

## Mapping Educational Ecosystems in Bulgaria: Types and Trends

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### *Abstract*

The paper presents the current results of a long-term research project focused on mapping educational ecosystems in Bulgaria. Based on a conceptual analysis of ecosystemic paradigm in formal and non-formal education the paper presents a classification of identified types of educational models and practices with ecosystemic features. The qualitative research is based on case studies of the 6 administrative regions of the country with the aim to map the typical educational ecosystems. The data show that their features and dynamics reflect the reached balance between proactive local culture(s), context and leadership, on one side, and the supportive external priorities and policies at regional, national and international level, on the other. This explains why some ecosystems are internally focused and resilient while others' sustainability is seriously affected by the external context and dynamics.

*Keywords:* educational ecosystem, mapping, case study, Bulgaria.

### 1. Introduction

The widespread processes of educational globalization and integration not only require ongoing alignment of development goals and priorities but also facilitate the exchange of concepts, ideas, and models from various scientific and practical domains – including natural and information sciences, economics and sociology, social and human medicine, and organizational and management studies. This dynamic interplay has significantly restructured both scientific systems and their applied fields, underscoring the profound interdisciplinary trends that emerge from the blending, enhancement, complementation, and integration of these fields. A notable impact of these shifts is the increasing adoption of unified conceptual frameworks that aim to comprehensively represent, explain, and develop complex realities.

A key element in this trend is the evolution of the ecosystem paradigm, which has expanded from the natural sciences into social and educational theory and analysis. In educational contexts, the ecosystem paradigm typically emphasizes a holistic approach to the interconnected, adaptable, and complementary nature of educational goals, curricula, environments, methods, participants, resources, processes, technologies, and management practices. Through this lens, proponents of ecosystem-based critical thinking seek solutions for 21st-century education that maximize the use of all available resources, experiences, and pathways to support optimal learning and development for every learner.

- Three core dimensions of educational ecosystems in Bulgaria: personal and social development, vocational training, and social support.
- Structural mapping shows strong spatial and regulatory connections among entities focused on personal development and inclusion, often facilitated by local administrations.
- Vocational schools and training centers generally align well with local labor market demands.
- Minimal resource-sharing among institutions constrains the broader connectivity required for a cohesive educational ecosystem.
- A region-specific approach is necessary for balanced educational development across Bulgaria, highlighting the need for further research.

Learning ecosystems thus encompass diverse models and practices that thrive in both formal and informal contexts, integrating analog and digital subsystems, as well as internal and external resources, supports, and elements. Many contemporary educational practices incorporate these elements, though some traditional educational system models still partially represent educational realities by focusing predominantly on formal systems and institutions, despite policies or legislation that advocate ecosystemic approaches.

In this context, Bulgaria's Education Act of 2016 marked a pivotal shift, opening the historically centralized and insular educational system to active collaboration with institutional and social partners. This reform restructured the school network, expanded the role of out-of-school institutions, and integrated the socio-pedagogical capacities of specialized units and professionals to better support vulnerable student groups. By engaging key institutional partners – such as health and social services, employers, civil society organizations, and various government ministries – Bulgaria aims to foster inclusive educational policies and practices. The intended outcome is a balanced integration with other economic and social sectors, creating favorable conditions for sustainable ecosystem-based education.

Eight years later, a critical question arises: has this substantial legislative shift, rooted in a profound paradigm transformation, effectively transitioned Bulgarian education from a systemic to an ecosystemic model? To explore this, the research presented in this paper seeks to identify and analyze ecosystemic dynamics within Bulgarian education, mapping the primary ecosystem profiles and developmental trends shaping the educational landscape.

## 2. Conceptual framework

An earlier paper (Nikolaeva, 2024), based on a systematic analysis of 74 thematically selected publications in Scopus, identified two main conceptual approaches to defining and classifying educational ecosystems.

