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STEM Education as a Strategy to Move from the New Structural Economy to the Endogenous and Sustainable Growth Model in Latin America

Edukacja w zakresie STEM jako strategii przejścia od nowej gospodarki strukturalnej do modelu endogenicznego i zrównoważonego wzrostu w Ameryce Łacińskiej

Introduction

1. Theoretical differences, structural and endogenous models in economics. 2. Validity of both models in the current context. 3. STEM education for economic sustainability. 4. Legal and structural challenges to enhance STEM

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education in LATAM. 5. Effects of STEM education on sustainability and development. 6. Conclusions. Bibliography.

Towards the first decades of the last century, when most Latin American nations achieved their consolidation as political and economic entities before the international community, the growth gap between industrialized and developing countries became very evident. Hence, the so-called classical theories that sponsored the growth as an effect of the simple passage of time began to be discredited. Instead, theories such as structuralist or developmentalist concepts began to be put forward in the belief that international factors conditioned the growth of countries, so that structural adjustments – or changes in some of their structures – could put less industrialized economies on a growth path. As a consequence of globalization and the rise in the use of information technologies, the paradigm of the New Structural Economy (NSE) was developed, which organizes the economy around the Internet, and relocates the economic dimension not only at the level of individual states, but also globally.

However, in view of the current evidence that neither industrialization nor the global organization of markets is the way forward, but rather the recipe for social and environmental deterioration in third world countries, the theory of the endogenous growth has developed. Although it does not have all the answers, yet it does allow for the stimulation of a panorama that is coherent with the opportunities posed by the knowledge economy, also known as the orange economy, as opposed to economies that propose unsustainable models.

If we could summarize the assumptions of this theory based on the endogenous growth, it would be the education of the population (investments and a stimulus for the research, as well as human capital formation), which allows an economy to generate positive variations that do not result in classic externalities that depress the wealth of the countries before increasing it in a sustained way.

Hence, this study will point out the main differences between both theories, whose postulates coexist in the economic policy of Latin America, despite the fact that global and regional circumstances urge the adoption of sustainable strategies far from human and natural exploitation, under a constant of sustainability. In this respect, this research is developed under the hypothesis that an enhanced STEM education will allow the states of the region to move away from the effects of the remnants that still survive from the structuralist

models of the second half of the last century – including their variations such as the NSE – to bring them closer to a logic of the endogenous growth that allows the states to be more empowered in their reorientation, as well as to raise social welfare.

The aim of this research is to demonstrate the coexistence of both models in Latin America, and the identification of the necessary requirements for the viability of the endogenous growth model, relating them to the educational orientation based on STEM.

These objectives are developed in function of the following guiding questions: What is the difference between the NSE and endogenous growth models? Under the current conditions, which is the model that favors welfare most? What role does STEM education play in its implementation? What are the legal and political changes that can impact the favoring of this model in Latin American economies?

Theoretical differences, structural and endogenous economic models

The accelerated economic development that characterized the 20th century, as well as the first decades of this century, generated significant welfare gaps among the world's population, among regions and even among countries and national societies themselves, highlighting the need to adopt policies that would allow those countries whose economies were more underdeveloped to boost specific sectors that would increase the economic growth.

A wide variety of economic theories of development were developed regarding the circumstances determining development. These theories include: the fundamentalism of capital, the centralist planning (*dirigista*), the neo-Marxist theory of dependence, the Washington Consensus, the theories of the endogenous growth and the theory of the new structural economy; with the last two being of special interest for the current research work.

In most Latin American countries, the economic doctrine of structuralism (usually identified with developmentalism) was adopted as a paradigm to overcome the situation posed by the failure of neoclassical theories. The boom in its application in various countries such as Mexico, Chile, Uruguay and Brazil occurred around the 1960s. One of its main postulates establishes that the world economic order follows a central industrial - peripheral agricultural scheme.

