one sector is a loss from another. This can be illustrated as three concentric circles (see figure 2). A universally accepted definition of sustainability remains intangible because it is often linked with other concepts such as sustainable development and or sustainable agriculture. It needs to be realistic and scientific, a clear statement of a definite destination. Sustainability is improving the eminence of human life while living within the carrying capacity of secondary eco systems, though a vague definition but delivers the knowledge of sustainability having measurable edges. The Earth Charter speaks of "a sustainable global society founded on respect for nature, universal human rights, economic justice, and a culture of peace." The term sustainability is applied not only to human sustainability on Earth, but too many circumstances and settings over many measures of space and time, from small local ones to the global balance of production and consumption. It also refers to a future

intention like sustainable agriculture which is not necessarily a current situation but a goal for the future. Available on line at: http://en.wikipedia.org/wiki/Sustainability

Sustainability is about maintaining or nourishing something. To understand the concept, first recognize what people are selecting to sustain, identify the focus of their concern, then you can work out how to sustain that mechanism or condition. In order to sustain something, it may well be necessary to integrate ecological, social and economic issues or to consult extensively. People often feel unclear about what 'sustainability' means is that it has to be applied to something before its meaning is clear and people usually don't specify what it is applied to when they use the term. Many environmentalists mean 'ecological sustainability' when they say 'sustainability'. And many business people mean 'economic sustainability' when they say 'sustainability'. So if a basic level of ecological, social and economic sustainability needs to be achieved simultaneously, if any one type of sustainability is to be achieved, you may well wonder why the focus of sustainability needs to be clarified at all! The reason is simply that, most often, when people use the term, they have in mind - in relation to their focus - a much higher level of achievement than the basic level. Environmentalists may well have in mind that they want to maintain a very high quality of life for humans or they want all other species to be protected (for their own sake). But to sustain society and the economy it is probably not necessary to sustain, for example, very high levels of environmental aesthetics or all other species. Social justice advocates probably have in mind the maintenance of a very high quality of life for people when they talk about the need for social sustainability. And for that to be achieved a high level of equality is needed. But a high level of equality is probably not necessary if one's concern is focused exclusively on economic or ecological sustainability.

3. The Antiquity of Sustainability

The antiquity of sustainability dashes human dominated ecological schemes from the earliest civilizations to the present. This is characterized by the amplified regional success of a particular society, trailed by crunches that were either decided, creating sustainability or leading to decline. In early human antiquity, the use of fire and desire for specific foods may have altered the natural composition of plant and animal communities. Between 8,000 and 10,000 years ago, Agrarian communities occurred which depended basically on the environment and the formation of a structure of eternity. The Western industrial revolution of the 18th to 19th centuries tapped into the infinite growth potential of the energy in fossil fuels. Coal was used to power ever more proficient engines and later to generate electricity. Modern hygiene systems and improvements in treatment secure great populace from infection. In the mid-20th century, a crowd environmental movement pointed out that there were environmental costs associated with the many material benefits that were now being enjoyed. In the late 20th century, environmental hitches became global in scale. The 1973 and 1979 energy crises demonstrated the extent to which the global community had become dependent on non-renewable energy resources. In the 21st century, there is increasing global cognizance of the threat posed by the human greenhouse effect, produced largely by forest clearing and the burning of fossil fuels (http://en.wikipedia.org/wiki/Sustainability).

4. Values and Perception of Sustainability

The philosophical and analytic framework of sustainability draws on and connects with many different disciplines and arenas. In modern age, an area that has come to be called sustainability science has emerged. Sustainability science is not yet an autonomous field or discipline of its own, and has tended to

be problem-driven and oriented towards guiding decision-making. Sustainability is studied and achieved over many scales, levels or frames of reference of time and space and in many contexts of environmental, social and economic organization. The focus ranges from the total carrying capacity (sustainability) of planet Earth to the sustainability of economic sectors, ecosystems, countries, municipalities, neighborhoods, home gardens, individual lives, individual goods and services, occupations, lifestyles and performance patterns. It entails the full scope of biological and human activity. Daniel Botkin, author and environmentalist, stated: "We see a landscape that is always in fluctuation, changing over many scales of time and space (http://en.wikipedia.org/wiki/Sustainability).

