

The Critical Shift from a Consumer to a More Sustainable Society

Antonio Vico Mañas, Arnaldo de Hoyos, Bia Telles, Diego Conti
School of Economics and Business Administration, Pontifical Catholic University of São Paulo,
São Paulo, Brazil

(E-mail: avicomanas@pucsp.br, dehayos@pucsp.br, biatellespuc@gmail.com, diegoconti@uol.com.br)

Abstract: This paper looks forward to analyzing the society industrialization period, considering factors like consumption, urbanization, social changes, global capitalism and the modern society. Starting from the Industrial Revolution, the author discuss ideas, events and the evolution of the Sustainable Development principles in particular concerning and social concerns as a way to deal with challenges regarding quality of life on today's megalopolis. For Governance purposes regarding Sustainability, it is suggested the creation of an international network forum with appropriate representatives from the triple bottom line of sustainable development.

Key words: Sustainable development; Industrial revolution; Urbanization; Governance

1 Introduction

With advances and progress regarding capitalism, mass production, migration from rural to urban areas, and population growth, we find in the modern world the uprising of many converging social and environmental local and global problems and that did not exist on the past. According to a recent World Bank's report,^① nowadays there are 1.4 billion people living below the poverty line (what represents almost a quarter of the world population),^② at the same time, through the world, we see a lot of natural disasters that might very well come from climate change like the Hurricane Katrina, or as a result of present human unsustainable activities like the BP Gulf Oil Spill disaster. As a matter of fact we live a consumer society paradox with very high concentration of wealth and where almost one billion and a half are still living with 1,25 dollars a day, worst all and as indicated by Dupas (1998)^③ "The poor can't allow himself to be unemployed, he is almost obliged to be underemployed" so we are far from reaching social justice as indicated by the Basic Income Earth Network^④; moreover all this is happening in the context of a predatory consuming and production, that pollute and endanger the environment and critical ecosystems.

One of the most common social phenomena happening on developing countries is urbanization. More and more people come to live in large cities seeking for better jobs and better salaries and better living conditions. This means that cities must change its environment and develop the needed infrastructure to provide needed resources such as water, energy and so on for appropriate and healthy living conditions which may end up creating social and environmental problems (HENDERSON, 2000)^⑤.

It is time to plan again the cities, looking to the future, as we can see on the Brazilian

^① Poverty data: A supplement to World Development indicators 2008.

^② United States Census Bureau: the world population in April 2010 is 6,815,900,000 people.

^③ Dupas, Gilberto. The logic of the global economy and social exclusion. *Advanced Studies*, vol. 12, no. 34, Sao Paulo, Sep./Dec.1998.

^④ Source: <http://www.basicincome.org/bien/>, accessed on July 21, 2010.

^⑤ Henderson, Hazel. *Building A Win-Win World . Life Beyond Economic Warfare*. Berrett-Koehler Publishers, 1996.

sustainable platform. Cities will need to reinvent themselves to adapt to the proper parameters of carbon footprint and water footprint. Some are being transformed in the light of these new challenges. Emissions of greenhouse gases could become a fundamental variable for planning of economic activities in the coming decades. Encouraging the use of renewable energy sources must be part of public policy, given the concomitant actions to promote measures that aim to better use and enjoyment of natural resources^①.

When dealing with development in the present work, we will not go deep in just economics matters, such as GNP. This way, we hope to work with a new paradigm about this matter, founded in Dowbor's vision (2009)^② that supposes that GNP is limited, because it doesn't consider environmental issues, and also in the vision of Sem (2000), that relates the development with the intellectual capacity of people. In this way, we will adopt a basic definition of sustainable development, that means: "development that suits the present needs without compromising the capacity of the future generations to satisfy its own needs.", concept that is highly linked to environmental and human matters. As a matter of fact, and as indicated by the Stiglitz Report:

There is a huge distance between standard measures of important socio economic variables like growth, inflation, inequalities etc...and widespread perceptions...Our statistical apparatus, which may have served us well in a not too distant past, is in need of serious revisions.