It means that the most developed countries base their growth on industry, favoring the conditions for the peripheral or underdeveloped countries to build their economy depending on agricultural and primary activities. Hence, the most forceful response to the problems of Latin American countries would be to stimulate the development of industrial sectors, to add value to exports as well as to substitute imports.

Later on, during the eighties, a modernizing trend of the structural development theories began to materialize, which led to the creation of the New Structural Economy as a result of the emergence of technological companies, despite the fact that with the crash of these markets in 2008 their postulates have been seriously questioned. According to Yifu Lin (2010), the most prominent of these postulates are:

a) As for their coincidences: "both the 'new' and the 'old' structural economies are based on the structural differences between developed and developing countries and recognize the active role of the state in favoring the advancement of the economy from a lower to a higher stage of development. However, there are profound differences between these two approaches in terms of their objectives and the modalities of state intervention".
b) The NSE postulates that import substitution is a part of the natural growth process of developing economies, testifying to the strengthening of certain sectors.
c) It considers that there is a low level of physical and non-physical (including technological and intangible) infrastructure, and the relative scarcity of capital in developing countries means that reallocations are not as efficient.
d) The differences between developed and non-developed countries are a result of both exogenous and endogenous factors, especially those resulting from the phenomenon of globalization. Furthermore, different historical and resource availability situations in each economy are taken into account.
e) It seeks to limit the protectionist activities of the State (which it considers to be artificial), and advocates that import substitution should be a natural phenomenon in the growing countries that are moving upwards in their industrialization and development

process, in accordance with the availability of their resources and the accumulation of the kinetics of their structural changes:

"The new structural economy concludes that the role of the state in industrial diversification and modernization should be limited to the provision of information on new industries, the coordination of related investments in different enterprises in the same industry, the compensation of information externalities for pioneering companies and the creation of new industries through the incubation and promotion of foreign direct investment (Lin, 2009; Lin and Chang, 2009). The state also needs to effectively assume its leadership role in improving the physical and non-physical infrastructure in order to reduce transaction costs in enterprises and facilitate the process of industrial development of the economy".

The so-called New Structural Economy (NSE), like structural theories, associates development with the structure of a country's economy, especially the industrial sector. However, it suggests that the industrial structure of a country is endogenous to its structure, i.e., that country's resources (land, population, skills, capital, natural resources, etc.) should determine its comparative industrial advantage. It assumes that the economic growth will occur if countries invest in their natural or latent comparative advantages. Governments must therefore design an industrial policy that facilitates the development of industries that can produce more efficiently, while leaving room for market forces to drive the process of technological innovation.

For the NSE, the human capital is a component of a country's heritage. For economic agents, risks and uncertainty arise during the processes of industrial modernization and technological innovation that accompany the economic development. As various companies move up the industrial ladder to new, more capital-intensive industries and approach the global industrial frontier, they face higher levels of risk. The human capital increases the ability of the working population to cope with risks and uncertainty, but it takes a long time to build up. In a robustly growing economy, it is important to plan ahead and make investments in the human capital before the economy requires the skill set associated with new industries and technologies.

However, the weaknesses of this theory is its static approach: while developing countries have large natural resources, these are not equitably distributed, while land and means of production are concentrated in a few historically favored oligarchies, which with the advent of globalization have

done nothing but strengthen their monopolies. Therefore, the distribution of capital goods presents a certain rigidity, as well as the capacities to adapt in markets that remain more or less fixed, and the same happens with the economic participation of people with lower incomes (Table 1).

Table 1. Participation behavior of the lowest income quintiles in 2002 and 2016, versus the participation of the highest quintile in 2016.

	Collection of the lowest income		Capture of the highest income Quintile V (2016)
	Quintile I (2002)	Quintile I (2016)	
Argentina	6	10	46.5
Bolivia	6	5	48.5
Brazil	6	6	58
Chile	5	8	53
Colombia	5	5	55
Costa Rica	5	5	Not available
Ecuador	5	7	50
El Salvador	5	7	Not available
Honduras	6	5	Not available
México	5	6	54
Panamá	5	5	54
Perú	5	5	48.5
Uruguay	4	8	46
Venezuela	5	8	Not available

Sources: Own elaboration, with data obtained from Navarrete/UNAM (2016), CEPAL (2018) & Moreno/STATISTA (2016).