5. Concept of Sustainable Development

Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains two key concepts:

- The concept of needs, in particular the essential needs of the world's poor, to which overriding priority should be given
- The idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs

Descriptions of sustainable development require looking the world as a system that connects space and time. When one think of the world as a system over space, he grow to understand that air pollution from North America affects air quality in Asia, and that pesticides sprayed in Argentina could harm fish stocks off the coast of Australia. When we think of the world as a system over time, we realize that the decisions our grandparents made about how to farm the land linger to affect agricultural practice today and the economic policies we endorse today will have an effect on urban poverty on our children. We also appreciate that quality of life is also a system. It's good to be physically healthy, but if the poor don't have access to education, it's good to have a secure income. The concept of sustainable development is entrenched in this sort of systems thinking. It helps us understand ourselves and our world. The problems we face are complex and serious and we can't address them in the same way we created them. On line: (http://www.iisd.org/sd/). Sustainable development involves planning a social and economic system, which certifies that these goals are sustained, i.e. that real incomes rise, that educational standards increase, which the health of the nation improves, and that the general quality of life is advanced (Pearce, Makandia & Barbier 1989). Daly (1991) argued that: Lack of a precise definition of the term 'sustainable development' is not all bad. It has allowed a considerable consensus to evolve in support of the idea that it is both morally and economically wrong to treat the world as a business in liquidation. However, no single approach to 'sustainable development' or framework is consistently useful, given the variety of scales inherent in different conservation programs and different types of societies and institutional structures **(**Heinen 1994). Sustainable development, sustainable growth, and sustainable use have been used interchangeably, as if their meanings were the same. Sustainable growth is a contradiction in that nothing physical can grow indefinitely. Sustainable use is only applicable to renewable resources. Sustainable development is used in this strategy to mean: improving the quality of human life whilst living within the carrying capacity of the ecosystems (IUCN, UNEP, WWF 1991). Development is about realizing resource potential, Sustainable development of renewable natural resources implies respecting limits to the development process, even though these limits are adjustable by technology. The sustainability of technology may be judged by whether it increases production, but retains its environmental and other limits. Sustainable development is concerned with the development of a society

where the costs of development are not transferred to future generations, or at least an attempt is made to compensate such costs (Pearce 1993). Most societies want to achieve economic development to secure higher standards of living, now and for future generations. They also seek to protect and enhance their environment, now and for their children. Sustainable development tries to reconcile these two objectives (HMSO 1994).

5.1 Scope of the concept of Sustainable Development

The focus of sustainable development is extensive than the environment. It's also about safeguarding a durable, vigorous and objective civilization. This worth consulting the varied needs of all people in existing and future communities, promoting personal wellbeing, social cohesion and inclusion, and creating equal opportunity. The concept of sustainability can be applied to the following disciplines:

- Environment or Ecological Sustainability
- Society or Social Sustainability
- Economy or Economic Sustainability
- Organization or Organizational sustainability
- Human sustainability

Sustainable development is finding better ways of doing things, both for the future and the present. We might need to change the way we work and live now, but this doesn't mean our quality of life will be reduced. A sustainable development approach can bring many benefits in the short to medium term, for example: Investments as a result scrutiny, government has saved over colossal amount by improving efficiency across its estate. In the sphere of Health & Transport, instead of driving, swapping to walking or cycling for short journeys will save you money, improve your health and is often just as quick and convenient. Sustainable development provides an approach to making better decisions on the issues that affect all lives. When we incorporate health plans into the planning of new communities, for instance, we can ensure that residents have easy access to healthcare and leisure facilities. (By encouraging more sustainable food supply chains, we can ensure that UK has enough food for the long-term future). http://www.sd-commission.org.uk/pages/what-is-sustainable-development.html. A number of corporate principles are entrenched in most definitions of sustainable development or sustainability. These include:

- Integration of environmental and economic goals in policies and activities
- Social equity and community participation.
- Conservation of biodiversity and ecological integrity and halting its loss
- Constant natural capital and sustainable income
- Dealing cautiously with risk, uncertainty and irreversibility
- Ensuring appropriate valuation of environmental assets
- Ensuring intergenerational and intergenerational equity
- Recognizing the global dimension

Unfortunately, these values fused together ends and means which lead to uncertainty about the concept of sustainability and global development. The upkeep of the natural environment, natural capital, environmental excellence and income for all generations and all species are the goals. While dealing prudently with risk, certifying appropriate valuation, assimilating environmental and social and economic goals, and promoting equity and participation are the means.

5.2 Concept of Survival sustainability

Table 3 depicts the relationship between survival, global and local sustainability. The most basic level of sustainability is survival which involves the upkeep of ecological life-support systems, the social capacity to resolve main hitches and the economic capacity to meet sustenance needs of the populace. At this basic level of sustainability all three requirements must be met simultaneously. The two levels of sustainability that worth prudence are:

- The maintenance of basic sustainability which is usually referred to as 'survival sustainability'.
- The other is the maintenance and or restoration of the expected quality of life. In some regions this quality of life is far beyond the level required for basic survival.