About the future, must be highlighted that, says UN that in 2050 is expected that the world population may hits 9 billion people, which means that the social problems can get worse, if nothing is done particularly due to the fact of the poor-rich great widening gap.

Thus, the difficulty of establishing a relationship of dependence between these variables, poverty and population growth are described as indicators of unsustainable conditions, next to the intermittent pollution, threats to biodiversity, scarcity of resources and sources in steady decline. All these factors could lead to economic decline, political disruption, social disintegration and serious environmental deterioration. Thus, issues such as these must be related and understood in a global scale, still without an adequate treatment in the international forum with the effective power of decision and action, far beyond isolated measures at national borders. As a matter of and as indicated at The Stiglitz Report:

Coordination is essential to the success of the different actions currently being implemented by governments in response to the crisis because of the impact of individual policies will depend on actions undertaken by other countries. It is important that national government recognize that their policies will be more effective in protecting their citizens from the crisis if they are internationally coordinated"

As a way out to some problems that will be shown and debated in this paper, we will adopt the innovation combined with sustainable factor, because it's not enough just to innovate, environmental issues must be considered so that the development doesn't destroy our habitat. The innovation must be focused in solutions to the wasting of water and energy, creation of new non-polluting fuels, renewable energy sources and trash recycling, finding the balance between food production and environment. A good example, is the building of Eco-Neighborhoods, like BedZED, in London, England, a village, were its dwellers produce 56% less CO₂ than the average normal-neighborhood dwellers of the same country. Its a place were the buildings and urban infrastructure need 45% less electricity, 50% less water and 81% less heating than the average of other cities. At the same time, and because of

^① Source: <http://www.cidadessustentaveis.org.br/eixos/futuro>, accessed on July 24, 2010.

^② Dowbor, L. The debate on the GDP: we are doing the wrong account. Dowbor online. São Paulo, 2009.

urbanization process, there is a trend going on regarding developing and investing on fast train railways in many places including Brazil and China.

We can observe other best practices in some cities around the world, however, we will show few examples from Asia and Brazil, as the municipality of Chengdu, China, where they performed a comprehensive revitalization of urban settlements, or in Rizhao, another Chinese town, where they developed an extensive program of Solar Energy. In Japan we can also see a simple practice of water reduction, as in Tokyo, which is the world leader in water containing leaks, and the Master Plan of Kyoto, which articulates government, citizens, civil society and local authorities, building a net for the major policies to be implemented in Kyoto City up to 2010. This Master Plan was formulated on a basis of repeated discussions and opinion-sharing amongst many citizens and authorities who offered their time to sit on the Committee of the Master Concept of Kyoto City, with the goal of materializing a vision of “Peaceful Life” and “Prosperous City”. In the other side of the world, in São Paulo, the biggest city of Brazil, many sustainable projects are being created, as the program to create 100 new green areas around the city until 2012, another example is the “clean city law”, that return the city to its inhabitants, with values based on the right to live in a town that respects the urban space, the historic and architectural integrity of buildings, and the control of CO₂ emissions from vehicles through the “vehicle inspection program”, the city currently has a fleet of more than 6 million vehicles. ^① In the national level, we can say that Brazil also forward in the creation of clean energy, with new hydroelectric plants and wind farms, and various investments to create new bio-fuels. However, we must look to the future and reach new levels of sustainability.

So we can better understand the society that we live, we will debate about the Industrial Revolution, that changed a lot the habits and human values through the last centuries, emphasizing the consuming and throwing out society.

2 The Industrial Revolution and the Modern Life Crisis

With the industrial revolution, the first part happening by the end of the 16th Century, and the second just by the beginning of the 20th, between 1860 and 1914, made the factory way of working, with hand-made techniques and limits, be replaced by the industrial mechanization. In this way, the productive system radically changed increasing the production and the job offers, reducing the price and increasing the consumption. On the other hand a big change in social organization came along with the fast urbanization, the growing proletariat and also the creation of the first’s labor laws, all of this happening without concern regarding social, environmental and industrial sustainability.