The first approach is rooted in traditional views of biological ecosystems, defined by the integration of biotic and abiotic elements through ecosystem functions that support their co-evolution (Bronfenbrenner & Morris, 2007; Railean, 2022). This approach primarily examines the relationships between biological, social, and psychological actors and elements in education, linked by values, structural-functional ties, and territorial complementarity. Educational ecosystems are classified by levels of connectivity and complementarity, including micro- (participants), meso- (organizations, institutions, communities), exo- (state institutions, media, professional organizations), and macro-levels (cultural and subcultural systems encompassing the micro-, meso-, and exo-levels) (Bronfenbrenner, 1976). Additionally, value-functional typologies have emerged, shaped by current global and regional educational priorities. Examples include theories of ecosystems designed for sustainable development education (Deev et al., 2020), inclusive education (Anderson, Boyle & Deppeler, 2014), and lifelong learning (Chiappe et al.,

2020). An updated version of this approach reflects post-COVID digital trends, emphasizing personalized learning in digital environments (Nguyen & Tuamsuk, 2022). Proponents of this paradigm argue it facilitates analysis of hybrid functions and relationships between traditional educational settings and those mediated by modern technological platforms and tools (Mart et al., 2008). This trend has further expanded with the rise of accessible artificial intelligence applications in education (Rojas & Chiappe, 2024).

The second approach, based on business modeling theories, conceptualizes ecosystems as non-hierarchical networks of organizations that interact and complement each other in modular, multilateral ways through specific, non-generic dependencies (Jacobides, Cennamo & Gawer, 2018; Shipilov & Gawer, 2019; Adner, 2017). Business ecosystem modeling posits that such configurations enhance the value pathway or final output of products or services by enabling effective adaptation to external conditions. This adaptability is achieved through autonomous, non-hierarchical complementarity of resources, technologies, markets, and environments within the ecosystem (Jacobides et al., 2018). Structurally, business ecosystems emphasize inter-agent flows based on complementary, autonomous roles that align with desired client utility and performance (Adner, 2017). Co-evolutionary approaches emphasize agents' affiliation with a community, often organized around a central actor that supports mechanisms for both macro- and micro-level co-evolution within the ecosystem (Moore, 2006).

Building on the well-established systemic paradigm in educational and social research, the ecosystem perspective enhances it by integrating key system levels in line with ecological principles. System analysis is a powerful tool in scientific research, enabling the description, clarification, and construction of multilayered, holistic models that integrate a system's foundational elements with its goals, functions, strategies, and processes. As such, system modeling and analysis serve as key methodological foundations for studying and forecasting formal educational systems. However, a primary limitation of this approach is that activities and elements outside a system's organizational boundaries are often difficult to identify or analyze. Within national, regional, and local educational layers, parallel, non-systemic, and informal practices often go unrecognized, despite their quality, utility, impact, and contributions.