The quest of sustainability does not suggest struggles to build for the first time a higher level quality of life. Such an activity or aspiration goes beyond the concept of maintenance and so goes beyond sustainability. This is not to say that people shouldn't aspire to advance their quality of life beyond their anticipated level, it is just that it destabilizes the meaning of the concept of sustainability to stretch the concept beyond its primary meaning. The quest of survival sustainability and improved quality of life may sometimes encounter. It is promising for communities to put such great volumes of strength into refining the empirical features of their quality of life such as aesthetics, time saving, that they fail to place sufficient effort into certifying survival sustainability. This is what most prosperous societies are doing (http://www.green-innovations.asn.au/sustblty.htm).

5.3 Global and Local Sustainability

Sustainability is a system distinguishing sub-systems in a higher system that is most unlikely to be sustained if the overall system is not sustained. Therefore, the sustainability of local geographic areas is very unlikely to be sustained, if the global sustainability is not assured. However, a firm is most unlikely to be sustainable if the society at large is not sustained. Subsequently, there is a high possibility that action taken to accomplish local sustainability, which is not combined with catalytic action to achieve global sustainability, is destined to failure. http://www.green-innovations.asn.au/sustblty.htm Sustainability is the attribute of a system that has the internal capacity to:

- Adapt and survive no matter how unsustainable the external environment might be
- Catalyze the achievement of the sustainability of its external environment
- Achieve the sustainability of its internal workings

Unsustainability is the state of a thing or condition prior to its actual or expected destruction. If the condition that ceases to exist is of no great significance then we need not worry too much about the earlier state of unsustainability. But if the destruction of the condition actually troubles morally, ecologically, economically or socially, then its earlier state of unsustainability also matters. In developing a dynamic system, things are constantly changing, which means that there is a constant unrest of the conditions ceasing to exist. It makes sense to try to sustain **some** things or conditions for practical or moral reasons like life support systems, economic productive power, social capacity for nurturance and problem solving or species for moral and or practical reasons. It is worth noting that treating a sustainable state as a destination doesn't mean that society cannot review or enhance its idea of what sustainability is at a future date. Sustainability is the attribute of a system that has the internal capacity to improve its internal or external sustainability. And there are virtually no products with this proactive capacity. http://www.green-innovations.asn.au/sustblty.htm.

6. Forms of Sustainability

Sustainable system must be based on resources that will not be exhausted over a reasonable period and must not generate unacceptable pollution externally or internally. However, sustainability can be of different forms as follows:

6.1 Economic and Social Sustainability

The efficient use of resources that is expressed in monetary terms is referred to Economics. Theories regarding sustainable use of resources can be applied. This concept is subject to different inputs and outputs. Economic sustainability of an enterprise is subject to the viability of market forces. That of a Nation is pursuant to the economy of the whole Nation both the local national and international level. Dependence of a variable on an unacceptable phenomenon is not sustainability http://www.ecifm.rdg.ac.uk/definitions.htm

6.2 Biological sustainability

Life forms cannot be sustained indefinitely since all creatures must taste death at some point in time. Hence preservation of lives can only be for limited period of time and species or ecosystems and habitats can be sustained because of their significance. Sustainable processes does not lead to sustainable entities as most biological systems has components, therefore, there is a considerable overlap between biological systems and physical resources. Water and energy can be recycled, change in form but cannot be destroyed.

7. Conclusion

It is now established that no any discipline in the arena of learning, business or corporate endeavors, biotic systems and subsystems, abiotic ecological strata, environmental surroundings and attached structures, subsistence and mechanized agriculture, to mention few of the living struggles can strive without the impact of sustainability. Transition of the tangible global processes and the intangible world systems has been evident in this millennium. Vehemently, sustainability has cut across all life processes, systems and challenges. Technological advancement and prosperity could not have been real without the concept of sustainability. All life struggles ranging from corporate, commercial and business challenges, intellectual struggles, learning disciples and disciplines, present and future tussles remain trailing because of sustainability.

8. Acknowledgement

It is my pleasure to vigorously commend the tireless efforts of both my main and my co supervisors whose vibrant expertise made this paper a reality. Equally is the substantial regards I was indebted to my University, Tun Hussein Onn Malaysia (UTHM). May Allah in His infinite mercy continue to uplift the University to greater heights.