As can be seen in the table above, in recent years, the population located in the lowest income quintile (20% poorest in Latin America) has maintained its share of the GDP of the countries listed, while the GDP share of the highest quintile (20% richest) constitutes about half of it, which gives us some idea of the rigidity mentioned above.

Likewise, the NSE continues to consider the State as a secondary actor, only in the capacity of a facilitator of a business climate, without considering it as an intermediary for the distribution of wealth and a procurer of well-being. In this respect, it should be mention here that the NSE underestimates the rest of the structures that constitute development, in order to subsume itself to the economic perspective, leaving aside well-being and sustainability,

while it is still based preponderantly on the natural wealth that is susceptible to industrialization. However, it cannot be denied that it recognizes the need to facilitate the technological means for the growth of industry as a peripheral benefit that the State should provide to companies. The role of human rights is diminished, and the environment is subordinated to the global inertia dictated by the economy, reaffirming those who already possess wealth, without solving the problem of internal gaps within countries.

The theory of the endogenous growth emerges as a response to the inability of the neoclassical model to explain the rates of technological change and productivity growth, as well as the long-term variable growth rates experienced by the different countries. Endogenous growth theories emphasize that the economic growth is an endogenous outcome of an economic system, and not a result of effects exerted by external forces. The endogenous growth theories assert that variables, such as a technological change, are not independent: they affect the growth, which in turn affects them. The existence of these virtuous cycles or a positive feedback reaffirms some of the most important findings of the research focusing on the human capital in Mexico, also analyzed in this paper.

Likewise, this theory maintains that investments in the human capital, innovation and knowledge contribute significantly to the economic growth. It also focuses on the positive externalities and indirect effects of a knowledge-based economy that will lead to economic development. The endogenous growth theory mainly argues that the long-term growth rate of an economy depends on policy actions and measures. For example, subsidizing research and development or education increases the growth rate in some endogenous growth models by increasing the incentive for innovation.

It is thus apparent that the difference between the two theories is quite striking, despite the fact that they represent two economic approaches developed in a response to the crises of recent years: while the NSE focuses on industrialization with technology as a peripheral infrastructure, the endogenous growth theory places the knowledge economy at the center of development. The NSE considers the State as a secondary non-determining actor in economic growth, while the endogenous growth theory assigns the primary role to it.

Validity of both models in the current context

In this regard, Trebilcock and Mota (2017) argue that an approach to the development that considers the economic growth as a central axis, or even perceives it as an end in itself, would imply attributing to the economic growth a preponderance in the conception of the ends of the development. This would leave in the background any consideration of what development would achieve for the members of a given society, as is the case with the fundamental objective of the NSE. The authors propose that the development should be measured from other points of view, which could lead us to a more comprehensive understanding of what the development means.

Some structural theories, such as the NSE, leave out one of the most important paradigms of the sustainable development that has been established in the international community through the different international legal instruments that lay the foundation of international law since the seventies.

Additionally, carrying out a policy where the components of the sustainability are disregarded promotes a deceptive economic growth, because the environmental impacts of industrialization are not considered. This, of course, leads to a reduction in the national resource capacity, generating a model that is not sustainable even from the economic point of view, and with even more severe impacts on the social and environmental aspects. An example of this is the information reflecting the Net Ecological Domestic Product (NEDP), which in the case of Mexico is defined as follows (SEMARNAT, S/F):

It is the annual percentage change of the Net Ecological Domestic Product (NEDP), corresponding to the monetary value of the production of goods and services in a given period by discounting the consumption of physical and natural capitals; it adjusts the national accounts by incorporating the costs associated with the degradation and depletion of natural resources.

