THE SUSTAINABILITY OF A NATION´S ECONOMY: AN ANALYSIS FROM THE PERSPECTIVE OF INTERNATIONAL INDICATORS

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ABSTRACT

This paper examines sustainability performance of the Mexican economy from the perspective of three international indexes. Information were gathered from reports published by: Environmental Performance Index, Global Green Economy Index, Carbon Monitoring for Action and the National and Latin-American indexes. The objective was to determine Mexico's levels of performance in each index analyzed and contrast these performances with research results obtained in the northern part of the country. This research used an exploratory and descriptive approach to analyze information obtained from databases. Among the main conclusions, is identification of the most important programs and polices needed for the improvement of the country´s sustainability performance.

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KEYWORDS: Sustainability Performance, Economy, Measurement

INTRODUCTION

Environmental sustainability is a key factor for the development of humankind in the XXI century. All countries need to ensure the quality of its natural resources, ecosystems and species diversity, to maintain a sustained quality of life. However, as the world population continues to grow, the consumption of materials and production technology intensifies, which impacts quantity and quality of natural resources available (Vlek, 2007). For over a decade, several international organizations have invested immense resources and efforts to measure the performance of nation's environmental sustainability. The countries selected for this study have identified the benefits of measuring performance. However, measures of sustainability do not constitute a parameter of success on the road to sustainable development. It is necessary to consider all elements needed to determine how development helps exceed the minimum quality of life levels.

Analysis of official data released by the National Institute of Statistics, Geography and Informatics (INEGI), The Ministry of Environment and the National Institute of Ecology (INE), shows sufficient basis to suggest that México has devastated natural resources with impunity and in dramatic magnitudes. INEGI estimates that, among the countries belonging to the Organization for Economic Cooperation and Development (OECD), the tentative costs of such destruction, represents ten to thirteen percent of the Gross Domestic Product (GDP) generated for the last decade of the past century and close to 11 percent for the first decade of this century. (INEGI, INE, Tijerina, 2002). Real economic growth registered in México in those years, would be negative: between -4.3 and -6.7 percent (INEGI, 2013). At the end of the past century (Hart, 1995, in Senise, 2008) emphasized the need to initiate a drastic change in economic activities, to avoid irreparable damage to basic ecological systems of the planet and ensure ecological sustainability (Senise, 2008). In the context of international cooperation, several agreement have been reached, including those generated in the United Nations Framework Convention on Climate Change to promote climate change mitigation actions (COP-15). According to the México´s National Institute of Ecology (INE), 2009 Copenhagen Summit text, establishes an overall goal of warming by no more than

2°C. It also points out that to achieve this goal, developed countries should reduce their emissions by 25-40% below 1990 levels by 2020 and 80-95% by 2050. The text also indicates that developing countries should achieve a significant reduction in emissions. Another significant agreement reached in this summit, is related to financial support to participating countries, which includes funding in the short and medium term in the range of 30 to 100 billion dollars annually by 2020 (INE, 2010). Table 1 highlights the commitments announced by emerging economies in COP-15.

Table 1: Emission Reduction Commitments Announced by Emerging Economies in COP-15

Country	Proposed Reduction	Remarks
Brazil	36-39% reduction of its emissions compared to BAU (Business as Usual) in 2020	Conditioned to have financial support
South Africa	26% reduction of its emissions compared to BAU in 2020	Up to40% conditioned to have financial support
Indonesia	34% reduction of its emissions compared to BAU in 2020	Conditioned to have financial support
South Korea	30% reduction of its emissions compared to BAU in 2020	Supported with own resources
China	40-45% reduction of its emissions in 2020, compared to 2005	
India	20-25% reduction of its emissions in 2020, compared to 2005	
México	10% reduction of its emissions compared to BAU, supported with own resources	Up to 30% Conditioned to have financial and technological support

This table shows commitments declared by emerging economies, declared towards the end of 2009, during the United Nations Climate Change Conference in Copenhagen – COP15, México is included in this group. During the Summit, participants established that developing countries in general and emerging economies in particular, declare their Nationally Appropriate Mitigation Actions (NAMAS).Adapted from INE, 2010.