9. References

Anis, F., Mohd, Z. & Nuru, F. H. (2012). The Development of Sustainable Manufacturing Practices and Sustainable Performance in Malaysia Automotive Industry Journal of Economics and Sustainable Development www.iiste.org ISSN 2222-1700 (Paper) ISSN 2222-2855(Online) Vol.3, No.7

Bartelmus, B. (2010), Use and usefulness of sustainability economics, Ecological Economics, in this issue.

Botkin, D.B. (1990). *Discordant Harmonies, a New Ecology for the 21st century.* New York: Oxford University Press. ISBN 978-0-19-507469-7.

Brundtland, G. (Ed). (1987). Our Common Future: The World Commission on Environment and Development. Oxford University Press, Oxford.

Central Bank of Nigeria (31st December, 2002). Annual Report and Statement of Accounts. Website www.cenbank.org

Daly, H. & J. Cobb (1989). *For the Common Good: Redirecting the Economy Toward Community, the Environment and a Sustainable Future.* Boston: Beacon Press. ISBN 0-8070-4703-1.

Daly, H.E. & Farley, J. (2004). *Ecological economics: principles and applications.* Washington: Island Press. ISBN 1-55963-312-3.

Heinen, J.T., (1994). Emerging, diverging and converging paradigms on sustainable development. International Journal of Sustainable Development World Ecol.1, 22–33.

HMSO, (1994). Planning Sustainable Development: Principles and Implementation Journal of Planning Education and Research April 1996 15: 237-241http://www.greenbiz.com/news/newsFthird.cfm?NewsID=13397

IUCN/UNEP/WWF (1991). Caring for the Earth: A Strategy for Sustainable Living. Gland, Switzerland. Retrieved on: 2009-03-29.

Jayal, A. D., Badurdeen, F., Dillon Jr., O. W., and Jawahir, I. S. (2010). Sustainable manufacturing: Modeling and optimization challenges at the product, process and system levels. CIRP Journal of Manufacturing Science and Technology, 2, 144-152.

Labuschagne C., Brent, A.C. & vanErck, R.P.G., (2005). Assessing the sustainability performance of industries, Journal of Cleaner Production 13(4), 373-385.

McWilliams, A., and D. Siegel (2000). "Corporate social responsibility and financial performance: Correlation or misspecification?" Strategic Management Journal, 21 (5): 603-609.

Moldan, B., et al. (2012). Composite indicators of environmental sustainability. In: Statistics, knowledge and policy: Key indicators to inform decision making. Paris: OECD Publishing, 2006. 154-163. ISBN 92-64-00900-0.

Pearce, David, Markandya, Anil & Barbier, Edward (1989). *Blueprint for a Green Economy*, Earthscan, London.

Prahalad, C.K. & Hammond, *A.* (*2002).* Serving the World's Poor: Profitably - The Payoff for Investing in Poor Countries. hbswk.hbs.edu/archive/3180.html

Riley, *J.G. (*1992*).* The analysis of uncertainty and information.

Schoenherr, T & Vincent, A.M. (2011). An Exploratory study of procurement strategies for multi item RFQs in B2B Markets: Antecedents & Impact on Performance, Production & Operations Management Vol. 2.

Singh et al. (26th February, 2009). Nature 457, E7 doi: 10.1038/nature07785

Veleva V, Hart M, Greiner T, Crumbley C. (15th Nov. 2000). Indicators of Sustainable Production. Journal of Cleaner Production 2001; 9:447–52. [3] Sustainability, Team Spotlights Top 50 Corporate Sustainability Reports. GreenBiz.

Veleva V., EllenBecker, M. (2001). Indicators of Sustainable Production: A New Tool for Promoting Business Sustainability, New Solutions in press.

First A. Author (M'76–SM'81–F'87) Mohammed Yahaya Ubale born in Bauchi local government area of Bauchi State, Nigeria on the 13th day of June; 1973.He is a member, Nigeria Institute of Town Planners (NITP). He obtained a Bachelor of Technology in Urban & Regional Planning at ATBU Bauchi, Nigeria in 2001. He is a post graduate student at UTHM, Parit Raja, Batu Pahat, Johor, Malaysia.