Basically, the function of the NEDP is to reveal the hidden costs or externalities that a system based on industrialization impacts on the State (Table 2), in response to which, from the same perspective proposed by the NSE, it should reduce its actions in the face of the inertias of industrialization whose impact is determined at the global level, and should adapt its development in accordance with its industrial or human resource focus. Thus, it is important to consider that the simple elevation of the GDP as an indicator of the development demonstrates clear deficiencies that impact on other, environmental and social, pillars of sustainability.

Table 2. Differences in GDP-NEDP and its trends in a period from 2003 to 2018.

Year	GDP	NEDP	Difference	Gap	Trend
2003	7,868,810	6,185,997	1,682,813	21.38%	
2004	8,828,367	7,010,697	1,817,670	20.58%	▼
2005	9,562,648	7,600,515	1,962,133	20.51%	▼
2006	10,630,939	8,486,006	2,144,933	20.17%	▼
2007	11,504,076	9,226,511	2,277,565	19.79%	▼
2008	12,353,845	9,799,477	2,554,368	20.67%	▼
2009	12,162,763	9,417,314	2,745,449	22.57%	▲
2010	13,366,377	10,481,157	2,885,220	21.58%	▼
2011	14,665,576	11,575,351	3,090,225	21.07%	▼
2012	15,817,755	12,431,465	3,386,290	21.40%	▲
2013	16,277,187	12,807,727	3,469,460	21.31%	▼
2014	17,473,842	13,893,100	3,580,742	20.49%	▼
2015	18,551,459	14,645,556	3,905,903	20.05%	▼
2016	20,118,101	15,788,805	4,329,296	21.51%	▲
2017	21,911,894	17,191,052	4,720,842	21.54%	▲
2018	23,491,507	18,382,098	5,109,409	21.75%	▲

Source: Own elaboration based on data from INEGI (2018).

As can be seen, the difference between GDP and NEDP shows the hidden costs of environmental degradation in the growth of the Mexican economy, which market distortions do not assign to companies that produce them, and which are not always remediable by the State and end up being socially and environmentally harmful. In the period shown, it is evident that these environmental costs range from 19.79% to 21.75%, and they could be reduced by applying an endogenous economic model.

Additionally, as the concept of the sustainable development evolved, it identified the coexistence of the economic and social development and environmental protection for the benefit of future generations as preconditions for its existence, which is evident in a system of national accounts. It should be considered as the objective of the humanity to achieve a balance between the man and the ecosystem. Economies should move from a developmentalist

model to one that reconciles the ambitious economic development with the need to preserve natural resources and ecosystems.

According to Trebilock and Mota (2017), other indicators should be implemented, measuring the development more efficiently, such as the Human Development Index (HDI), which is a valid indicator for the development since it considers a number of development and welfare factors that are not included in the calculation of GDP and GNP. The Human Development Index is calculated using indicators of life expectancy, adult literacy, school enrolment and logarithmic transformations of the per capita income. The HDI is a weighted average of income adjusted for distributions and purchasing power, life expectancy, literacy and health.

STEM education for economic sustainability

As it was demonstrated in the previous section, in an area like Latin America the NSE as an economic model does not result in a greater distribution of wealth. Nor does it result in an improvement in the region's natural resources or environment. In this way, it is convenient to reorient the economic growth towards a more sustainable model, based not as much on natural resources and on the exploitation of labor, as on the intrinsic capacities of the human capital of the countries to which the theory of endogenous growth can offer greater opportunities for development.

To this end, the theory of the endogenous growth postulates the following:

a) The strengthening of the human capital, training and knowledge contribute to the growth of economies, independently of market forces acting from outside.
b) State intervention is favored mainly as a promoter and a guide for research and development policies and subsidies for research and innovation.
c) The absence of the technical progress of its own and the increase in the population paralyses the growth.
d) The growth patterns and cycles are not determined by external factors, but within the economies.

In this way, economies based on knowledge and the provision of services, and which reduce their level of industrialization when it is not based on clean technologies, will achieve greater development, and not only an increase in

simple terms of GDP. The State should address these needs through education policies, promoting education based on the acquisition of knowledge that allows its citizens to generate a more dynamic economy.

