

FORESIGHT AS A PLANNING TOOL: A KEY ELEMENT FOR THE DEVELOPMENT OF FUTURE STRATEGIES IN THE EDUCATIONAL SYSTEM.

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Abstract

This article is part of an investigation that seeks to analyze the advances and challenges that exist in the Colombian educational system, based on the use of the strategic foresight methodology, which allows for an initial diagnosis, the identification of trends, and the establishment of future strategies that contribute to the achievement of these objectives. Based on the voluntarist prospective school, a specific methodology combined with the use of specialized software is applied to determine viable strategic actions that ensure the fulfillment of these objectives. This article focuses on the educational sector in Colombia, proposing initiatives and actions to improve the quality of the educational system at all levels. Preliminary results provide valuable information that contributes to a better understanding of the phenomenon under study, leading to the development of strategies and programs to strengthen the Colombian educational system.

Keywords: Foresight, scenarios, education, strategy, planning.

1. Introduction

The 1991 national constitution expresses in its different paragraphs the freedom of education as a right of the individual, education as a social function and the promotion of science and culture; the convention on the rights of the child (law 1098 2006) and the code of childhood and adolescence (2016) define the comprehensive policy for early childhood and only until 2006 the Colombian state defines that children between zero and five years old (0 and 5) should be educated and not only cared for. The General Education Law (Law 115 of 1994) describes the Colombian education system, its objectives, participating actors, form of organization, the training process for students and teachers, the teaching career, obligations of the MEN and other entities that participate in the system and the mechanisms for financing education. The document defines three levels for formal education: preschool education, which is compulsory for children under six years of age, the completion and development of nine grades of basic education (five primary and four secondary) and two more grades of secondary education. The priority in these learning stages is directed toward the formation of the self, ethics, participation in democratic activities, responsible sexuality, respect for ethnic groups, and even international solidarity. In the case of higher education (Law 30 of 1992), issued two years before Law 115 of 1994, establishes that education at the university level is a "public cultural service" for which the state is responsible. At the level of national, departmental, and local development plans, significant progress has been made in different areas that are part of the education system, however, these are not very visible to a series of indicators that are far from the commitments made by governments.

Education plays a key role in the framework of sustainable development, as it acts as a driver of social change and progress. Using foresight tools, the future of education can be anticipated and planned to align it with global sustainability goals. These tools enable the identification of emerging trends, challenges and opportunities, facilitating the creation of educational policies that promote the development of competencies and skills needed to meet the environmental, economic and social challenges of the 21st century. Integrating education into sustainable development strategies fosters an informed and engaged citizenry, capable of driving sustainable innovations and practices that ensure an equitable and viable future for future generations.

In this order of ideas, the objective of this document is to determine, based on prospective tools that allow planning the future of education, strategies within the framework of sustainable development

from the formation of committed and trained citizens to respond adequately to the economic, social and environmental problems that allow a better development and collective welfare in society in the particular case of Colombia.

2. Theoretical references.

Foresight

Since the 1960s, the term has been developed at the level of governments, economic sectors and academia De Jouvenel (1966) proposed the term with the ability of man to choose and make decisions based on foresight; Decoufle (1974) points out that the term is not a short-sighted vision but, on the contrary, a sensible reflection on the future. Mojica (2010) indicates that the future should be analyzed through linear readings or conceiving it as a reality with several options; the linear analysis corresponds to the term forecasting and the exploration of different possibilities to strategic foresight.

According to Godet (2000) cited by Mojica (2008), strategic foresight aims precisely to break away from the traditional conception of a single future and that, on the contrary, several future scenarios are possible, and that the future can therefore be constructed.

In this order of ideas, a new vision of the future is opening the way for strategic foresight, which emerges as an innovative technique that breaks with traditional molds and offers a different and dynamic perspective to understand and anticipate the changes that can be expected. Of course, one of the most important pioneers is Michael Godet; this French methodology has become an invaluable tool for organizations and individuals seeking to achieve their objectives with a high degree of success in an uncertain and constantly changing world (Chung Pinzás, 2009).

Strategic Foresight differs from other approaches in two fundamental aspects: the future is not just an extension of the past, nor is it a predetermined destiny; rather, it refers to a dynamic construction that arises from the interaction between various system factors, actors and objectives.

