

## Towards a Sustainable Cognitive Economy

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**Abstract:** Economic systems are critical drivers in the survival of nations. As humanity faces a growing natural resources scarcity, it becomes increasingly critical that we develop and adopt environmentally sustainable methods of extracting such resources. The current research focuses on analysing economic doctrines and comparing literature regarding cognitive economy and its sustainability. Since the Western way of thinking is in crisis, the industrialism paradigm loses its legitimacy and the principle of capital over humans becomes obsolete. The capitalist system, in which the free markets prioritize investing in the acquisition of technology and goods in order to increase profitability when they are humans who should be put over the chrematistic systems. For this reason, it is necessary to include environmental preservation as the core of the development of bio-economy. A cognitive economy seeks to integrate nature and knowledge while maintaining responsible consumption and good living practices. This research analyses and compares the diverse schools of economical thought, from capitalism to cognitive economy. Through this, we hope to identify the true needs of a society, rather than the illusions created by consumerism that lead to a selfish economy and a political ecology. Would a cognitive economy be sustainable in the mid to long-term? Is a cognitive economy subjective? What is the main driver of consumerism? In conclusion, the world's economy is cyclical and since nothing is static, governments should invest in human brain research.

**Key words:** Systems, consumerism, cognitivism, industrialism, bio-economy

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### INTRODUCTION

A country's development is typically measured using macroeconomic indicators, such as capital, economic power and destructive power. These indicators are the result of investment and economical support from semi-peripheral countries in central and peripheral countries. Consequently, different countries have developed their economies without using their true capacity. In hindsight, it is possible to appreciate that in a sense; the true value of Latin America was always laid in its lands. However, as needs of its people grew it became necessary to use more and more of its resources. Unfortunately, in this process, nations do not realize that such resources are limited and that they are damaging nature. This destruction is the unfortunate result of prioritizing capital over humans (Wallenstein, 2006).

The challenges faced by the world are changing. It is no longer about accruing the greatest wealth, nor inflicting the most violence. It is about taking advantage

of all nations in the most sustainable manner. A lot of countries can see an emerging concept of necessary measures to make this a reality. Some researchers propose new arguments to redirect the management of economy in such a way that these measures assure the future of humanity. This is what Morin proposes in one of his many publications (Morin, 2003). The hegemony of the quantitative does not account for the quality of existence, solidarity, environment, life, human wealth that is not quantifiable monetarily. In the name of the development, inhuman economy devaluates the cultural treasures, ancestral knowledge and traditions (Morin, 2003).

Roegen (1975) was one of the first academics to attempt to reconcile economy with ecology, founding the field of bioeconomy. In one of his most well-known publications, "Energy and Economic Myths", Georgescu-Roegen states "Perhaps, the destiny of man is to have a short but fiery, exciting and extravagant life rather than a long, uneventful and vegetative existence" (Roegen, 1975).

In light of Georgescu-Roegen's statement above, it is disappointing that humanity's current state of mind is geared towards a shorter, less meaningful existence instead of a longer, more fruitful one. This raises the issue of assessing the sustainability of cognitive economy.

**Precedent:** Current educational institutions place great value on the dissemination of facts, numbers, theories, precepts, outdated ideas and archaic modes of thought. This has proved devastating for the world. Instead, educational institutions should be places where new generations are given the means to flourish, find their place in society and coexist harmoniously with the natural world. The main objective here should not be obtaining a degree with the sole aim of entering the work-force as this, along with the lust for wealth, is a source of unhappiness. The educational process with regard to bioeconomy, must be oriented towards a research culture and fostering our greatest resource, the human mind. The education of a new society must be based on clear concepts regarding the meaning of life and how to achieve goals. Education regarding ethics, cooperation, reciprocity and solidarity is critical to achieving sustainable development.

In summary, the educational process should experiment with scientific and academic revolution through the interaction of cognition and economy in order to provide integrated education based on bioeconomy. An educational process such as this is both holistic and interdisciplinary and promotes a unified culture while facilitating the art of learning how to learn. This development must be achieved regardless of how much research is required, especially in Ecuador where we can still find endemic forests and animals and where despite the influence of the "World System" it is still possible to maintain ancient traditions and cultures without destroying nature. What actions would be required to maintain a cognitive economy?

The objectives of the current investigation are as follows: identification of the sustainability of a cognitive economy, analysis of various economic schools and models and proposition of a sustainable and environmentally friendly economic system.

**Achieving a sustainable economy:** Economy is comprised of many elements, the most important of which are: finance, micro and macro-commerce. Micro commerce has become more significant as the role of macro commerce has not had success nor useful to society, nature or the environment. Conventional economy has become mechanical as it only manages society in terms of efficiency, optimization, productivity and efficacy, disregarding responsible resource management.