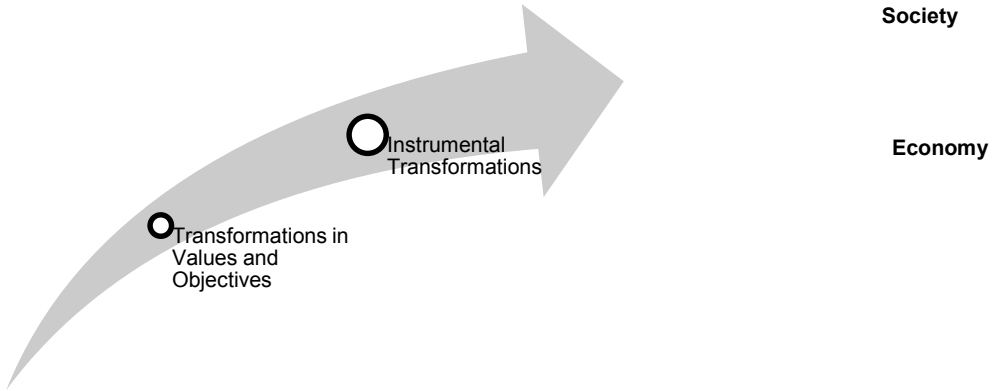
Although a plethora of authors address the issue of sustainable development from many perspectives – political, social, economic, geographic, to name a few – there are few publications that address country performance from the optic of how international organizations measure national economies, considering all levels and scopes of sustainable development. This paper presents a descriptive analysis of scores obtained by México in the international sustainable performance indexes.

LITERATURE REVIEW

The global economy is in a period of decline, requiring urgent review and reconsideration. This change imposes co-evolution between ecosystems, human society and lifestyle within a limited period. The local and regional approach takes a role and responsibility in the success of the process that has no precedent in the economic development history. However, the local and regional approach requires interspatial tuning and cooperation in the path to transform a society, to mobilize it to the acceptance and incorporation of sustainable behaviors, and to be committed to the overall economic process development from the perspective of ecological sustainability (Pulido, 2003).

Initiatives promoted by governments whose strategies include environmental care and innovation, can be of three types: those aimed at reducing the impact on the environment, those that seek to solve environmental problems and those aimed to the development of policies and initiatives to promote eco-efficient actions. (Ramus, 2001). From an analytical and strategic perspective, sustainable economic development is conceived as a process of global structural change involving the transformation of economy and society, both in means (Instrumental) and ends (values and objectives). The basis of this transformation is on the development of strategic capabilities, both economical and extra-economic in nature (Carpi, 2008). Figure 1 shows these relationships.

Figure 1: Economic Development as a Process of Global Structural Change



This figure shows the stages of the process of structural change applied to economic development. It initiates with a level of deep transformation, followed by the instrumental transformation stage (the building of capabilities level) and its impact on society and economy. Own elaboration, based in Carpi, 2008

Empirical data and field studies from Nicol et al.,1999, Humphreys, 1994, and Goñi, 2006, provide a basis for understand how people from different cultures approach and grasp the meaning of the environment as an instrument of comfort, conditioning the way they relate, manage, value and maintain natural resources. From this point of view, we understand the different responses given by different societies to approach the issue of responsible and sustainable environmental management (Chappells, 2005). Goñi (2006) establishes that the conceptual framework discussion of sustainable development should evolve from a formality, to a concept of sustainability applied to society as a whole, not only to specific sectors (e.g., environment, politics, and economics). From this perspective, real sustainable development occurs when society becomes its final beneficiary.

Measures of sustainability considered more strictly "environmentalist", do not constitute a parameter of success on the road to sustainable development, if they do not consider how this development helps exceed the minimum levels of quality of life. The main benefit of measuring performance, relates to improvement in the way participants identify the level of compliance with issues of the indexes in which they participate. Equally important, is that they obtain information regarding their performance, compared with other participants in the measurement exercise. Finally, the data facilitates decision maker's work of designing a public policy framework, to allow the country to address its strategic actions, to improve operation of its structural programs. These advantages have the power to trigger participation and assimilation of the dynamics of performance measurement, as well as to promote and improve the performance of the structural processes, by directing efforts to make better use and management of the Country´s natural resources. Likewise, the country can improve its sustainability and the quality of life of the population. In the classic model of economic development, ecosystems are unending economic goods.

Therefore, the methods used by these models, are not effective for managing most natural resources required for the development of welfare and quality of life. This limitation gives space for emerging alternative economic models. One such model is the so-called "green economy" (Campos, 2011). The green economy concept refers to the use of a set of production models that takes into account integrated, comprehensive environmental and social variables. From this perspective, such an economy produces low carbon emissions, uses resources efficiently and is socially inclusive (UNEP, 2011). The ultimate goal in implementing a green economy model is to improve living conditions of the poor and to reduce social inequality, environmental risks and ecological degradation.

According to Campos (2011), the green economy approach, does not differ from laws governing the market and free trade. It only transcends traditional production method, by means of incorporating social and environmental variables. The concept of "green economy" is not a substitute for the concept of sustainable development, as this is much broader and is a global development model. There is evidence to that sustainable development in not possible without a correct and appropriate economy. In that sense, the green economy becomes a tool to achieve sustainable development and not a synonym or a rival. Green economy recognizes and demonstrates the value of natural capital and seeks to increase it.