Scenarios: uses and abuses

According to Godet (2007), he explains that the word "scenario" is often used indiscriminately: any set of hypotheses is thus qualified without verifying its relevance, coherence, or worrying about its plausibility (probability). Another frequent confusion consists in taking desires (objectives) for realities, mixing the exploratory with the normative. Not all possible scenarios are equally probable or desirable, and it is important to distinguish between the scenarios of the general environment and the strategies of the actors.

In this vein, Godet (2007) goes on to explain that the term "scenario" is not without its dangers for prospective thinking and that it can be more of a media concept than a concept with scientific arguments. The author poses two preliminary questions:

"Are we to consider that simply calling any combination of hypotheses a scenario gives an analysis, however appealing, any prospective credibility?"

"Is it indispensable to elaborate complete and detailed scenarios in a prospective reflection?"

Godet emphatically points out that the answer is No, because prospective and scenarios are not synonymous. A scenario is not the future reality, but a means of representing it, to illuminate present action in the light of possible and desirable futures. Reality testing and concern for effectiveness should guide prospective reflection for better control of history. Thus, scenarios are only credible and useful if they meet five conditions: relevance, coherence, plausibility, importance and transparency (Godet, 2007).

In this context, foresight can be defined as the discipline that analyzes the future based on reflection, action, knowledge and consensus, seeking that its results lead to decision-making that reduces uncertainty in the face of current complexities and helps with the anticipation of long-term plans and strategies (Aceituno, 2014); In the same sense, Godet (2007) considers that foresight is an anticipation to evidence present actions in the light of possible and desirable futures; on the other hand, Jordi (2010) states that in addition to foresight as a tool, there is another fundamental element in the creation of scenarios and that is the strategy as complementary actions since it analyzes which of the scenarios could be considered as optimal.

The analysis of foresight in the educational sector has gained relevance in recent years, given the recognition of the need to adapt educational systems to a dynamic and constantly changing global environment. Different methodologies and approaches have been used for its development, achieving

results that have directed strategies and public policies that contribute to the improvement of quality at different levels.

For the study of educational transformation and the analysis of trends at a global level, UNESCO (2015) has developed numerous prospective studies that analyze the influence of globalization on the sector, as well as digitalization and climate change, and focuses its studies and reports on the fourth industrial revolution, emphasizing emerging technologies, the use of AI, automation processes, redefining the competencies, skills and abilities necessary for future performance. analyzes foresight and educational policies and their adjustments to face future changes; focuses on lifelong learning and equity of educational systems and highlights the importance of flexible and adaptive educational policies that can respond quickly to unexpected crises, such as the COVID-19 pandemic (WEF (2020) (Vélez et al., 2022) (Rovira-Collado, et al. 2024).

In the case of Latin America and the Caribbean, CEPAL (2017) focuses its studies on the challenges facing the education sector at all levels, including issues related to inequality and lack of access to technology. Foresight studies in the education sector at the global and regional levels indicate a clear trend toward the need for adaptability and resilience in education systems with an emphasis on technology integration and preparation for a constantly changing labor market.

Foresight models and approaches

Foresight as an object of study relates different concepts and theories that merit analysis and definition to broaden the spectrum of knowledge and understand and apply the methodology it relates. The following are some of these theories and models: The open future is justified by the previous conception that the future is not defined and the importance of exploring its possibilities in terms of strategies and scenarios. Bell, W. (2003).

Another of the methodologies used in prospective studies is the planning horizon through which the time horizon is defined in which the actions and strategies that are intended to be used must be defined and planned whose main purpose is the analysis of changes and trends in that period (Godet, M. 2000) (Rodríguez, C. M. 2014).

The concept of vision, which is widely used in the creation of strategic direction at the organizational level, is used in foresight as a representation of what is expected in the future and as an orientation toward the development of actions and objectives to be achieved Bezold, C. (2009).

As for the analysis of megatrends, it focuses on five fundamental aspects of the environment related to economic, social, political, technological and environmental factors that allow anticipating future actions and mitigating their impacts, among these tools is the PESTEL analysis that provides the possibility of understanding a scenario concerning the factors mentioned above (Naisbitt, J. 1982) (Sánchez-Álzate, et al., 2020) (Galdón, et al., 2024).