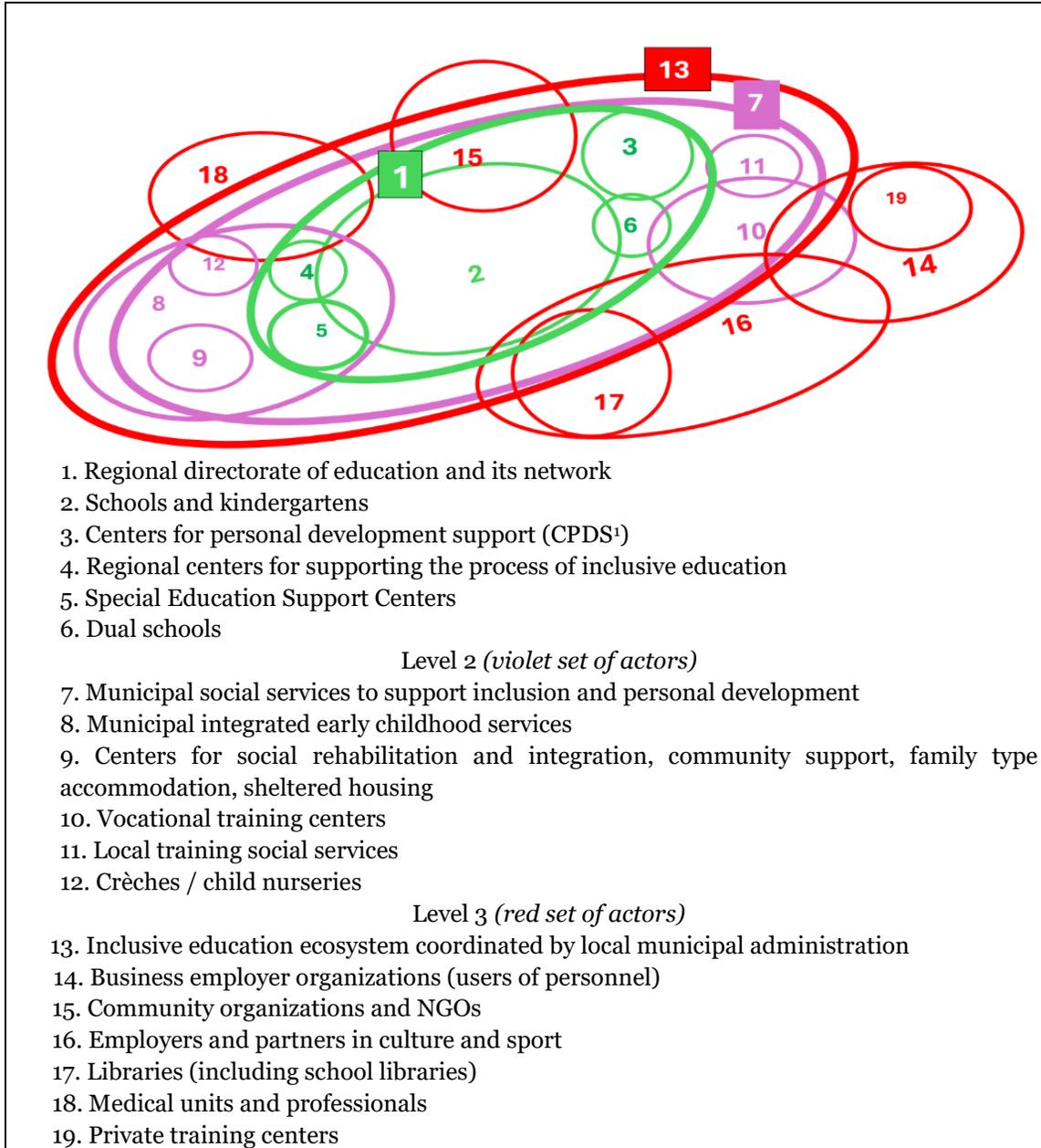
For ecosystem analysis, understanding the parallelism between organized (institutionalized), partially institutionalized, and spontaneous educational flows is essential to capture the holistic structure and functional dynamics of learning and education as a continuum. Ecosystem models thus examine interactions among systems and subsystems with varied levels of structure, intentionality, and sustainability, extending to human, social, socio-cultural, socio-economic, as well as natural, technological, and material contexts. The ecosystem paradigm is reshaping learning and educational systems and practices by:

- Stimulating greater connectivity, inclusivity, partnerships, and sustainability for lifelong learning.
- Supporting holistic personal and social development by drawing on diverse incentives, resources, environments, and tools.
- Emphasizing the interconnectedness of all elements in the learning environment, beyond formal limitations, spatial boundaries, institutional regulations, or socio-cultural or age-based participant profiles.

While educational ecosystems are not inherently sustainable, they can be intentionally designed and managed to achieve sustainability through strategic planning, resource management, adaptability, and stakeholder engagement. A balanced ecosystem harmonizes innovation with stability, inclusivity with efficiency, and a long-term vision with immediate needs, to remain impactful and relevant over time.