During the 19th Century, the big organizational empires rise, driven by this changing process that may be summarized this way: new technologies and transformation in the work environment and in the society, which influenced the economy, the culture and the environment. What is even more worrisome is the fact that according to the Institute for Policy Studies, of the 100 largest economic units 51 are multinationals and 49 are countries^②, this means that important decisions may be moved more by seeking profits than improving social and environmental conditions.

According to Cipolla (1978)^③, the industrial revolution may be considered as an historic process that lead to the replacement of the hand-working tools by the machines. Machines were the basic innovation needed for material development from that time on.

^① ERKENS, Rainer (Org). New Public Management. Friedrich Naumann Brazil Institute. São Paulo, 2010.

^② Source: <http://www.corporations.org/system/top100.html>, accessed on July 21, 2010.

^③ Cipolla, Carlo M. The Economic History of World Population. 7th.ed., Pelican Books, 1978.

Driven by scientific research and new models of production and management, factories started providing people with a wide range of materials, products and brands. And that changed daily routines as well as social relations.

Western Industrial Revolution started in England, on the second half of 18th Century. Been extremely benefited by the accumulation of money that strengthened the capitalism and ended the mercantilism's capital arrogance over the industrial's (MANTOUX, 2006) ①.

According to Cipolla (1993) ②, the industrial revolution process, may be considered as consisting of the following steps:

(1) 1760 to 1850: The industrial revolution started in England with the production of consumer goods, especially textile using steam-produced energy.

(2) 1850 to 1900: A period of the industrial expansion through the world, getting close to European countries like Belgium, France, Germany, Italy and Russia, and also the non-European countries USA and Japan. In this stage the competition between the countries grew a lot, the industries of factory-goods and the railroad too. New energy sources arise, like hydroelectric and the oil derivate fuels, and also a lot of improvements in the transportation railways and iron steamships.

(3) 1900 to 1980: Multinationals began. Producing starts to become automated, the serial-production began too, and together came the mass-consuming society. At the same time there was a lot of improvements in the communication area, and new sectors are created, like the chemistry and the electronic industry, the genetics engineering, and also robotics.

(4) 1980 until today: The revolution moves even more to technological and widen its divisions, one of its bigger and most important: informatics.

As a matter of fact Cipolla (1993) ③ mentions that already in 1733 John Kay's developed its flying shuttle. It was basically, adapted old textile machines, so it could produce more in less time, so far the weaver could only work with a tissue as wide as his own arms. Moreover by 1767 James Hargreaves developed equipment that made possible to the weaver to work with 80 strings at the same time, although they could get thin and fragile. So then it comes Sir Richard Arkwright, considered the father of the modern industrial factory system, developed the industrial cotton spinning mill that was moved by water and steam energy, was more economic, and produced thick and strong strings. This way, the workers started having a living wage submitted to the capitalists who were the owners of the media manufacturing (Hobsbawm 1999).

As said before, another important consequence of the industrial revolution was the fast growing of cities, due to peasants migrating to the cities looking for a job in industries; as a matter of fact already by 1800 London had almost a 1 million people living there (Hobsbawm 1999) ④. In Brazil Dupas (1998) ⑤ shows that, according to census 1980 / 1991 / 1996, the ongoing deflation on the field and the explosion of the little and medium cities, along this period.

Due to the progresses that were happening, especially transportation, cities became more independent from its surroundings, because the food to its growing number of inhabitants could be transported from longer and longer places. Simultaneously, the need of workers in the factories also grew up continuously. The urbanization was both a cause and effect of the Industrial Revolution. As an example one may London that grew from 45

① Mantoux, Paul. *The Industrial Revolution in The Eighteenth Century*, Routledge, 2006.

② Cipolla, Carlo M. *The Emergence of the Modern Age*. In: *Before the Industrial Revolution* 3rd ed. Rutledge, 1993

③ Ditto↑

④ Ditto↑

⑤ Op. Cit. Dupas, 1998.

thousand to 865 thousand habitants between the 15th and 19th centuries. At the same time the world urban population also grew a lot: in the beginning of the 19th century there was 20,3 million people living in cities, that represented 3% of all the world's population, in 1900 that number was already reaching 224,4 million people, what represented 13,6% of the world's population; in 1950 was already 729 million people (28,8%), in 1980 there was 1,82 billion people living in cities, 41,1% of the world's population^①; and today more than 50% of world population already lives in cities and according to the UNHABITAT it may grow to 70% in the next two decades^②.