**Classical economics:** At the end of the 17th century, dominant capitalist economic relationships underwent a significant transformation. As a result, the then-current economic doctrines too underwent changes. Some of the most important events that occurred between the 17th and 19th century included: the Industrial Revolution and the French Revolution. These two events resulted in the formation of the classical school of thought. This in turn gave birth to a theory based on the value of work or time required to manufacture a product as the core of an economy. The classical school seeks to incorporate into their theory, the role of the industrial businessmen and landowners that are the main parts of a country's economy.

**Marxian economics:** In the first half of the 19th century, based on the theory developed by classic school regarding the value of work, Karl Marx and Friederich Engels created a new explanatory, theoretical body that explained how markets and capitalism functions. This theoretical body goes into greater depth regarding the value of work and explains, historically and dynamically, the capitalist system with respect to the exploitation of the laborer as the core of an economy. According to Marxian economics, value is objective and is based on the amount of work involved in manufacture and is the productive process in which human relations are created (social relationships of production).

**Neoclassical economics:** The first half of the 19th century saw the marginal revolution which marked the transition of economic theory from classical to what is now known as neoclassical economics. The new social conditions brought on by the development of industries, allowed for the development of hypotheses that accounted for the individual activities of all members of society as the basis of economic systems. Therefore, to neoclassical economists the value of a given product is determined by its utility. The possibility of obtaining a profit encourages businessmen to produce. Neoclassical economists consider the activity of individual businessmen and consumers to be the core of an economy (Mancedo, 2003).

An alternative model for development recognizes the critical role of natural resources, knowledge and technology in the sustainability of an economy on the mid-to large-scale. These systems have been implemented and expressed in free markets and capitalist system to demonstrate the differences between big-scale economy and models of human development.

Since, new cultural trends encourage the conservation and preservation of nature, it is

important to consider implementing cognitive economy. Cognitive economy adapts to the current world's conditions due to the fact that it integrates disciplines such as: Earth sciences, biology, ecology and life sciences. As such, it could be compared to ecologic economy as it seeks to develop society and good living, conserving Nature and future generations.

The new paradigm of Bio-economy, will integrate facts, feelings, the objective and the subjective. In addition, it would serve to propose alternatives to the conventional aims of economy of generating large profits in short periods of time.

Thus, economics is proposed as a scientific basis for a visionary human enterprise, Economics of the Third Way, placing it among the old economy balance, simplicity, quality and value in use and the new (global) economy no equilibrium, complexity, quantity and value of trade economic enterprise. (Mohammadian, 2003).

However, the economy of the third way should benefit from the best of both models: as competition with cooperation (Mohammadian, bioeconomy Interdisciplinary study of Biology, Economics and Education, 2000). Change the concept consumerism quantity for quality, price value, spirituality and materialism exchange value for value in use. It means to acquire and produce goods that are truly necessary for subsistence. Change this precept and marketing industries to implant in the minds of consumers philosophy increasingly distant from nature artificial life. Yet, another paradigm that influences the economy is the, bioeconomic paradigm of capitalism in which has become the financialization of the economy.

The integration of these factors into human activities constitutes a remarkable challenge. The technological development and the increasing economic power exert a pressure on cultures. As a result, these aforementioned cultures lose their identity and become dependent on natural resources. Unfortunately, these resources are poorly managed and destroyed. Based on this, Rene Ramirez analyses the current governmental period.

## **MATERIALS AND METHODS**

“One of the central pragmatic proposals of this government is to shift from a ‘limited resource’s economy to an ‘unlimited resources’ economy. That is, to shift from a country whose economy depends primarily on exportation and secondarily on importation, to a country whose economy is based on the knowledge and creativity of the human talent ideas, innovation, creativity and culture are limited only by ethics”.

The social and economic problems of today have affected the world, we are now realizing the need for a new way of living. An example of this is the governments’ attempt to change the production matrix. This could be a solution; however, it raises the question of whether or not such methods are sustainable.

It is evident that this would help to overcome the impasse and would solve some socioeconomic problems. However, there are several views on the definition of sustainability. On one hand, it is necessary to design new development models according to environmental, socioeconomic, biological and ethical imperatives. On the other hand, it is unclear how to achieve sustainable development without radical societal change.

However, the sustainable development process is an important process as it could ensure humanity’s long-term survival and the continuation of the socioeconomic system, thus ensuring short-term prosperity. Based on this, changes in the production matrix promises to be a viable alternative to ensure the sustainability of a nation. While it may seem contradictory, it is possible to use economic capital obtained from the extraction of natural resources to preserve biological capital. This would be a more worthwhile than investing such capital in destructive pursuits such as the arms race and wars.