In accordance with the current Education Act (2015), educational ecosystems in Bulgaria operate across at least three levels of functional coexistence and structural complementarity (Fig. 1).

Figure 1. Connectivity between levels of functional coexistence and structural complementarity between actors in educational ecosystems in Bulgaria



The foundational level comprises organizations and agents that, under the current Preschool and School Education Act, are part of Bulgaria’s formal education system. This includes

<sup>1</sup> The abbreviation for the Center for Personal Development Support used in this paper is CPDS. According to Bulgarian law, five types of institutions hold the formal status of CPDSs: CPDS - cultural centers for children and students, CPDS - career centers, CPDS - observatories, CPDS - student hostels, and CPDS - sports centers.

the Regional Directorate of Education (Fig. 1, #1), which coordinates activities across municipal and private kindergartens and schools (Fig. 1, #2), centers for personal development support (Fig. 1, #3), special education support centers (Fig. 1, #4), regional centers for inclusive education (Fig. 1, #5), and vocational schools (Fig. 1, #6). Together, these entities form a core network that provides interdisciplinary and inter-institutional support for the social and academic inclusion of every child and student in the education system.

This network's interactions are coordinated by the Regional Education Offices (REOs), which ensure the quality of individual and group support for students. Schools and kindergartens, responsible for outreach, retention, and the social and academic development of children and students, act as main coordinators within their local ecosystems, ensuring their structure and functionality align with the inclusive goals of the system.

The second level of functional coexistence and structural complementarity within the local Bulgarian context incorporates social services and activities that support social and educational inclusion and integration (Fig. 1, #7). This level typically includes integrated social services that support early childhood (Fig. 1, #8) and are closely connected to integrative social services such as Social Rehabilitation and Integration Centers, Community Support, Family Accommodation, Sheltered Housing (Fig. 1, #9), Vocational Training Centers (Fig. 1, #10), Local Educational Social Services (Fig. 1, #11), and Nurseries (Fig. 1, #12). Their support for inclusive education takes the form of statutory inter-institutional procedures and protocols for shared responsibility and care.

The third level of structuring an educational ecosystem in Bulgaria integrates local actors, resources, spaces, and activities coordinated by the municipal administration (Fig. 1, #13). This level shapes the external environment of the inclusive education ecosystem, which, while not formally part of the internal structure, provides it with additional resources and support for regular functioning. At the municipal level, this typically includes business organizations (potential employers) (Fig. 1, #14), reading and civic organizations (Fig. 1, #15), cultural institutions (Fig. 1, #16), libraries (including school libraries) (Fig. 1, #17), medical units, centers, and specialists (Fig. 1, #18), and private training centers (Fig. 1, #19).

This paper presents the findings from a cumulative case study on the first level of functional coexistence and structural complementarity among actors, their environments, resources, and actions within a local Bulgarian educational context. The analysis identifies and examines key ecosystemic characteristics and trends, integrating concepts from both biological and business ecosystem theories. This hybrid approach reflects the mixed nature of educational functions, environments, actors, resources, and impacts, highlighting trends in sustainability, inclusion, and market orientation.

### 3. Method

The cumulative case study employs various research techniques to identify profiles, generalize findings, and compare different cases to increase the robustness of conclusions.

#### 3.1 Data aggregation

The aggregated data covers selected cases from all six regions and 28 districts, representing all core types of institutional and functional entities, participants, environments, and communities involved by law as supporting entities for the formal educational system (Table 1).

Table 1. Types of aggregated data and entities

Key types of aggregated data	Key entities integrated into educational ecosystems
<ul style="list-style-type: none"> <li>- Number of entities by type</li> <li>- Number of entities by districts and regions.</li> <li>- Core share functions of each type of entity (qualitative data).</li> <li>- Core share activities &amp; services of each type of entity (qualitative data).</li> </ul>	<ol style="list-style-type: none"> <li>1. Centers for personal development support (CPDSs)               <ol style="list-style-type: none"> <li>1.1 Children’s centers for culture, art and education</li> <li>1.2 Observatories</li> <li>1.3 Student hostels</li> <li>1.4 Career centers</li> </ol> </li> <li>2. Regional centers for supporting the process of inclusive education</li> <li>3. Special Education Support Centers</li> <li>4. Vocational training centers</li> </ol>

### 3.2 Generalization

The goal is to generalize findings from multiple cases, ultimately identifying typologies and trends within educational systems by region and district (see Fig. 1).

