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EDUCATIONAL INFRASTRUCTURE – AN IMPORTANT FACTOR OF SUSTAINABLE DEVELOPMENT IN THE NORD-EST REGION

ABSTRACT

As an indispensable element for the sustainable development of any area, education enables each person to acquire the knowledge, skills, attitudes, and values necessary to ensure a sustainable future, which also requires the existence of an adequate educational infrastructure. The educational infrastructure in Romania has undergone profound structural changes over the last 30 years, with significant disparities across regions and between rural areas. In this regard, this study aims to analyse the educational infrastructure in the Nord-Est region, compared to the national average, with a particular focus on rural areas.

Key words: education, infrastructure, sustainable development, development regions.

JEL Classification: D83, I21, I24.

1. INTRODUCTION

Educational infrastructure in Romania has been the subject of many discussions over time in terms of access to quality infrastructure, and especially in terms of its inadequate funding. The structural changes that have taken place in recent years led to widening the gaps in the provision of adequate educational infrastructure between development regions, and mainly between rural and urban areas. The different local development potential has also led to a differentiated allocation of funds for the development of related infrastructure in the field of education.

2. STATE OF KNOWLEDGE

Educational infrastructure refers to all physical, logistical, and human elements that support the learning and training process, from early childhood education to post-doctoral studies and lifelong education and training. The main components of educational infrastructure include: school facilities, equipment and resources, teaching staff, as well as utilities and structural safety.

The quality of education is influenced, among other things, by students' learning conditions, including the educational infrastructure available to them.

These conditions are fundamentally interconnected, interact with each other, and together reflect a comprehensive vision of quality education, which includes political, cultural, and economic factors (UNESCO, 2019).

According to the World Bank, the above-mentioned elements are crucial components of the learning environment in schools and universities. There is strong evidence that high-quality infrastructure facilitates better training, improves student outcomes, and reduces dropout rates, among other benefits (World Bank, 2017).

At the same time, experts (Wood, 2023) appreciated that education is one of the essential aspects of life, but also a key element in the personal development of each individual. Differences in education and related infrastructure between urban and rural areas affect quality and accessibility.

To the extent that rural population does not have access to quality education, and implicitly to adequate infrastructure, this will lead to a shortage of skilled labour in those rural areas, with a direct impact on local economic development (Daipha *et al*., 2001).

Some authors acknowledge that many rural communities lack the necessary infrastructure, which limits access to education. To eliminate the gaps between urban and rural areas, decision-makers should invest in the construction and maintenance of schools in rural areas and provide resources such as textbooks, teaching materials, and internet access (Gill *et al*., 2013).

3. MATERIAL AND METHOD

From a methodological point of view, this approach is based on public information provided by the National Institute of Statistics through the Tempo-Online database. Dynamics, comparison, and structure are the main methods used in analysis. The reference period considered is 2020-2024. The main analysed indicators are the following: number of classrooms, school laboratories and PC/IT equipment. These indicators were analysed at the level of the Nord-Est region, in rural areas, by main educational levels.

4. RESULTS AND DISCUSSIONS

As it has been mentioned above, this study aims to analyse the relevant indicators that characterise the educational infrastructure in the Nord-Est Region of Romania.

In this regard, the first indicator analysed was the *number of classrooms* (schoolrooms and amphitheatres). From this point of view, in the period 2020–2024, their number increased by 2.7% at national level, and decreased by 0.1% in the rural areas.

By educational levels, the period 2020–2024 is characterised by a decline in all levels of education, ranging from -2.6% (vocational education) to -1.3% (primary and lower secondary education), while at national level a slight upward trend in all levels can be noticed.

In the Nord-Est region, it is worth mentioning that in the year 2024, compared to 2020, the share of the number of classrooms in total national decreased by 0.3 percentage points, from 17.9% (2020) to 17.6% (2024).

By component counties of the Nord-Est region and educational levels, significant fluctuations can be noticed across counties in the period 2020–2024. Thus, in higher education, the number of classrooms decreased in the analysed period, from -14.1% (Neamț county) to -53.3% (Iași county), while in vocational education there was a significant increase in the number of classrooms. For example, in Suceava county, we can notice a doubling of the number of classrooms for vocational education, with Bacău, Neamț and Vaslui counties also following the same upward trend. The four counties, where an increase in the number of classrooms for this type of education can be noticed, exceed the national increase by only 2.1% (Table 1).

Table 1

Dynamics of the number of classrooms in the Nord-Est region, by counties, compared to national total (2024/2020) (%)

	National total	**Primary and lower secondary education (special education included)**	**High-school education**	**Vocational education**	**Higher education**
TOTAL	2.7	0.9	0.8	2.1	3.4
Bacău	-0.7	-2.6	0.1	21.6	0.0
Botoșani	1.8	1.7	0.4	-4.3	3.0
Iași	3.8	3.5	-2.1	0.0	-53.3
Neamț	-1.4	-1.0	-4.5	8.3	-14.1
Suceava	2.3	2.2	-1.3	100.0	0.2
Vaslui	-1.7	-2.8	-2.4	9.3	0.0

Source: Author's calculations using data from the Romanian National Institute of Statistics, Tempo-Online.