Furthermore, in recent years an area of education has been defined that allows the promotion in the population of those areas of knowledge that refer to fields where scientists and engineers usually work: STEM (science, technology, engineering and mathematics) education.

It is assumed that training in these professional skills will be increasingly in demand among countries, given the technical and tenure needs of markets that require increasingly qualified solutions that are less linked to physical work, mainly with the advent of technology (IA LATAM, 2019):

"STEM jobs will, according to some media and experts, be in a very high demand in the labor market. At the end of 2016, Randstad, the human resources company, stated in its annual report on labor flexibility that digitalization will generate more than 1,000,000 jobs in the next 5 years, of which a large percentage will be taken by STEM professionals. Technology and digitization have changed the labor market and the professionals in charge of managing and introducing these advances in the company will gain relevance in the following years".

However, when education in Latin America is analyzed, the problem of the lack of pertinence of the educational content to the demands and requirements of the endogenous model becomes evident - assuming that it is necessary to develop other kinds of skills and knowledge to increase population's well-being and economic growth - since there are few teachers qualified in these areas. As for students, 39% study careers are linked to the social sciences, administration and law, and enrollment rates in STEM-related careers range from 2% to 7%, compared to 13%–18% in other countries with more powerful economies, like China, the United Kingdom and Ireland/ Other problems identified by the OECD (1996), hindering achievement of these objectives are:

1. Women's lack of access to education, and especially to STEM education, which constitutes a significant issue.
2. More than two thirds of young people in LATAM are not sufficiently qualified, as they do not have a university degree or a higher technical education.
3. The region has the largest gap in the world between the skills available and the skills required by economies and businesses.

4. The access to higher education in Latin America is still below the levels of other OECD countries.
5. Technical and vocational education in the region rarely provides young people with high-level technical, professional and managerial skills.

It can be seen from the above that state intervention through policies promoting these areas of STEM education is urgently needed, to provide students with skills that are consistent with the growth needs of the region and on a global level.

Legal and structural challenges to the promotion of STEM education in Latin America

It has already been pointed out that placing the State at the forefront of the design of economic strategies favoring STEM education, and the usefulness of this strategy in eradicating the exploitation of natural and human resources as the core of economic growth in Latin American countries is an immediate need in a development model based on the endogenous growth. In addition to the economy, another important condition for well-being is the rule of law, so for the State to operate in favor of this model it is necessary to incorporate it into its current legislation, especially in the field of education.

When discussing this relationship between the rule of law and development, Trebilcock and Mota (2017) start with the following trigger question: What are the causal mechanisms that transform improvements in the quality of the rule of law into better development outcomes? They make a distinction between authors who perceive this relationship optimistically and those who perceive it pessimistically. Starting with the optimists, Hernando de Soto (2000) is quoted as saying that "the legal system may be the main explanation for the difference in development between industrialized and non-industrialized countries" and that "law is the most useful and conscious instrument of change available to people".

Although optimism about the legal reform seems to dominate the world of practice, and has done so for at least two decades, in the world of ideas and doctrine optimistic views have been attacked from several directions. The slightest of these attacks challenge the assumption that legal and development practitioners are capable of identifying and implementing legal reforms that promote development. The more forceful attacks challenge the notion that

aspiring reformers can reasonably expect to effect a significant legal change, given the obstacles posed by various historical, economic, political or cultural factors.

More skeptical approach challenges the claim that the law plays a significant causal role in the development. These contrasting views are important, because as long as they remain unanswered, it is not possible to know whether continued devoting of substantial resources to legal reforms in developing countries is justified. This problem, which Thomas Carothers (2006) calls "the problem of knowledge", makes law and development a mature field for academic research.