Figure 2. Regions and districts addressed by cumulative case study

NORTHWESTERN REGION <i>Montana, Vratsa, Vidin, Lovech, Pleven</i>	NORTHERN CENTRAL REGION <i>Russe, Gabrovo, Veliko Tarnovo, Razgrad, Silistra</i>	NORTHEASTERN REGION <i>Varna, Targovishte, Shumen, Dobrich</i>
SOUTHWESTERN REGION <i>Sofia City, Sofia district, Kyustendil, Blagoevgrad,</i>	SOUTHERN CENTRAL REGION <i>Ploudiv, Pazardjik, Smolyan, Haskovo, Kardzhali</i>	SOUTHEASTERN REGION <i>Stara Zagora, Yambol, Burgas, Sliven,</i>

### 3.3 Comparative analysis

The classified case studies are compared to examine differences, commonalities, and patterns. This analysis integrates both qualitative and quantitative data to uncover key ecosystem features of local educational entities, including their components, actors, contexts, and resources, evaluated through structural and functional connectivity.

*Functional ecosystem connectivity* – centered on biotic actors and their value-oriented actions – is analyzed using four key indicators:

- Teaching and learning agents and actors (e.g., teachers and trainers, children, students, learning groups, educational teams, etc.).
- Vocational training agents and actors (e.g., vocational students and teachers, employers, social partners, career counselors, etc.).
- Consultation and orientation agents and actors (e.g., counselors, mentors, students, parents, families, special education teachers, students with disabilities, gifted students, etc.).
- Personal development and inclusion agents and actors (e.g., children, students, teachers, psychologists, mentors, special education teachers, students with disabilities, gifted students, parents, local and micro-cultural community groups, etc.).

*Structural ecosystem connectivity* – based on abiotic components and tools that enable connectivity – is evaluated through conceptual content analysis of documents, products, websites, and media publications. Four main indicators are used:

- Normative, regulated, and empowered connectivity, based on educational acts and normative regulations.
- Territorial connectivity, based on spatial connectivity and the complementarity of spaces, resources, and support structures.
- Formal (institutional) connectivity, based on organizational affiliation and belonging.
- Resource-based connectivity, based on the complementarity of physical, natural, educational, digital, and technological resources.

#### 4. Results

The study's key results are presented in two segments. The first segment maps quantitative data on the co-evolutional dissemination and typology of the addressed educational entities (3.1). The second part focuses on connectivity between these entities based on accumulated qualitative data about their shared values and roles (3.2).

##### *4.1 Mapping the distribution and typology of educational ecosystems across regions and districts in Bulgaria*

Mapping educational ecosystems by regions and districts highlights three primary structural dimensions: (1) practices for personal and social development, (2) vocational training and career guidance, and (3) social protection and support.

Data aggregation and generalization provide insight into the current state of structural and functional connectivity among local ecosystem entities that support the school and kindergarten systems. This analysis begins with an examination of Centers for Personal Development Support (CPDSs), a network of training and educational units that address the three primary structural dimensions of open ecosystems. CPDSs are accessible to all children and students within local municipalities and districts, regardless of social origin, economic background, or academic performance, making them vital components of local educational ecosystems. However, previous research suggests that inclusiveness can vary depending on socio-cultural factors and conditions (Nikolaeva, 2024).

Local authorities establish and maintain various types of CPDSs based on evaluations of complementary educational needs, which accounts for the notable quantitative disparities in CSPD distribution across districts and regions (Table 2).