Similar to the number of classrooms, the number of school laboratories showed a much more pronounced downward trend in rural areas compared to national average in the reference period. Thus, in 2024, the number of school laboratories decreased by 2.6% nationwide compared to 2020, while in rural areas the decline was 4.3%.

The largest decline in rural areas was in the number of school laboratories for high-school education (-6.8%). Although there is a trend towards improving vocational education, the number of laboratories dedicated to this level in rural areas decreased by 3% in 2024 compared to 2020.

Across the Nord-Est region, the period 2020-2024 is characterised by a downward trend in the number of laboratories as percentage of national total, namely by 0.5 percentage points (from 16.8% in 2020 to 16.3% in 2024).

By component counties and level of education, the number of laboratories showed a noticeable upward trend in Iași and Neamț counties in terms of higher education, while Botoșani county is at the opposite end of the spectrum, where the number of laboratories decreased in all levels of education, with percentages ranging from -1.6% (high school education) to -16% (vocational education). Also in this case, Suceava county stands out, where the number of school laboratories increased by 50%, followed by Bacău county, with an increase by 33.3%. In fact, these two counties exceed the national average of 4.2% (Table 2).

Table 2

Dynamics of the number of laboratories in the Nord-Est region, by counties, compared to national total (2024/2020) (%)

	National total	**Primary and lower secondary education (special education included)**	**High-school education**	**Vocational education**	**Higher education**
TOTAL	-2.6	-4.9	-5.1	4.2	0.6
Bacău	-1.2	-8.1	3.6	33.3	0.0
Botoșani	-2.2	-5.0	-1.6	-16.0	-7.9
Iași	-7.7	-13.7	0.0	0.0	66.7
Neamț	-3.1	-6.8	1.0	-23.1	16.8
Suceava	-5.4	-12.5	-11.0	50.0	-5.1
Vaslui	-3.2	-6.3	0.0	-8.2	0.0

Source: Author's calculations using data from the Romanian National Institute of Statistics, Tempo-Online.

In the context of the expansion of information technology, fast internet connections, and digitalisation, the number of computers and IT equipment increased significantly, not only nationwide, but especially in rural areas, in all educational levels. Thus, in 2024, compared to 2020, the number of computers and IT equipment in rural areas increased by 14.9% (higher education) to 59.2% (secondary education). Compared to the national average growth (36.6%), rural areas exceed the national total by 8.8 percentage points.

For the North-East region as a whole, the period 2020–2024 is characterised by an upward trend in the number of computers and IT equipment in national total, namely by 4.2 percentage points (from 12.7% in 2020 to 16.9% in 2024).

By county and level of education, there is a significant increase in the number of computers and IT equipment for primary and secondary education, which is a positive aspect in the development of young people's skills in the use of information technology. In fact, this level of education, together with vocational education, recorded significant increases in the reference period, with percentages ranging from 52.4% (vocational and secondary education – Bacău county) to 286% (vocational education – Suceava county) (Table 3).

Table 3

Dynamics of the number of computers and IT equipment in the Nord-Est region, by counties, compared to national total (2024/2020) (%)

	National total	**Primary and lower secondary education (special education included)**	**High-school education**	**Vocational education**	**Higher education**
TOTAL	36.6	44.6	33.0	39.8	26.4
Bacău	55.6	52.4	65.0	97.1	50.9
Botoșani	102.8	126.7	57.1	129.6	30.5
Iași	76.8	154.0	69.4	94.6	-21.9
Neamț	56.0	62.7	50.8	84.1	46.6
Suceava	97.1	144.2	137.6	286.0	38.6
Vaslui	107.6	146.0	59.4	117.8	0.0

Source: Author's calculations using data from the Romanian National Institute of Statistics, Tempo-Online.

5. CONCLUSIONS

The analysis of the available information shows that in the period 2020–2024, educational infrastructure, from the perspective of the analysed indicators, experienced a clear trend of improvement in rural areas. However, there are still significant gaps between rural and urban areas, generated by different allocations of funds for the development of this infrastructure.

Across the Nord-Est region as a whole, there is a downward trend in the weight of the first two analysed indicators in national total, while by counties there are significant gaps in all levels of education.

It is noteworthy that between 2020 and 2024 there was a major interest in investing in educational infrastructure in terms of IT equipment and computers in all levels of education, but especially by significant percentages in primary and lower secondary education as well as in vocational education.

In fact, the shift towards vocational education is an option and an alternative for faster use of the acquired skills. On the other hand, it creates the conditions for

faster integration of graduates into the labour market, with a direct impact not only on their income, but also on the economic development of each area.

In conclusion, in order to reduce disparities in educational infrastructure in the Nord-Est region, it is necessary to implement appropriate public measures and policies that should take into consideration the current needs of the labour market, and to ensure optimal conditions for the educational process.

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