Another important aspect in prospective studies is to take as a reference the theory of change, which helps to establish a mapping of those aspects that should be taken into account to generate the necessary conditions to reach the desired future or scenario, as well as the triangulation method, another of the techniques used in exercises and prospective studies consists of the use of different methods and sources to guarantee the veracity of the data obtained; this helps to generate greater credibility to the results obtained in the studies developed (Weiss, C. H. 1995) (Vásquez, et al., 2022).

Stakeholder analysis is used to understand and identify the different actors related to and interested in the results of a foresight exercise in the business and territorial sphere; in this type of study this analysis is of vital importance because it infers the different reactions and behaviors that the actors would have with the objectives to be achieved (Gutiérrez, 2024). (Hernández-Arce, et al., 2024).

The Delphi method is a structured communication technique based on the consultation of experts through successive rounds of questionnaires to reach a consensus on specific topics. This method is useful for forecasting technological changes and future trends (Linstone, H.A., & Turoff, M. (2009).

3. Methodology

The foresight studies, according to the theoretical references analyzed on the subject, consider that the methodology for the construction of future scenarios is developed following the following chart:

Table 1. Phases of the integrated methodology of strategic foresight

Step	Process	Focus
1. Definition of the desired future	Creativity	Future
2. Diagnosis (SWOT Analysis and Competency Tree)	Prospective reflection	Prospective reflection
3. Determination of strategic variables (Structural Analysis)	Available resources	Prospective reflection
4. Identification of involved actors (Analysis of Alliances and Conflicts)	Available resources	Prospective reflection
5. Generation of Scenarios (Smic-Prob-Expert and Peter Schwartz Axes)	Necessary resources	Strategic will
6. Design and Execution of the action plan	Action	Action

Source: Prepared by the authors based on Cortez and Galicia (2007).

In compliance with the methodology developed and to define strategies that contribute to the development of the desired future for the education sector, the model described in the previous image will be developed in the following phases: analysis of the state of the art, selection of factors of change, precision and definition of strategic or key variables, analysis of the actors, design and future scenarios, selection of strategies for the development of each phase we will use the LIPSOR laboratory software such as MICMAC, MACTOR,

4. Analysis and results.

In the first instance, it is important to point out the context in which the studied problem is observed, in that order of ideas, we analyze some of those variables that should be considered to determine the future actions that should be developed. For coverage, in rural and dispersed rural areas, the percentage is much lower than in urban areas, and for obvious reasons, coverage is higher in the large capital cities than in the smaller municipalities. This variable in the educational levels described above is very unequal, and of course generates inequity and problems in the quality of education. Wasserman, M (2021).

Figure 1. Basic, secondary, and middle school education. Coverage data 2019

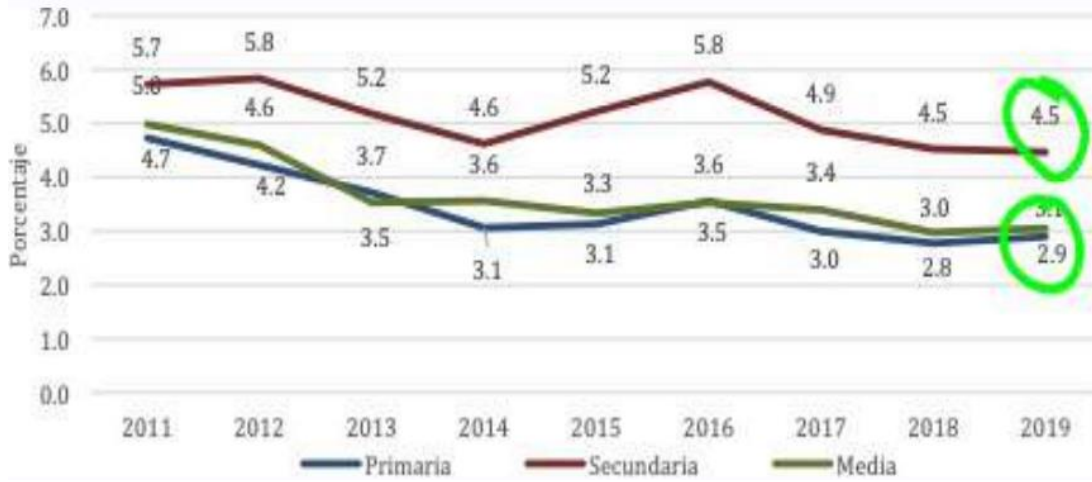


Source: Ministry of Education, SNIES

The coverage rates for primary and basic secondary education reach 100% and are also free of charge; this indicator, when referring to net coverage, is 77.5%, showing variations in transition levels and basic secondary education, which is even below the OECD and below the average for Latin America.