By investing in the creation of employment and nature conservation, capital could be used as a tool for sustainable development. In addition, it would contribute to changing the conventional way of thinking in which capital is used to produce and consume luxury items. Considering humanity as a single cognitive system, developing each individuals abilities and harmonizing them with nature would be a means of ensuring sustainable development. It is also imperative to establish a solid foundation to ensure the long-term continuity of sustainable development. For this reason, it is important to include holistic thinking as part of our education.

In order to achieve a sustainable economy, it is necessary to consider social exchange. This is in contrast to capitalism, “a capitalist economy is a monetary economy of production, not an exchange economy”. The formula for the perfect harmony between nature and human economy does not yet exist. The truth is that changing a culture based on greed and waste into one centered on conservation and self-sufficiency, is a good alternative. Why not consider changing a culture divided by greed, into one where solidarity and fraternity are core values? In doing so we would be promoting sustainability, trust, mutual care and preservation.

Any socioeconomic activity based on conservation, regeneration, recycling and respect towards biological cycles while maintaining the socioeconomic principles of

equality are good alternatives to a capitalist economy. This kind of economy is based on the idea that wealth and prosperity are only possible through continuous development. While it is true that the economy must grow in order to generate wealth for a population that is also growing, it is critical to protect the environment and maintain biodiversity. In doing so we would be protecting the regenerative ability of our planet's biological capital. We must not allow for a repeat of the situation in Argentina, where all the organic soy has been replaced by transgenic crops. Not only do these crops destroy nature, it is a slow suicide for humanity as the genetic alterations may result in mortal diseases. In this context, medicine should also contribute by adopting a new mentality, producing more homeopathic medicines as opposed to chemical medicines. If humans come from nature, it is not logical that we should go against nature to survive.

Bioeconomy represents a significant shift in ideals. It is an attempt to expand the discipline of economy to include the mother of all sciences, Biology. This would allow for integrated, empirical research and projection. This is the science that could approximate the range of socioeconomic activity for which a biological resource could be used without destroying its regenerative properties.

Cognitive economy combines the principles of harmony between nature and humanity based on respect and preservation. It avoids destruction and waste of resource while maximizing humanity's cognitive potential. This potential could be used to find equilibrium between humanity's needs and our planet's resources.

On the other hand, it is not necessarily a shift in mentality but rather a change in perspective that would ensure this transformation. This is why that it is critical that we adopt an educational system that is based on knowledge and the human ability to produce environmentally friendly products. This raises the question of how difficult it would be to create a culture of continuous learning. This process has proved difficult to make a reality in Latin America due to traditional modes of thinking.

According to Souza, the process articulates hegemonic speech (source of reality), political rules (source of power), epistemological role (source of truth), institutional arrangements (source of behavioral patterns), cultural meanings (source of sense) and social practices (source of change).

Only a few researchers in Ecuador have considered developing strategies to aid the national economy. Nationally, a small number of institutions are dedicated to raising awareness about the importance of national resources and the development of cognitive abilities.

It is important that the future generation know of their heritage to know that a sustainable economy is possible. Furthermore, I remark that the country has an abundance of natural resources. There has been no president until the current that has shown any concern for the preservation of these resources.

A University survey about the main concerns of the students as future leaders and if those concerns included the environment. The results showed that 60% of the students are concerned about getting a job, starting a business, making money and having a family. The remaining 40% mentioned scientific research and environment conservation as their main concerns in life.

This data demonstrates that it is necessary to promote investigation, environmental conservation and sustainable planning. Despite some environmental programs have been implemented in educational centers, there is more work to be done.

**Sustainable economy:** Now a days we feel the need to unite economic production with the production of knowledge due to the integration of technology and science into the industries. Production has benefitted from the amount of knowledge humans have invested into it. Practical advantages of this are increased productivity and income.

Knowledge plays an important role in industrial development. Knowledge in organizations represents the proper administration of the processes, the capital value and the value of work.

The productivity of a nation tends to depend on the immaterial production and knowledge which are intangible. This complicates determining fair wages and the environmental impact reflected by the loss of biodiversity.

The Bioeconomy provides the possibility of integrating the calculator rationality, competitiveness, distrust and hostility prevailing in capitalist socioeconomic activity to intangible non-economic components of human feeling that will make possible the development of a humanistic socio-economic activity, recognizing the spiritual needs in addition to the economic, social, biological and environmental realities of mankind (Mohammadian, 2003).