Table 2. Typology of CPDSs

Joint children centers for culture, arts and education	87
Career centers (out of the structure and functionality of the joint children's centers)	6
Students' hostels	22
Observatories	8
Sport clubs	5
Speech therapy center	1

The largest subgroup of Centers for personal development support (CPDSs) includes 87 local centers dedicated to out-of-school learning activities in areas such as arts, culture, languages, science, and, more recently, youth work, psychological support, and career counseling. The next largest group consists of 22 student hostels across 16 of the country's 28 districts, offering affordable housing for students from vulnerable backgrounds who attend local schools. Additionally, while United Children's Centers can develop sports programs and provide

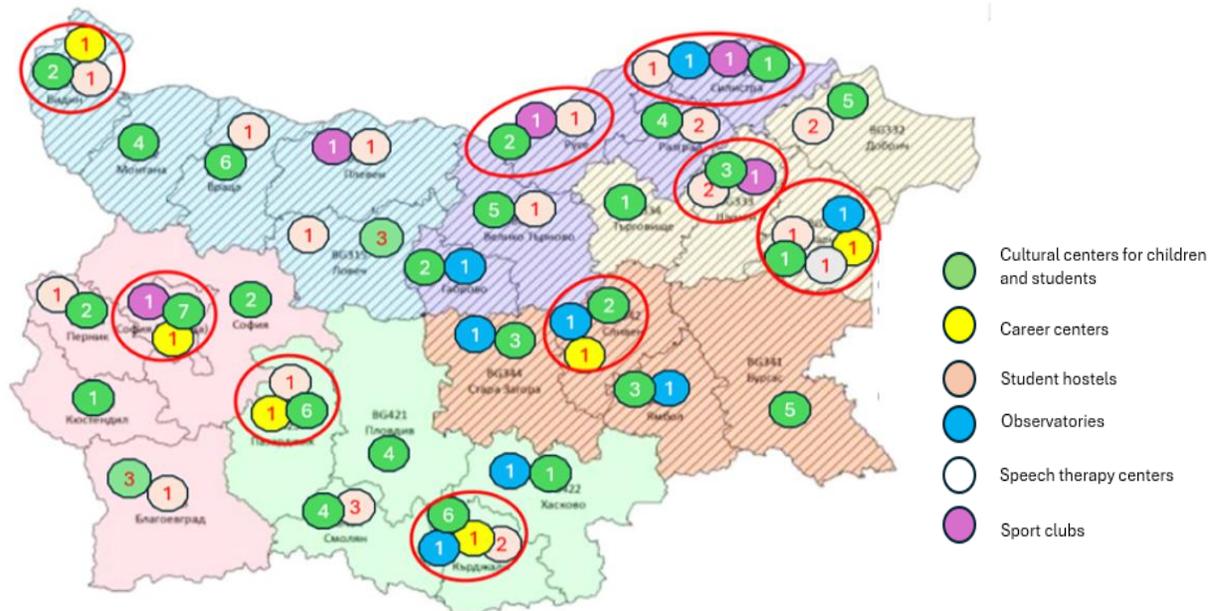
counseling and guidance, there are also six independent career centers and five sports clubs, all offering free, universally accessible services to children, students, and young people. Among the most innovative types of personal development centers are the observatories, now established in eight districts, along with one speech therapy center in Varna district.

The distribution of different types of Centers for Personal Development Support (CPDSs) varies significantly across the country and does not correlate directly with the proportion of young people under 19 in each district and municipality. Notably, some large districts with average youth populations (18-20%) and numerous regional towns lack a diverse array of CPDSs (Fig. 2).

However, functional analysis of ecosystem connectivity among local CPDSs reveals different trends. Some of the most populated and economically advanced districts, such as Varna (5 types), Sofia City (3 types), and Ruse (3 types), offer a broader variety of CPDSs. Interestingly, some districts with lower GDP and smaller populations—such as Kardzhali (4 types), Silistra (4 types), Vidin (3 types), Shumen (3 types), and Pazardzhik (3 types)—also show a good variety of out-of-school educational services (Fig. 2).