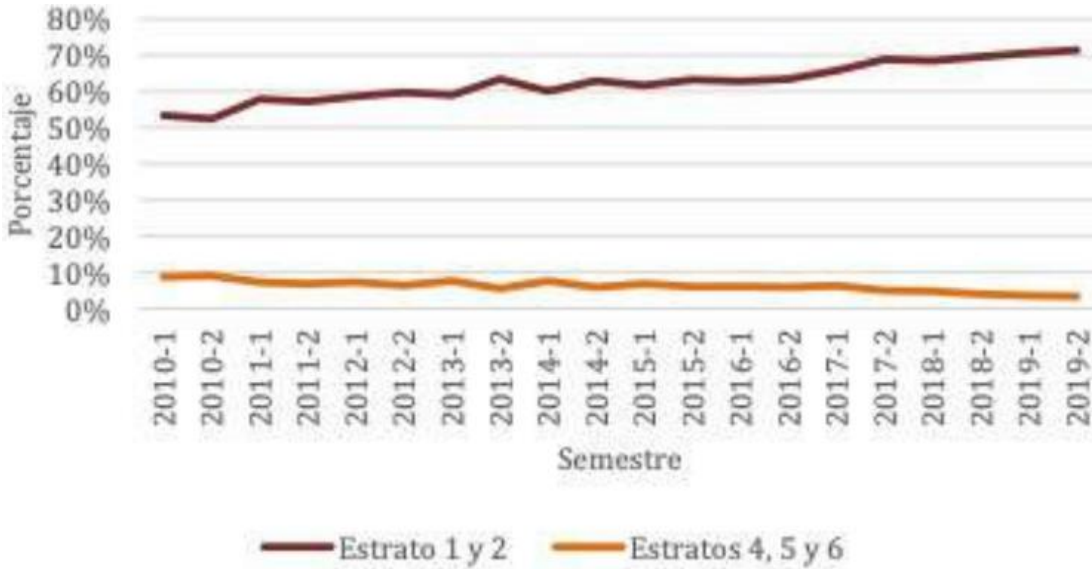
In Colombia, school dropout continues to be a significant problem that affects the different educational levels. Below are the dropout rates for primary, secondary and middle school education, based on recent data primary education 2.9%, secondary education 5.4%, and middle school education 7.2% (MEN 2019). In this sense, it is also important to consider the factors that influence this phenomenon such as socioeconomic, family environment, educational quality, social factors and the effects generated by the Covid-19 pandemic Wasserman, M (2021).

Figure 2. Primary, secondary and middle school dropouts



Source: Ministry of National Education. SNIES

Figure 3. Attrition by socioeconomic stratum



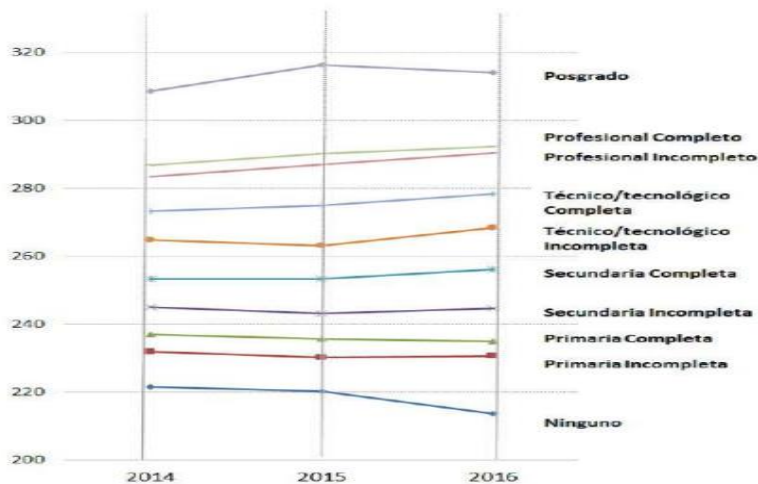
Source: SPADIES

Possibly one of the major shortcomings of the system is related to quality; one of the reasons for this could be the government's focus on increasing opportunities for a greater number of young people by making efforts in coverage, which at some levels, as we have seen, achieved the objective, while at others it did not. However, this exercise of expanding coverage did not achieve equal opportunities for all young people, given that regardless of the economic capacity of families, differences in quality have a very direct impact on equity. Wasserman, M (2021).