S/no	Ecology	Social	Economic	Hierarchy

1.	**Protection of life support systems**	**Capacity to solve Problems**	**Subsistence**	**Global – Local**
Maintaining Quality of Life				
2.	**Maintenance of Decent Environmental Quality**	**Maintenance of Decent Social Quality**	**Maintenance of Housing Standards**	**Global -- Local**
Improving Quality of Life				
3.	**Improving Environmental Quality**	**Improving Social Quality**	**Improving Living Standards**	**Global -- Local**

Table 1. Survival Sustainability

Table 2. Investigating Sustainability

S/no	Assessment	Presence of Sustainability	Determinants of Sustainability
1.	**Production**	**Technology, management, business & corporate affairs**	**Improving Technology, management, business & corporate affairs**
2.	**Agriculture**	**Economic & social needs, viable cultivation systems Production in crops & animals; Conserving soil nutrients & water; crop & animal diseases**	**Knowledge on viable systems and markets, Soil nutrients & water sustenance, hybrid crop varieties & animals**
3.	**Nation**	**Sound Development & conservation of Resources**	**Policies on Development & Resource Conservation**
4.	**World**	**Quality of the natural environment; human welfare & equity mechanisms; international agricultural research & development**	**Control of Greenhouse effect, pollution, world trade distribution**

Source: (Riley, 1992)

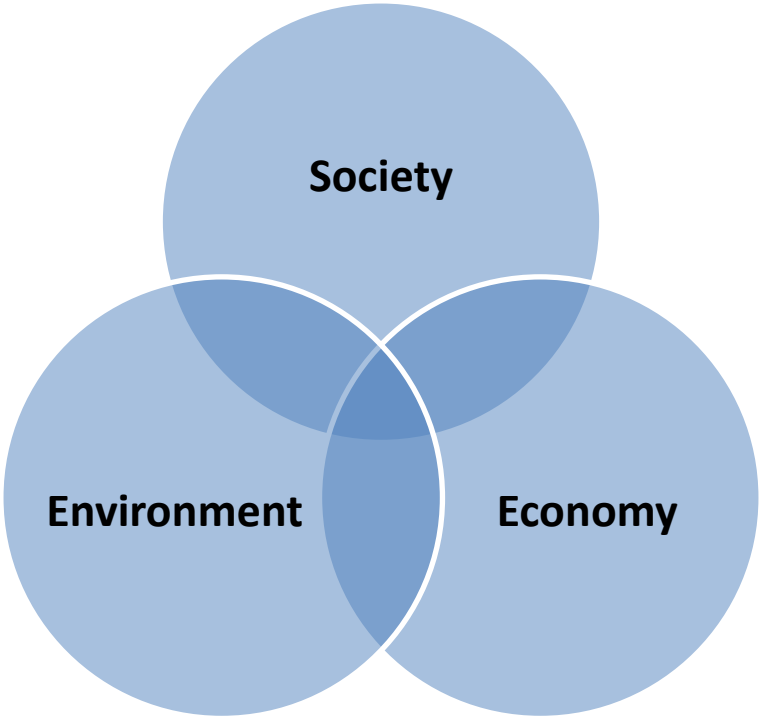

Figure 1. Illustration of the Relationship between the Environment, Economy and the Society Using Three Overlapping Ellipses

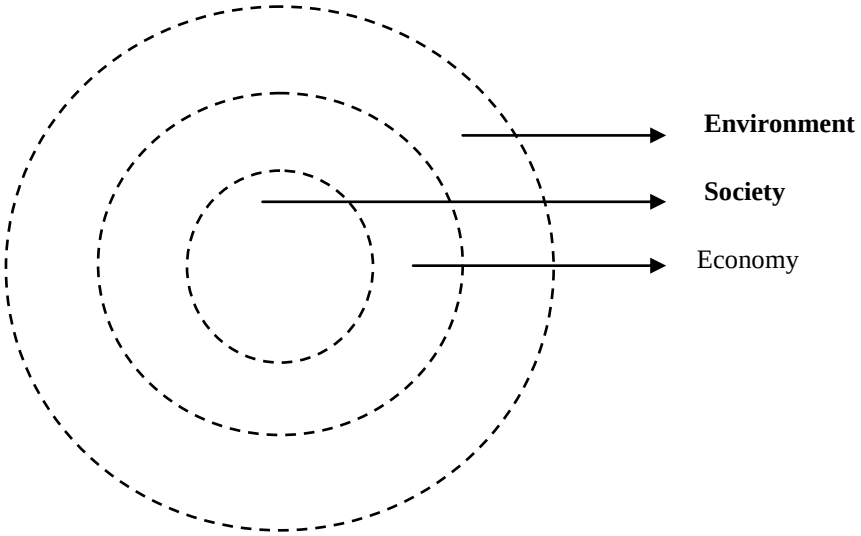

Figure 2. Illustration Using Three Concentric Circles