METHODOLOGY

The method used in this research was exploratory, longitudinal, non-experimental and descriptive. Information considered for the analysis is from reports published by organizations responsible for the indexes taken into consideration to achieve the objectives established. An analysis of documents was done to determine the level of country performance. The EPI 2008, 2010 and 2012, published by the University of Yale, were reviewed as well as the 2010 report of the Carbon Monitoring for Action (CARMA) and the 2012 International Competitiveness Index (ICI), published by the Mexican Institute for Competitiveness (IMCO)

RESULTS AND DISCUSSION

This section presents the analysis reports reviewed. We summarize key findings regarding performance of México on environmental sustainability. CARMA (Carbon Monitoring for Action), is a database that manages information to monitor carbon dioxide emissions of more than 50,000 energy generation plants and 4,000 companies around the world. They are the first global inventory of environmental emissions by power energy generation which is responsible for over 25% of CO2 emissions worldwide (CARMA, 2012). Table 2 shows selected results of this study, including the performance of Mexico.

Table 2: Select List of Countries That Produce CO2 Emissions from Power Energy Generation

Pos.	COUNTRY	Tons. C02	% Fossil Source	%Hidro Source	%Nuclear Source	% Other Source of RE
1	China	2000: 1,260,000,000	79.61	18.63	1.23	0.18
		2011: 3,120,000,000	82.51	14.51	2.02	0.12
		Future: 5,000,000,000	72.66	19.25	6.68	0.16
2	U. S.	2000: 2,700,000,000	65.88	7.34	20.21	4.14
		2011: 2,820,000,000	68.79	6.57	18.4	4.39
		Future: 3,520,000,000	70.51	5.71	16.86	5.08
3	India	2000: 2,700,000,000	78.39	14.15	2.86	0.79
		2011: 2,820,000,000	76.3	16	2.41	1.6
		Future: 3,520,000,000	77.25	15.33	3.04	0.75
12	Canada	2000: 171,000,000	27.62	52.29	10.17	2.09
		2011: 172,000,000	26.29	49.91	11.95	4.28
		Future: 203,000,000	25.37	49.96	9.62	8.06
16	México	2000: 79,100,000	69.55	19.23	4.58	4.95
		2011: 102,000,000	73.16	13.34	4.66	5.82
		Future: 140,000,000	75.87	12.07	3.66	5.91

Table 2 shows that México is the 16th economy contributing to the emissions of CO2 to the environment. It also shows how in the near future the country will continue generating CO2, given its dependence on fossil sources and the slow growth in the development of renewable sources of energy generation. Source: http://carma.org/

The Environmental Performance Index (EPI), measures the effectiveness of national environmental protection efforts in participating countries. The indicators focus on measurement of outcomes, rather than policy development. The EPI core objectives are Environmental Health, which measures the stressors and their impact on human health; and Ecosystem Vitality, which measures health of the ecosystem and natural resource management. Table 3 shows the EPI components. Table 4 shows the performance of countries on the EPI score. Table 5 shows Mexico's EPI ranking from 2008-2012.

Table 3: Components of the EPI

	CORE OBJECTIVES	POLICY CATEGORIES	PERFORMANCE INDICATORS
EPI	ENVIRONMENTAL HEALTH	Environmental Health	Child Mortality
		Water (Effects on Human Health)	Access to Sanitations Access to Drinking Water
		Air (Effects on Human Health)	Particulate Matter Indoor Air pollution
		Air (Ecosystem Effects)	SO2 per Capita SO2 per GDP
		Water Resources (Ecosystem Effects)	Change in Water Quantity
	ECOSYSTEM VITALITY	Biodiversity and Habitat	Critical Habitat Protection Biome Protection Marine Protected Areas
		Agriculture	Agricultural Subsidies Pesticide Regulation
		Forests	Forest Growing Stock Change in Forest Cover Forest Loss
		Fisheries	Costal Shelf Fishing Pressure Fish Stocks overexploited
		Climate Change and Energy	CO2perCapita CO2 per $GDP CO2 per KWH Renewable Electricity

This table shows variables considered in the generation of the Environmental Protection Index: Environmental Health (EH) and Ecosystem Vitality (EV). The dimensions considered for each variable are 3 for EH and 7 for EV. The last column of the table contains indicators developed to measure each dimension considered in the EPI. Source: Emerson, 2008, 2010, 2012.