Therefore, to make STEM education in Latin America a part of an integrated development strategy, it will be necessary to identify the main actors (Penta Helix for Development) that have to intervene in this implementation, always referring to the endogenous growth model:

a) The State as the main driver of the development and as the main duty bearer in the fulfilment of the human rights directly involved, such as the human right to development, the human right to a healthy environment and the human right to education, among others. It must adopt and communicate clear guidelines through its governmental planning and programming systems, in order to send to other actors involved clear signals about the importance and relevance of developing strategies consistent with this model of growth. These activities can include incentives to industries to favor research and development and stimulate the dialogue between employers and educational institutions, to foster the relevance of educational programs and the recruitment needs of different sectors, tending toward the deindustrialization of national activities and the generation of fiscal and economic incentives for those who develop socially, environmentally, and economically sustainable processes.

b) Companies, as generators of recruitment dynamics in the most vulnerable sectors of the economically active population – women, people with disabilities, young people, and even indigenous people. Companies must also be held responsible for compliance with the legislation guaranteeing the human rights referred to in the previous point, and with high standards of corporate co-responsibility and codes of ethics for social improvement. Likewise, it is important that

companies resume the role of research developers that gives back to society.

c) Universities and educational centers as modelers of workers, independent professionals, entrepreneurs, generators of research along with the State, companies and the general society, as well as entities functioning as relevant providers of permanent educational programs.
d) Organized general society, as a watchdog for transparency and accountability (of State and business activities), and as a developer of relevant research geared to promote entrepreneurship and a solution of specific problems in urban and rural areas.
e) The national and the global environment and its defenders, as a stock of finite resources that simultaneously fulfil functions of non-quantifiable natural elements considered as public property and therefore not amenable to reparation on a human scale.

To implement the proposals that can be seen in the interactions of the actors described above, STEM education proposed by the State should be oriented on satisfying the needs and demands of each of the actors. Therefore, a dialogue between all mentioned players is essential; this dialogue must be promoted by the State to satisfy these requirements in the medium and long term perspective.

The above is consistent with the postulates of the endogenous development theory, since the State must assume a role of a leader and an interlocutor for the main actors involved in the development, because the education and the human capital formation represent one of the most important resources available to transcend developmentalism, and the general society and the country's natural resources are the endogenous resources available, supporting a reduction in the growth gaps in the region.

Effects of STEM education on sustainability and development

For Amartya Sen (1999), development is favored by, and favors democracy and the protection of human rights. Such rights, especially freedom of the press, speech, and assembly, increase the likelihood of an honest, clean, and accountable government. For Sen, development is the process of expanding human freedom. It is the expansion of freedoms that allows people to lead lives they would like to live. The development, therefore, requires the removal

of the major obstacles to achieving true freedom: both poverty and tyranny, limited economic opportunities and systemic social deprivation, intolerance or excessive activity by repressive states.

It also addresses the concept of the sustainable development - which can be fostered by the application of this economic model - as an organizing principle for achieving human development goals while maintaining the capacity of natural systems to provide the natural resources and ecosystem services on which the economy and the society depend. For sustainable development, the desired outcome is a state of society in which living conditions and resources are used to continue to meet human needs without undermining the integrity and stability of the natural system. The sustainable development can be defined as the development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Promoting of STEM education:

a) Improves information and decision-making skills, which are critical to fostering transparency and accountability, and thus to the effective implementation of human rights
b) Enables training of well-qualified teachers and researchers, to maximize the impact of research by transferring scientific findings and improvements to various actors making up the Penta helix of development.
c) Encourages better calculated entrepreneurship, with a greater chance of survival, reducing the pressure of unemployment and promoting the relevance of social activity.
d) Promotes development through strengthening of sectors based on the provision of services – industries without chimneys – generating the added value to the economy and reducing the gaps between GDP and NEDP discussed at the beginning of this paper.
e) Favors the growth of primary activities with a more efficient potential resulting from the use of technology, with a reduced environmental impact. The exploitation of natural resources in favor of industrialization abroad impoverishes those who depend on their land for their survival, and STEM education would favor the rooting of the population and the domestic products, with an effect on the substitution of imports already addressed.