Regarding social conditions and employment, at the early stages of this process there were children working in factories; and although they received a smaller salary, they used to work just like the adults. It's very important to highlight that the textile industry was almost 50% off the working mass. The other types of industries used to hire children with 6 years old or less, and the working time was of 16 hours per day. There were no social benefits for the workers, and no labor rights such as: vacation, weekend, unemployment insurance, 13th salary and etc. And also the working local conditions were sometimes very dangerous (Hobsbawm 1999)^③.

It was very common not to have windows in the factory, making it easy for diseases to spread. Hence one may conclude that workers were always in danger, and moreover mid-class lifestyle was very low (Cipolla 1993)^④.

It's highlighted that mechanization lead craft workers lost their jobs, or their salary even lower.

No wonder it was at that time that started many working movements fighting against machine-based manufacturing. The working classes pressure was increasing making the dominant classes create laws that ensure the sub-existence of the unemployed people. The riots and conspiracies were frequent, mostly because of the hunger that came with the food price raising (HENDERSON, 2006)^⑤.

By 1811 a strong protest and riots started by the so called Luddites defined as: workers against machines; and that may eventually lead to the starting of trade unions. Finally in the 1830s and 1840s the first large scale organized working class political movement which campaigned for political equality and social justice was started; and the so called chartist movement slowly gains strength and finally gave rise to the Labor Party. By the way in Brazil the labor party was only born in 1980.

Cipolla (1993)^⑥ highlights that the most organized workers were the ones with some kind of specialization such as the wool combers that were able to get some rights like paying the funeral of a worker or relative. From this on, a new disposition was created; and Unions started to get strong and organized, and they eventually conquered the abolition of the children work, the limitation of 8 hours of work per day and the right to strike.

3 Rethinking the Development Aspects, a Look to the Future

Eventually and as a result of social and environmental impact of the industrial revolution slowly a reaction movement started questioning the development vision, that so

^① Landes, David S. *The Unbound Prometheus. Technical Change and Industrial Development in Western Europe from 1750 to the Present.* Cambridge Univ. Press 2nd.ed. (2003)

^② Source: <http://www.unhabitat.org/pmss/listItemDetails.aspx?publicationID=2960>, accessed on July 21, 2010.

^③ Op. Cit. Hobsbawm, 1999.

^④ Op. Cit. Cipolla, 1993.

^⑤ Henderson, W. O. *The industrial revolution on the continent, 1800-1914,* Routledge, 2006.

^⑥ Op. Cit. Cipolla, 1993.

far was founded in profit and short-term initiatives, disregarding social needs and the preservation of the habitat to the next generations worldwide; as a matter of fact UNDP was only started on 1965 and UNEP in 1972; which eventually gave rise to the Sustainable Development vision, in particular to the Brundtland's Report^①. The Report was prepared by the World Commission on Environment and Development as part of a series of initiatives, prior to Agenda 21, which reaffirmed a critical view of the development model adopted by industrialized countries and played by developing nations, and that highlight the risks of overuse of natural resources without considering the carrying capacity of ecosystems.

The report points to the incompatibility between development and sustainable patterns of production and consumption as established by the Environmental and Development World Conference in 1991, hence defining sustainable development (or sustainable growth) as “development that meets present needs without compromising the ability of future generations to meet their own needs.”

However, we realize that for many people, especially in developing countries, basic needs of the present, such as food, water, clothing, housing, employment, are yet from being met, which in particular leads to income distribution problems become a mayor social ill. The report points to the incompatibility between development and sustainable patterns of production and consumption as established by the Environmental and Development World Conference in 1991, hence defining sustainable development (or sustainable growth) as “development that meets present needs without compromising the ability of future generations to meet their own needs.”^②.