The economy oriented towards the exchange, accumulation and valuation of the basic needs of human beings. This includes linguistic capacity, cognitive ability and social interaction. The objective of assigning value to such basic needs is entirely capitalist.

One of the key factors in the development of knowledge is the integration of technology and culture. In doing so, it is possible to see the world from a different perspective regardless of economic power. When a society is blind to this, it loses its identity and becomes dependent on natural resources.

The current government encourages a change in the production matrix in response to the socioeconomic problems faced by the country. Through the creation of new sources of sustainability, it is possible to push the socioeconomic development by creating new models of development oriented towards utilizing the infinite resources of the human mind.

Indeed, the current rules of world trade have produced a perverse phenomenon: the “tragedy of the anti-commons”. This has involved hyper privatization the patenting and capital hyper concentration by those institutions that finance research and innovation; which has generated a social underuse of good knowledge. Breaking with such a tragedy, recover a sense of the public and to democratize access and use this it is the core of the knowledge economy and social system of social innovation. The ultimate goal of innovation should not be to maximize profit but to create economy that will satisfy needs, ensure and enhance individual rights, collective and territorial capabilities.

The foundations of this sort of economy are knowledge and creativity. The use of innovation, capital conservation and natural preservation, are tools for a sustainable economy. It is imperative to that we create new tools in order to achieve harmony between humanity and nature for the sake of future generations.

A cognitive economy seeks to take advantage of the unlimited human mental resources. In doing so, it is possible to achieve a sustainable economy based on the principles of bio-economy. The optimization of resources tends to moderate the use of limited and unlimited resources, creating a sustainable economy. As such, this economy promotes the responsible use of natural resources. The adoption of an educational system based on the idea of increasing productivity while producing environmentally friendly goods, is necessary for a sustainable economy.

The new industrial revolution requires the commitment of governments, industries and society in order to bring about change. This would allow for the development of a global sustainable economy based on biological resources.

Bioeconomy promises to be a means of recovering competitiveness in the environments in which it develops. In addition, it adopts measures to recover leadership, economic growth and technological innovation, satisfying economic needs.

An alternative model for development would be to understand the role of natural resources, knowledge and technology as tools to achieve a sustainable economy. These systems have been implemented and expressed in a capitalist “free-market” system where it demonstrated significant differences between the large-scale economies and models of human development.

Cognitive economy invites us to create harmony between nature and knowledge. It also encourages good practices such as responsible consumption and good living. In this way, we can realize the true needs of society, rather than the shallow consumerist needs imposed by a capitalist system. Capitalism prevents the development of a sustainable economy by dragging society into a selfish political environment.

Economy is comprised of many elements, the most important of which are: finance, micro and macro-commerce. Micro commerce has become more significant as the role of macro commerce has not had success nor useful to society, nature or the environment. Conventional economy has become mechanical as it only manages society in terms of efficiency, optimization, productivity and efficacy, disregarding responsible resource management.

Since, new cultural trends encourage the conservation and preservation of nature, it is important to consider implementing cognitive economy. Cognitive economy adapts to the current world’s conditions due to the fact that it integrates disciplines such as: earth sciences, biology, ecology and life sciences. As such, it could be compared to ecologic economy as it seeks to develop society and good living, conserving nature and future generations.

Knowledge is more important than ever in the development of a nation and it turns cognitive economy into a rapidly growing economy since the speed of processes increase. This is the reason why innovation becomes essential to achieve sustainability and goes hand in hand with scientific research. New generations are the ones called upon to maintain a competitive advantage and to achieve economic success through knowledge, production and innovation. In doing so, it is possible to generate ideas that transform resources into products and intangible capital. Assigning value to intangible capital such as knowledge has become a key growth factor complemented by creativity and not capital.

Bioeconomy is a consequence of the environmental damage in the past. Bioeconomy, therefore, seeks to unite conventional economy with the environment as a new paradigm in economic science. Economy transcends time and logic of the varying markets, as it attempts to reconcile public and private interests.

## **RESULTS AND DISCUSSION**

The aim of an economy is to satisfy human needs through the optimisation of human resources. It seeks to integrate the economic transformation, environment and humanity. Within the economical processes, it is possible to visualize the true importance of nature. In addition, thermodynamics demonstrates that natural resources are limited. Therefore, unless we take care of nature it will be permanently damaged.

Economy is based in various rules that complicate the optimization and the integration of economic, human and environmental factors. Therefore, it is imperative to grow apart from these rules, in order to achieve a sustainable economy based on preservation.

The improvement and competitiveness within the markets, demands human efforts and knowledge that satisfy human needs in an efficient and environmentally friendly way. Economic tools have been replaced the awareness of impacts on society. Thus, developing countries are supplied with technical capital in order to satisfy their needs and to protect them.