Figure 4. Gaps in mother's educational level.



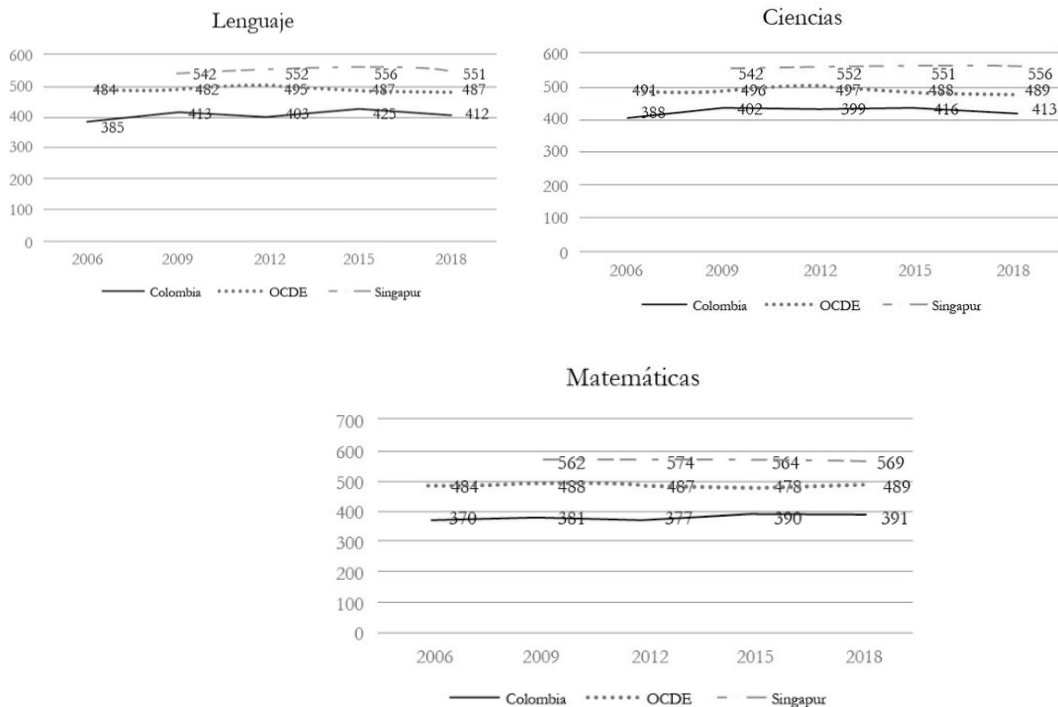
Brecha Nivel Educativo de la Madre - Puntaje Global Saber 11



Source: García, Maldonado & Rodríguez (2017).

The analysis of quality results at an international level and according to the OECD analysis is carried out through the PISA (Programme for International Student Assessment) tests, which is carried out every three (3) years and about 60 countries participate and Colombia has been participating since 2006. The results are measured through three specific or fundamental competencies "ability to pose and solve everyday problems in mathematical terms", "to read and understand a text in depth" and "to understand phenomena of the physical world using scientific concepts" its application is from ninth grade onwards. According to the tables that we took as reference for the analysis, it is observed that there is no improvement in the results; however, in the three competencies, either the same results are maintained (which are not the best) or a decrease in the percentage results is observed.

Figures 5. Comparative results of Colombian students in the PISA tests on the three basic competencies, conducted between 2006 and 2018.



Source: Wasserman, Moisés. Education in Colombia (p. 89).

The comparisons established in the graphs are made between the periods from 2006 to 2018, comparing the scores for the three competencies evaluated by the PISA tests. Colombian students are compared with the OECD averages and with Singapore students for always being at the top of the results. Among



the most relevant aspects to consider is that the lines are horizontal and parallel to the abscissa, with minimal variations, which implies that there are practically no changes during the study period. The data for Colombia is of great concern given that it is below the OECD averages between 75 and 90 points and for 2018, compared with Singapore, the results are even more complex: 139 points below in language, 143 in science and 178 in mathematics.