Schumpeter (1908, p. 212)^③ highlights that:

The importance of the bread is not measured by how much bread there is on a country or in the world, but its measured by how much bread you have for yourself, and that depends on the total quantity of bread.

On this field, we will also find the concept of “Social Innovation”, which aims at increasing the effectiveness of processes, services and products related to satisfaction of social needs. It is seen as the creation and use of technologies, processes and unique methodologies that may be built in coping with social problems (PASSONI, 2010)^④. Social technologies in turn, is the inclusion of civic values, participation, affordability, sustainability, promoting wellness, innovation, and includes products, technical or replicable methodologies developed in the interaction with the community and represent effective solutions for social transformation (OLIVEIRA, 2010)^⑤. So, we must use “Science and Technology to mobilize, through innovation, the social energy needed for sustainable development and sustainable societies” (BRITO, 2010)^⑥

Yet, beside the basic needs previously shown, it's clear that people are always looking for an improvement of conditions and quality of life

^① Brundtland Report is the document entitled Our Common Future, published in 1987, and initially prepared by the World Commission on Environment and Development (WCED).

^② Brundtland Report is the document entitled Our Common Future, published in 1987, and initially prepared by the World Commission on Environment and Development (WCED).

^③ Schumpeter, Joseph A. The Nature and Essence of Theoretical Economics. 1908.

^④ Passoni, Irma. Social Technologies. In: Parallel Session: Axis IV. Science, Technology & Innovation for Social Development. Brasília, DF, 2010.

^⑤ Oliveira, J. D. The role of social technologies as public policies for sustainable development. Brazilian Bank Foundation. 2010.

^⑥ Brito, Lidia. STI Challenges in a changing world: Ideas for reflection. UNESCO, 4th CNCTI - Session 6. Brasília, 28th of May 2010.

(GENOV, N. 2004)^①; hence sustainable development goals must be attained for all and everywhere. The question is how fast this may be done. In China government decide to seek a development model of prosperity for all, but some first than others; and the pace the government decide according to context (NAISBITT, 2010).

Sustainable Development implies however lots of conditions: A rational society, clean industries, inserted in the so called economical growth, that is, attach to it what looks like fitting it. Yet, it needs to cover the satisfaction of the present needs, the attending of the needs of the poor part of the society and at the same time the preserving resources and conditions so that next generations to suits their own needs. Many times this seems to be incompatible since economic growth may depend on non-renewable resources. Over the next half century, most of the population growth will take place in the poorest regions of the world and the social and environmental strains will be enormous. Birth rates on developed countries keep falling down and population is aging rapidly.

Hence global growth is possibly the great challenge to sustainable development goals that needs to care also of natural and human resources; so the challenge ahead is how to improve today living conditions for 2/3 of world population without destroying the environment and their health. This is becoming critical nowadays particularly due to globalization and fast development of countries like China with is booming economy and growing impact on the environment; on the other hand the limits of the so much needed green revolution are becoming clear in India as declared by Amrita Chaudhry, an

Agriculture Correspondent with The Indian Express newspaper:

The balance sheet of the Green Revolution is that, yes, we are feeding the mouths. India no longer has to ask for food aid from other nations. But the fact is we are paying a very heavy price for agriculture at this present moment. Punjab is one of the biggest user of pesticides in India, and they have leached into our subsoil water. We have had babies born blue because they are not breathing. Some of them have mental health problems. In the south-western belt, we have entire villages where each family has at least one or two cancer cases. All this is all because of this intensive agriculture that we have been doing^②.

Goals hence need to be established, and in Brazil Mininni Medina is suggesting to focus the following items (2001)^③:

(1) Sustainable Agriculture: based on the transformation of today's predatory development model and in the soil occupation and production healthy policies, commercialization priorities and rural credit investments;

(2) Sustainable Cities: targets related to the urban places appropriate to the human activities development, with good housing conditions, transportation, leisure and etc;

(3) Sustainable infrastructure: targets making energy sources non-wasteful and efficient, and investments in technology to produce clean and alternative renewable energy;

(4) Reduction of the social inequalities: targets minimizing the extreme poverty, giving people access to resources (social inclusion) and decrease the poor-rich gaps;

(5) Science and Technology: the economic, social and environmental sustainable development requires huge investments in science and technology, for this to happen, is necessary more investments in education and research on innovation focusing sustainability.