Table 4: Country´s Performance in EPI Core Objectives

EPI	CORE OBJECTIVES	SCORE 2008	SCORE 2010	SCORE 2012
MÉXICO	ENVIRONMENTAL HEALTH	91.3	76.63	64.1
	ECOSYSTEM VITALITY	68.3	58.06	42.7

The data in table 4 and 5 shows how Mexico has decreased in the capacity to measure the health of the ecosystem and natural resource management as well as in the overall performance ratio. Source: data from Emerson (2008, 2010, 2012)

Table 5: México´s Ranking in the EPI 2008-2012

Year	Sample*	México´s Rank	EPI Higher Score	EPI Lowest Score	México´s Score
2008	149	47	95.5	39.1	79.8
2010	163	43	93.5	32.1	67.3
2012	132	84	76.7	25.3	

This table explains the performance of Mexico in the EPI. The first column indicates the year of the reports reviewed; the second column indicates the total of countries included in the sample per year; the third column shows how México Ranked; the fourth and fifth column indicates the higher and lowest score in the EPI, respectively and in the last column is the Country´s EPI score. Source: www.epi.yale.edu.

The Mexican Institute for Competitiveness (IMCO), in its International Competitiveness Index, 2011 (ICI), measures the performance of 46 countries from information obtained from the World Bank. The analyses of the ICI are presented disaggregated into ten sub-indexes. The analysis in this paper focuses on results reported by the IMCO in the ICI sub-index named: Sustainable Management of the Environment (SME). According to ICI (2011:294), this sub-index evaluates environmental conservation status, as well as the rate of degradation of key environmental assets and their interaction with production and consumption activities. Therefore, this indicator considers the overall sustainability and the environment prerequisites for growth and long-term sustainable development. The following table summarizes the ICI sub-indexes and highlights the SME, given the interest of this research The IMCO (2011), reports declines in the performance of the Mexican economy. These declines are present in three of its 10 sub-

indexes between 2007 and 2010. These declines are as follows: The Functional and Stable Political System sub-index fell 8%. Sustainable Management of the Environment worsened by 7%. According to Emerson (2012), this decline is due to an increase in ecological tragedies in the country, as there was a greater loss of forest area. At the same time, México continues to increase water consumption and carbon dioxide emissions. These four factors combine to worsen the county´s environmental condition. The Law system reliable and objective, shows a 2% decrease.

CONCLUDING COMMENTS

México´s environmental performance, remains one of the ballasts for its competitiveness. The decline in performance occurred despite the fact the country itself improved in some of the indicators of the sub-index. However, information presented here indicates the country has worsened in ranking as well as score relative to the rest of the world. Even so, over the four year of the reports, it shows more progress lags, implying it is not moving quickly enough to improve its competitiveness in the long term. The ability to be environmentally friendly, includes more than just the presence of skills for action, it also includes the decision to act, beliefs to support actions favorable to conservation, as well as attitudes to promote sustainable development (Baldi and García, 2005). The IMCO (2011), argues México will face the following challenges: reduction of the emissions intensity in CO2; adoption of more sources of clean energy; drastic and radical changes to stop biodiversity loss and better strategies in water management. While the country´s environmental future is not encouraging, it is important to take immediate actions to provoke the structural changes needed to accelerate improvement of the performance.

Table 6: México´s Performance in the Sustainable Management of the Environmental Sub-Index

IMCO	SUBINDEXES	MÉXICO´S SCORE	INDICATORS	MÉXICO´S SCORE
ICI 2011	Stable Macro-Economy	65.1		
	Efficient Market Factors	43.2		
	Precursors World Class Sectors	37.3		
	Sophistication And Innovation In Economic Sectors	17.5		
	Efficient And Effective Governments	55.02		
	Educated And Healthy Inclusive Society	46.14		
	Law System Reliable And Objective	44.32		
	Stable And Functional Political System	54.73		
	Sustainable Management of the Environment	41.2	-Use Of Fertilizers In Agriculture	41.1(Kg. Of Fertilizers Per Ha.)
			-Protected Natural Areas	2,125 (Km2 Por Mm).
			-Aquifer Recharge	1,286 (M3 Per Cápita)
			-Non-Polluting Energy Sources	6.1 %
			-Creating Wealth Without Contamination	
			-Clean Certified Companies	517 (Emisiones De CO2/ PIB)
			-CO2 Emissions	101 (Per Mm PEA)
			-Water Consumption Efficiency	492 (Mm Of Tons.)
			-Change In Forestry Area	.09 (Mm Of M3 Per USD)
			-Ecological Tragedies By Human Intervention	-0.44%
			-Relationship Within Agricultural Production And Water Consumption	8
			-Endangered Species	1.69(M3 Agricultural /Aggregated Agricultural Value)
				304
	Use Of International Relations	36.5		

This table summarizes the ICI sub-indexes and highlights the Sustainable Management of the Environment.Mexico has not been able to improve in four of the 10 sub-index measured by the ICI. (IMCO, 2011)

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