According to (PISA). Results - Colombia (2018). Paris: OEDC, (2019) only 1% of Colombian students have a superior performance in mathematics, in science, there is no data at a higher level that is 0% (zero) while Colombian students with very inferior performance in mathematics are 65%. The results also show that socioeconomic status can predict the results of the country's students in tests such as language where these students are 86 points ahead of the others on average, in mathematics there is a 13% difference and in science, there is a 12% difference.

Now, after the consequences of the COVID-19 pandemic, the projections for the education sector are not the best. The flexibility in the models, the lack of mastery of technological tools by students and teachers, and the lack of preparation of educational institutions, especially in the public sector, have generated a setback in the teaching and learning processes, which merits a great commitment by governments to bring the education system at least to the indicators in which it was before the pandemic.

Table 2. Percentage of students below the minimum reading level, projection for Latin America and the Caribbean

Scenario	Percentage
Pessimistic	88%
Intermediate	70%
Optimistic	53%
Baseline	35%

Source: Azevedo et al. (2020).

Another variable to consider is inequity understood as the disparities and differences between education and opportunities in terms of public and private, urban, rural and dispersed rural. One of the indicators that most clearly emphasizes this aspect is the ranking of educational institutions (schools or colleges) according to their average ranking based on the Saber 11 tests as shown in the following table.

Table 3. Percentage distribution of official educational establishments according to the average performance of their graduates in the Saber 11 state tests.

Category	A+	A	B	C	D
Large cities	4.19	18.76	38.24	28.33	14.98
Intermediate cities	1.51	8.57	30.38	30.59	28.94
Rural	0.30	6.47	24.83	34.76	33.63
Dispersed rural	0.00	4.67	26.81	34.82	33.70
Total country	2.11	11.65	31.83	29.38	25.02

Source: National Planning Department. Bases of the National Development Plan 2018-2022.

The analysis shows that in the capital cities or larger, 4% of the IEOs have a good performance, while in rural areas only 0.3% and in the dispersed rural areas there are no schools at that level. In large cities, 23% of schools are good or very good; in intermediate cities 12%, in rural areas 7% and in dispersed rural areas not even 5%. It is quite clear that the differences are wide for the contribution and commitment of the state to youth in large cities and rural areas.

Given the previous analysis of the data established in the variables analyzed at the basic primary, basic middle, and high school levels, it is justified for the following reasons 1) planning of strategies and public policies to align resources and action plans with the future needs of the social economy 2) adapting to socioeconomic changes and advances in educational technologies given the rapid innovation in



technologies a prospective analysis, would help the process of adaptation of the educational system to achieve a relevant education to the future demands of the labor market (OECD, 2019) (World Economic Forum (2020).

One of the main objectives of the prospective study would be to improve the quality of education with the aim of identifying trends, strategies and alternatives that point to the implementation of new teaching and learning methodologies, teacher training, and curriculum updating, among others UNESCO (2015). Concerning equity and inclusion, a study is justified to identify gaps and inequalities to establish public policies that promote inclusion and equity at all educational levels. UNICEF (2021).

Results.

Concerning the challenges of education, the SWOT matrix exercise is presented, which identifies the strengths, weaknesses, threats and opportunities within the framework of education from a sustainable development approach.

The SWOT (Strengths, Weaknesses, Opportunities, Opportunities and Threats) matrix presents a detailed overview of the challenges and opportunities facing the education system in Colombia. This general analysis aims to provide a holistic view of the key elements identified and propose comprehensive strategies to improve education in the country.

Weaknesses: The weaknesses identified, such as technological limitations, socioeconomic inequality, lack of adequate infrastructure, and high dropout rates, highlight structural problems that limit the quality and accessibility of education in Colombia. These weaknesses underscore the need for significant investment in technology and infrastructure, as well as the implementation of policies that address socioeconomic inequality and promote school retention. The lack of adequate infrastructure and technological resources not only affects the quality of teaching but also negatively influences students' sense of belonging and motivation.

Opportunities: On the other hand, opportunities such as technological advances, educational inclusion, public-private partnerships, and lifelong learning programs offer avenues to transform and improve the education system. The increasing availability of educational technology and the focus on inclusion can be leveraged to close educational gaps and promote more equitable education. Public-private partnerships can provide the resources and expertise needed to carry out significant reforms. In addition, the demand for continuing education programs can better prepare students for an ever-changing job market.