^① Genov , N. Advances in Sociological Knowledge VS Verlag 2004.

^② Source: http://news.bbc.co.uk/2/hi/in_depth/6496585.stm, accessed on July 21, 2010.

^③ Mininni-Medina, N. Papers on Environmental Education. In.: LEITE, Ana Lucia Tostes Aquinas; MININNI-MEDINA, Nana. Environmental Education (Basic course at a distance) Documents and Legislation of Environmental Education. 2. ed, v. 5. Brasilia: Ministry of Environment, 2001.

Actually Brazil is already moving forward developing official policies for Climate Change-PNMC. Those policies establish principles, objectives, directives and instruments to reduce and control the climate change. ^①

4 Government, Companies and Civil Society: Building a Sustainable World

Sustainable development depends on a proper interaction among the social, economic and environmental aspects; as indicated by the Triple Bottom Line, which is known as the tripod of sustainability or “PPP” ^②:

(1) People - Refers to the treatment of human capital of a company or society: fair wages, adequate labor legislation and pleasant working environment. It is also essential to pay attention to the effects of economic activity in neighboring communities to the enterprise.

(2) Planet - Refers to the natural capital of a company or society. It is the environmental leg of the tripod. Here it is important to consider the short, medium and long term. Initially, virtually all economic activity has environmental consequences. In this respect, the company or the company should think of ways to mitigate and compensate. Should be taken into consideration the adequacy of environmental laws and various principles discussed today as the Kyoto Protocol.

(3) Profit - This is a positive economic result in a company. This leg of the tripod must take into account the other two aspects.

Below we have an image that illustrates each “P” in one circle, forming the Triple Bottom Line, as Figure 1.

Hence the need to seek and implement ways to integrate corporate (shareholders), societal and environmental interests. WIN-WIN common interests may now depend on the development of a New Common Sense and of course of good-will of all the parts involved where in particular economic efficiency should be considered more relevant than plain business profitability. Social balance and environmental concerns should be part of this New Deal; in particular environmental sustainability should be driven by innovating on the appropriate use renewable resources, yet allied with the awareness of consumption and waste disposal, generation of clean technologies, as well as design and consolidation of well implemented policies for environmental and social protection. Many initiatives are now becoming know all over on this time of great concern, in particular as a result of a lack of the so much needed Global Governance as may be seen by the failure of the recent UN Climate Change Conference COP15; an important one besides the Stieglitz Report mentioned earlier is by the founder of the Earth Policy Institute Lester Brown called Plan B4.0 : Mobilizing to Save Civilization giving suggestions regarding renewable energies, recovering nature, saving water and feeding everybody.

5 Final Conclusion

As we move more and more into the Network Society, thanks in particular to fast advances on Communication and Information Technologies, and global concern keeps growing the possibility of Planetary Citizenship becomes more plausible; and is becoming more likely that civil society may self-organize better and better^③; and social and environmental leaders may be able to influence directly public opinion and politics, and even the corporate world helping to define and monitor quality of life and well-being local and

^① Source: http://www.mma.gov.br/estruturas/208/_arquivos/pnmc_in_english_208.pdf, accessed on July 26, 2010.

^② Triple bottom line: People, Planet, Profit.

^③ Source: <http://esango.un.org/civilsociety/login.do>, accessed on July 21, 2010.

global goals related to sustainable development private and public policies, as may be seen with International Council for Local Environmental Initiatives^①, the UNHABITAT Planning for Sustainable Cities Policy Directions^② or even the very recent VISIONS 2050 of The World Business Council for Sustainable Development^③.