This way, humanity becomes the main actor as is able to innovate and intensify processes through scientific research. In doing so, it is possible to harmonize different ideas in order to create a development model that serves humanity and all life on Earth. These economies transcend themselves in order to grow, emerging as the need to understand beyond the limitations of human culture, thoughts feelings and values.

Now a days, this is considered a new type of economy that is based on the technological manipulation, exploitation and appropriation of all living beings. Through this, we have a wider perspective regarding economic growth and the competition that should exist between individuals and/or groups. The optimization of these resources becomes the main concern, since it is not known for certain whether such resources will be managed responsibly. In order to preserve the planet's limited resources, such an economy would focus on responsible practices (Mohammadian, 2003).

Economic growth depends on investment into research that enables efficient and competitive businesses that are based on innovative entrepreneurship. Key factors in the generation of new business opportunities are continuous training and learning. These two factors alone could mean the difference between success and failure.

A cognitive economy integrates various scientific disciplines to generate a new environmentally-friendly model of industrial development. This is possible through the awareness of new professionals responsible for the creation of new policies that will safeguard the limited resources of our planet.

New generations are in search of new environmentally conscious strategies that encourage and simplify an efficient transition into a new knowledge-centric economy. The development of new models emphasizes the importance of new skills that provide incentives for primary production. In doing so, new technologies and sources of employment will emerge.

A new model of development must tackle current environmental and social issues through the creation of new sustainable alternatives based on the respect of Nature and human rights. In addition, it must be able to integrate economic policies and systems with environmental and social factors.

A cognitive economy differs from a traditional economy in the sense that it attempts to stimulate economic growth while protecting the environment and humanity. The current administration has proposed shifting from a traditional economy to a knowledge-centric cognitive economy that promotes innovation, creativity and culture.

One of the greatest changes proposed by the current government is to, through the creation of new sources of knowledge, shift from being primarily an importing country to one that produces and exports.

By changing the production matrix, it possible to change society in such a way that the generation of knowledge would raise awareness and stimulate progress. In doing so, it would be possible to fully develop the industry in a manner that generates employment, attracts investment while remaining sustainable (Mohammadian, 2003).

As the sustainable growth in the planet reaches breaking point, the challenge becomes bigger. The problem lays in that the main purpose of some economies is to increasingly produce goods and to encourage consumerism. The key factor to face these problems is changing the educational and research perspective in such way that a sustainable extraction of natural resources becomes a priority. All these elements are deeply connected with each other and must be preserved for the sake of future generations.

In this context, it is necessary to encourage research that focuses on sustainable economy where humans are prioritized over capital and where resources are distributed equally. The policies that destroy economies of semi-peripheral countries should be abolished. Phylshyn (1992) in his publication "Computing in cognitive science".

A sustainable economy in Ecuador is feasible because this ideology is supported by the studies analyzed in this paper. The road to a sustainable economy is complicated; however, it is imperative to acknowledge its importance and the roles that different factors play in the world system. The current work succeeded in

identifying the necessary actions for this country to adopt a sustainable cognitive economy that benefits people.

### **CONCLUSION**

The objectives of the current research were to analyse economic doctrines and to compare literature regarding cognitive economy and its sustainability; all of which were accomplished satisfactorily. Cognitive economy is a new field of economy which was born at the end of the 19th century as a result of social sciences research. It was founded by Friedrich von Hayek, Armen A. Alchian, Herbert Simon, Gerd Gigerenzer and Ellen Langer. It was further developed after Vernon Smith and Kahneman won the Nobel Prize in Economy in 2003.

Peripheral countries should invest more into Research, Development and Innovation (R+D+i), in order to control consumerism imposed by capitalist countries. Since incomes have been unequally distributed and poorly managed by groups in power and monopolies, capitalism has had negative impacts in peripheral countries.

The stages of economy analyzed in this study, belong to a world-system. In addition, Classical, Marxist, neoclassical and cognitive economies differ from each other. It is necessary to mention that not all peripheral countries have experienced all the stages of economy mentioned above. Many of these countries remain in a capitalist system and resist adopting a cognitive

economy based on nature conservation and a fairer incomes distribution. South America, for example has a long history of inequality.

There is a current influx of new social proposals that indicate that change is imminent in central and peripheral countries. These changes promise to benefit humanity as opposed to capitalism (monopolies). Ecuador, for instance, is currently experiencing a change in the productive matrix as outlined in the 2008's National Constitution and the Good Living National Plan which seeks to preserve water sources and other natural resources.

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