Cultural centers for children and students are the most widely distributed type of CPDSs across regions and districts. Virtually every district has at least one such center, with some districts hosting multiple centers across different municipalities (e.g., Vratsa - 6, Pazardzhik - 6, Kardzhali - 6, Sofia - 7, Burgas - 5, Veliko Tarnovo - 5, Dobrich - 5, Plovdiv - 4, Smolyan - 4, Montana - 4, Razgrad - 4).

Figure 2. Distribution of CPDSs Across 28 Districts and 6 Regions in Bulgaria

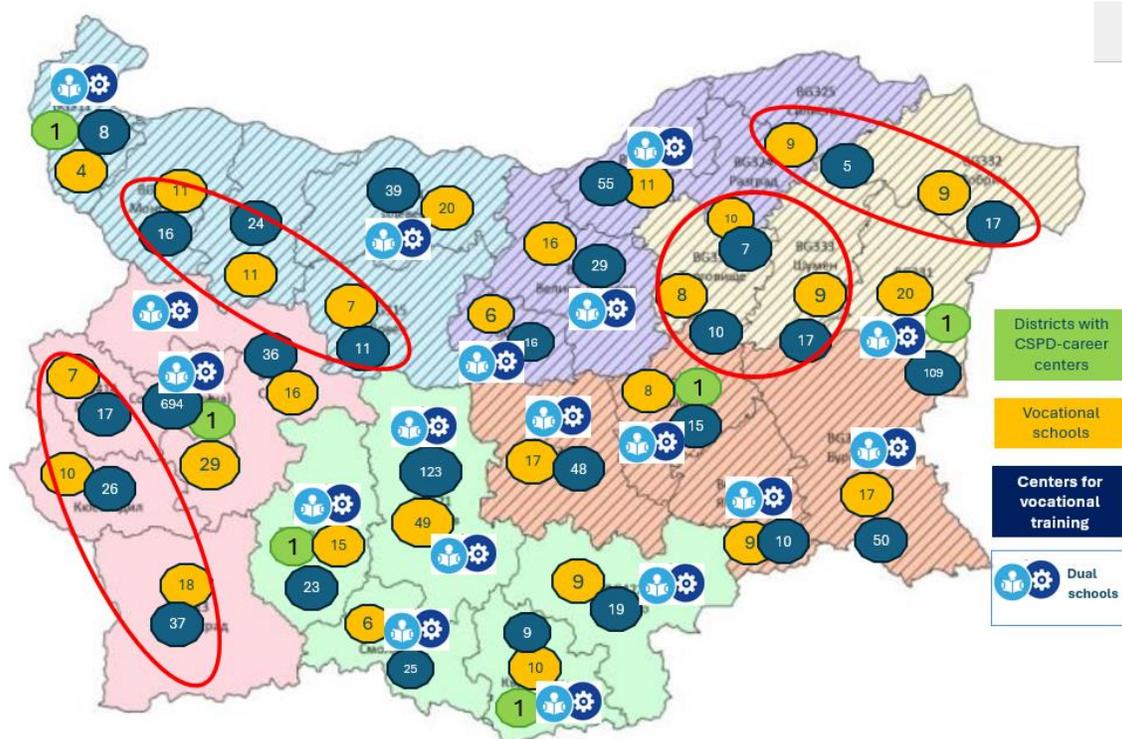


Like the CPDS – cultural centers for children and students, the CPDS - observatories and CPDS – sports centers are also vital parts of the local open ecosystem, as they provide specialized learning environments and support for children and students with unique talents or interests in sports and science. There are eight observatories across the country, most of which are in central districts such as Gabrovo, Stara Zagora, Sliven, Yambol, Haskovo, and Kardzhali. Only two observatories are found in the northeastern districts (Varna and Silistra). The five sports centers with CPDS status include one in the capital, Sofia, and the others in semi-rural districts (Pleven, Ruse, Razgrad, and Shumen).