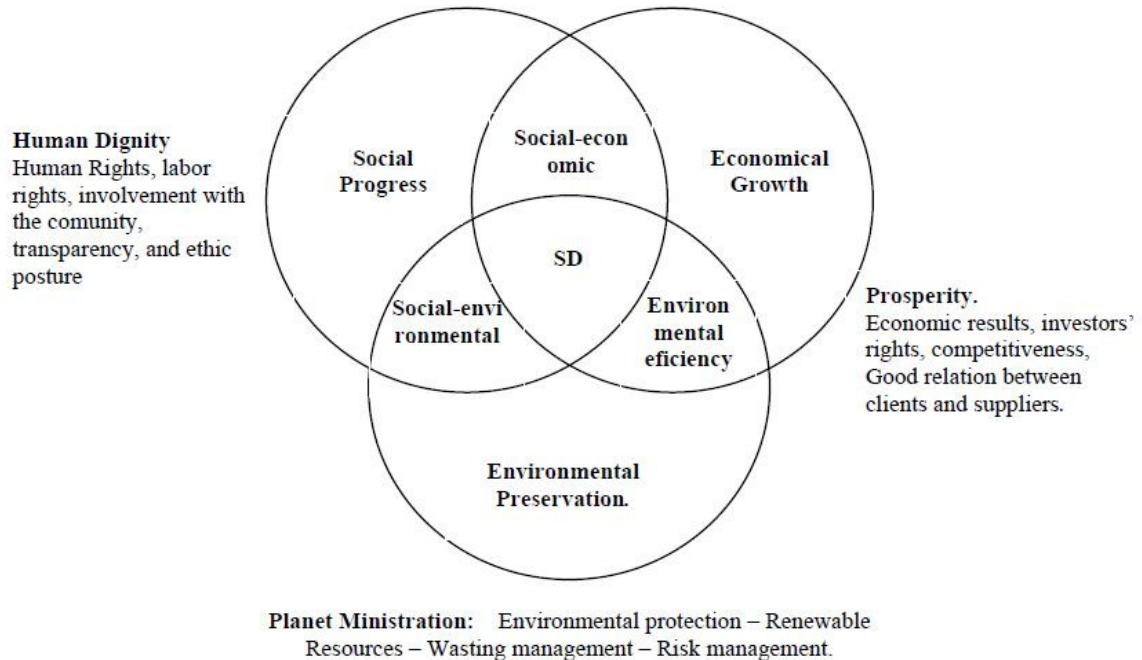


Figure 1 - The Illustration of Each “P”

No doubt that recent financial crisis, climate change and environmental disasters and geopolitical and economical power shifts may force to move faster to overcome great challenges of present day particularly regarding ethics, social responsibility and global governance. Signs for this process of planning, implementing and monitoring transformations well-being processes to be on its way, may be seen through the advances on the MDG of the UNDP^④, the Agenda 21^⑤ and the Johannesburg Plan of Implementation of the Division for Sustainable Development of the UN Department of Economic and Social Affairs^⑥.

On the other hand tools for Social Networks keep on developing helping to build up a kind of Global Brain, so that new ideas (best practices) for solving problems may be share globally on real time creating also a Global Hearth Sharing and Caring. Actually the MIT

^① Source: <http://www.iclei.org>, accessed on July 21, 2010.

^② Source: <http://www.unhabitat.org/pmss/listItemDetails.aspx?publicationID=2838>, accessed on July 21, 2010.

^③ Source: <http://www.wbcsd.org/Plugins/DocSearch/details.asp?DocTypeId=25&ObjectId=MzczOTc>, accessed on July 21, 2010.

^④ Source: <http://www.un.org/millenniumgoals/>, accessed on July 21, 2010.

^⑤ Source: http://www.un.org/esa/dsd/agenda21/res_agenda21_00.shtml, accessed on July 21, 2010.

^⑥ Source: http://www.un.org/esa/sustdev/documents/WSSD_POI_PD/English/POIToc.htm, accessed on July 21, 2010.

SOL group of Peter Senge, has been working with a process called Presence^① that gives a hint of how may be possible to move forward developing ideas in a new co-creative collaborative way. This may be crucial to overcome the great challenges of sustainable development ahead.