Threats: Threats, including natural disasters, youth unemployment, and political instability, represent external factors that can disrupt and complicate access to and quality of education. Exposure to natural disasters requires the implementation of robust contingency plans to ensure continuity of education. Youth unemployment and political instability demand adaptability in curriculum and stability in educational policies to ensure that education remains relevant and accessible, even in times of crisis.

Strengths: Strengths such as cultural diversity and political commitment to education are valuable resources that can be leveraged. Colombia's cultural richness can be integrated into the educational curriculum to promote intercultural understanding and global citizenship. The government's commitment to education, if maintained and strengthened, can provide the necessary support to implement the reforms and policies required to improve the education system.

In this order of ideas, we also show the results from the identification of the factors of change, which are derived from the SWOT matrix.

Table 4. The change factors identified in the SWOT matrix are listed below:

NAME	SHORT NAME	DESCRIPTION	FAMILY
Integration of virtual classrooms	(IAV)	Refers to adopting online platforms and learning management systems that allow students to access educational content, interact with their teachers and peers, and complete assignments from anywhere with an Internet connection.	Technological

Curricular reforms	(RECURRICU)	Generation of changes in educational curricula at the national or local level, introducing new subjects, competencies or pedagogical approaches that adapt to the needs of the 21st century or comply with international standards.	Legal and regulatory
Scholarship programs	(PROBECA)	Government or private initiatives that offer financial support to low-income students to access and remain in the education system, including scholarships for tuition, transportation, food or school supplies.	Socioeconomic
Connectivity infrastructure in rural areas	(IDEAUR)	Projects that seek to bring technology and digital educational resources to rural communities where access to quality education can be limited due to distance and lack of infrastructure.	Socioeconomic
Environmental education	(ECOA)	Introduction of educational programs that sensitize students to the importance of environmental conservation, promoting sustainable practices and care for natural resources.	Environmental
Educational reforms	(REDUCA)	Implementation of educational reforms driven by changes in government administration, which may include modifications in the structure of the educational system, curricula, resource allocation and evaluation policies.	Politicians
Student participation	(APE)	Promotion of student participation in decision-making at the school and national levels through the creation of spaces for student representation and consultation on issues relevant to the educational community.	Politicians
Focus on digital skills	(HADE)	Adjustment of educational programs to develop digital skills in students, such as programming, data analysis and management of technological tools, in response to the growing demand for technology-related skills in the labor market.	Labor market trends
Promoting entrepreneurship	(INNOVA)	Integration of entrepreneurship education into the school curriculum, preparing students to start and manage their own business projects in an increasingly competitive work environment.	Labor market trends
Internationalization of higher education	(ESI)	Increased international student and academic mobility, with more Colombian students choosing to study abroad and more Colombian educational institutions establishing collaborations and joint programs with foreign institutions.	Globalization

Source: based on MACTOR software.

The identification of key actors is an action of vital importance for the implementation of any educational strategy. In the Colombian context, the actors identified in the table above are educational institutions, local and national governments, non-governmental organizations, the private sector, local communities, students and their families.

Likewise, identifying the factors of change is also a very important process for the continuous improvement of the educational system in Colombia. It enables proactive adaptation, improves educational quality, facilitates strategic planning, fosters innovation, and ensures that education is relevant, equitable, and sustainable. By recognizing and addressing these factors, stakeholders can


to social demands in education systems, based on the integration of technology and the development of digital skills that are at the forefront of the labor market. The application of prospective methodologies has made it possible to identify key factors and strategic variables that must be addressed to ensure sustainable and equitable educational development. The implementation of virtual classrooms and mobile educational applications, as well as curricular reforms and educational inclusion laws, stand out as fundamental elements to transform and improve the Colombian educational system.

The findings underline the importance of significant investment in technology and infrastructure, especially in rural areas, to close the educational gap between urban and rural areas and thus guarantee the quality and accessibility of education. In addition, the creation of public-private partnerships and the promotion of continuing education programs are strategies aimed at promoting educational inclusion and equity. Cultural diversity and political commitment to education must be leveraged to integrate an intercultural understanding into the educational curriculum and strengthen the governmental support needed to implement the required reforms and policies.

Finally, educational foresight not only contributes to anticipating and preparing responses to possible future scenarios but also provides a framework for informed and strategic decision-making. This is very important to adequately respond to the challenges of a dynamic environment and ensure that education in Colombia progresses and therefore contributes to the integral development of students.

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