Conclusions

The economic growth models of the New Structural Economy and of the endogenous growth were created as a response to the failures of the neoclassical model, manifested in particular in Latin America, where its postulates did not lead to the increasing economic growth, but rather produced a debacle of natural resources and a decrease in the population welfare. Both have important similarities, because they are basically contemporary, but their approach focuses on different aspects. While the NSE is oriented on the companies (especially the industries and the global dynamics), the endogenous growth model is holistic and again takes up the idea of development perceived as a synergy of welfare, which requires the preponderant participation of the State and the remaining actors (forming a penta helix), establishing that the growth is a result of internal conditions of the economies.

Therefore, while it is more holistic and better adapted to the welfare needs of developing economies, we believe that the endogenous growth model is more appropriate for Latin America, where deep gaps in the distribution of wealth can be seen, as proven by the differences between the highest and lowest income quintiles of its population, which tend to remain fixed. In the same way, development based on industrialization implies important burdens on the environment and natural resources that are assumed by the State and not by those who generate them, i.e., the companies.

To implement this model, it is necessary to stimulate the formation of human capital, research and technology, which definitely requires reorientation of the education, particularly, by focusing on STEM-based competences, to strengthen the response, decision-making and self-employment capacities of the population.

On the basis of the above discussion, it can be seen that the most important legal and political changes within Latin American states have to focus on the implementation of rules contributing to the increase in the educational level of the population, adjusting the educational offer to the needs of the environment, and reducing the incidence of careers that are not generating employability, while encouraging the interaction of the Penta Helix agents around research and development, as well as potentiating the growth of the primary and service sectors.

Therefore, the hypothesis can be confirmed, stating that by enhancing STEM education the states of the region will be able to move away from the effects of surviving remnants of the structuralist models of the second half of the last century – including their variations such as the NSE. Instead, they will be brought closer to a logic of the endogenous growth, where the states are more empowered in their reorientation (including the education of their population and their own capacities), and their social welfare will increase, because not only economic, but also environmental and social aspects will be considered.

Abstract: The different economic models implemented by the states in the last decades range from a simple tendency for accumulation and growth in terms of the Gross Domestic Product to the development of people's well-being under the premises of sustainability. Those that invest in individual development through education in strategic areas, facilitate the generation of intrinsic value, without relying on the exploitation of their natural resources or on the physical labor force of their citizens, thus achieving the effective sustainable development.

In this paper, we analyzed the importance of introducing legal and political changes, focused on encouraging education in Science, Technology, Engineering and Mathematics (STEM), mainly in those economies that are oriented on the structural or developmental paradigm, whose most current form of expression is found in the theory of the New Structural Economy, to favor endogenous growth in accordance with the sustainable development paradigm, using LATAM as an example.

Keywords: STEM – Economic models, sustainable development

Streszczenie: Różne modele ekonomiczne wdrażane przez państwa w ostatnich dziesięcioleciach wahają się od prostej tendencji do akumulacji i wzrostu produktu krajowego brutto do rozwoju dobrobytu ludzi w warunkach zrównoważonego rozwoju. Ci, którzy inwestują w indywidualny rozwój poprzez edukację w strategicznych obszarach, pozwalają na generowanie wewnętrznej wartości, bez polegania na eksploatacji ich zasobów naturalnych lub na fizycznej sile roboczej ich mieszkańców, co pozwala na skuteczny zrównoważony rozwój.

W pracy tej analizujemy znaczenie wprowadzania zmian prawno-politycznych, ukierunkowanych na zachęcanie do kształcenia w zakresie nauk ścisłych, technologii,

inżynierii i matematyki (dalej STEM), głównie w tych gospodarkach, które są zorientowane na paradygmat strukturalny lub rozwojowy, którego najbardziej aktualną formą wyrazu jest teoria Nowej Gospodarki Strukturalnej, aby sprzyjać rozwojowi endogenicznemu – na przykładzie LATAM – zgodnie z paradygmatem zrównoważonego rozwoju.

Słowa kluczowe: STEM – Modele ekonomiczne, zrównoważony rozwój

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