References

- [1] Brito, Lidia. STI Challenges in a Changing World: Ideas for Reflection. Unesco, 4th CNCTI - Session 6. Brasilia, 28th of May 2010
- [2] Lester Russed Brown. Plan B4.0: Mobilizing to Save Civilization [M]. New York W.W. Norton, 2009
- [3] Carvalho, O.; Viana, O. Eco-development and Ecological Balance: Some Thoughts on the State of Ceara[J]. Revista Econômica do Nordeste,1998,29(2)
- [4] Castells, M. The Rise of the Network Society, [M]. Oxford Blackwell, 2000
- [5] Catalisa - Cooperation Network for Sustainability. The Concept of Sustainability, Sustainable Development, 2005[EB/OL]. <http://www.catalisa.org.br/>
- [6] Carlo Maria Cipolla. The Economic History of World Population. 7th.ed[M]. London:Penguin Books, 1978
- [7] Dowbor, L. The Debate on the GDP: We are Doing the Wrong Account. Dowbor online. São Paulo, 2009
- [8] Dupas, Gilberto. The Logic of the Global Economy and Social Exclusion[J]. Advanced Studies, 1998, 12(34)
- [9] Erkens, Rainer (Org). New Public Management. Friedrich Naumann Brazil Institute. São Paulo, 2010
- [10] Hazel Henderson Hazel. Building a Win-Win World: Life Beyond Economic Warfare [M]. San Francisco Berrett-Koehler Publishers, 1996
- [11] Nikocai Cienou , N. Advances in Sociological Knowledge [M]. Wiesbaden: VS Verlag 2004 [12] Henderson W. O. The Industrial Revolution on the Continent,[M].New York: Routledge, 2006
- [13] E.J Hobsbawm. Industry and Empire: The Birth of the Industrial Revolution. rev. ed[M]. New York: New Press, 1999
- [14] David S Landes. The Unbound Prometheus: Technical Change and Industrial Development in Western Europe from 1750 to the Present[M]. Cambridge Cambridge Univ. Press,2003
- [15] Mantoux, Paul. The Industrial Revolution in the Eighteenth Century [M].New York: Routledge, 2006
- [16] Mininni-Medina, N. Papers on Environmental Education. In.: LEITE, Ana Lucia Tostes Aquinas; Mininni-Medina, Nana. Environmental Education (Basic Course at a Distance) Documents and Legislation of Environmental Education. 2. ed, v. 5. Brasilia: Ministry of Environment, 2001
- [17] John Naisbitt. China's Megatrends: The 8 Pillars of a New Society[M].Beijing:Tian Xia Wen Hua, 2009
- [18] Oliveira Filho, Jaime E. Environmental Management and Sustainability: An Eco-economic Paradigm for Modern Organizations[EB/OL]. http://fbb.br/downloads/domus_jaime.pdf
- [19] Oliveira, J. D. The Role of Social Technologies as Public Policies for Sustainable Development. Brazilian Bank Foundation, 2010
- [20] Passoni, Irma. Social Technologies. In: Parallel Session: Axis IV. Science,

^① Source: <http://www.presence.net/>, accessed on July 21, 2010.

Technology & Innovation for Social Development. Brasília, DF, 2010

[21] Philippi, Luiz Sérgio. The Construction of Sustainable Development. In.: LEITE, Ana Lúcia Tostes de Aquino; Mininni-Medina, Naná. Environmental Education (Basic Course at a Distance) Environmental Issues - Concepts, History, Problems and Alternative. 2. ed, v. 5. Brasília: Ministry of Environment, 2001

[22] Joseph Alois Schumpeter, Joseph A. The Nature and Essence of Theoretical Economics[M]. New Brunswick: Transaction Publishers,2010

[23] Sen, A. Development as Freedom[M]. Translated by Laura Teixeira Motta and Technical Review of Doninelli Ricardo Mendes. São Paulo: Companhia das Letras, 2000

[24] United Nations, Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat. World Population Prospects: The 2008 Revision. New York: 2009

[25] World Bank. World Development Report 2000/2001: Attacking poverty. Washington: World Bank, 2001