When considering the structural distribution of CPDS career centers, the limited number (only six across the country) stands out. A comparison of vocational school and career center distribution with the proportion of residents under 19 by district does not reveal a clear trend. For instance, Vidin district, with one of the lowest percentages of young residents, has four vocational schools and one career center, whereas Veliko Tarnovo district, also with a relatively low youth population, has 16 vocational schools.

This analysis reveals that CPDS – cultural centers for children and students in some districts lacking independent career centers have adapted by integrating career guidance activities into their regular offerings. However, in certain cases, these centers are housed in buildings with special regulations (e.g., municipal buildings), which imposes restrictions on service accessibility. Announced activities do not include outreach options outside official locations, such as municipal visits or community sessions. Additionally, the websites rarely provide resources for young people or parents, unlike some regional centers for inclusive education support. There is also limited data on partnerships with other social organizations or educational institutions (Fig. 3.).

Figure 3. Comparative analysis of structural distribution between CPDS - Career Centers, Local Vocational Schools, Vocational Training Centers, and Dual Schools

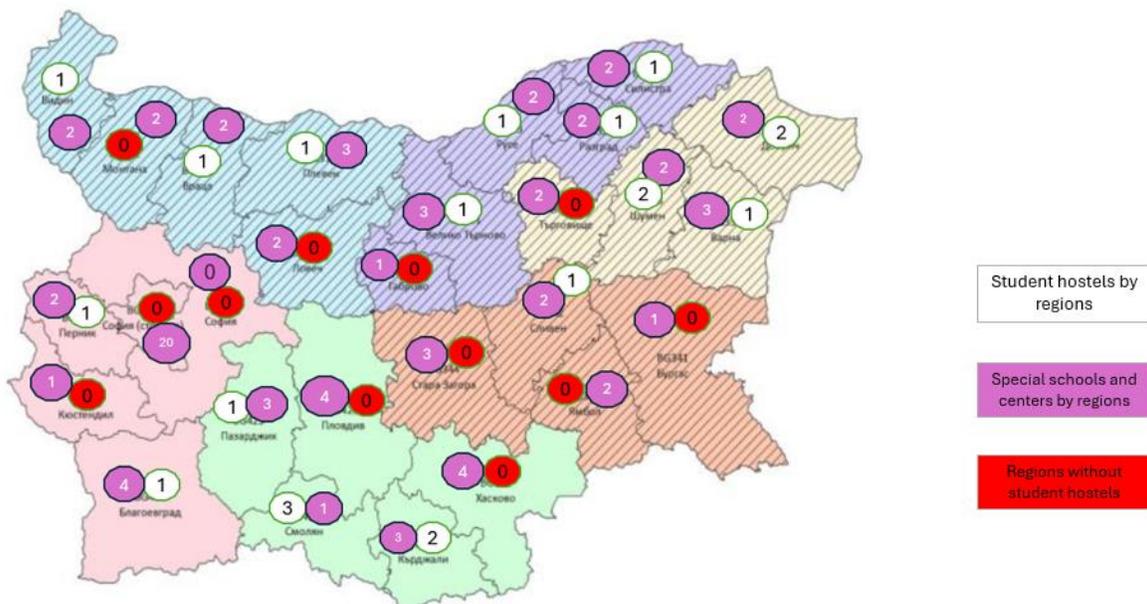


The comparative analysis also indicates a positive correlation between the number of vocational schools and training centers and the local labor market's demand for skilled workers. Districts with high personnel demand, such as Sofia City (29 vocational schools and 694 training centers), Plovdiv (49 and 123), Varna (20 and 109), Ruse (11 and 55), Burgas (17 and 50), Stara Zagora (17 and 48), and Blagoevgrad (18 and 37), tend to have a greater number of these institutions. Among these districts, only Sofia City and Varna have independent career centers. The remaining centers are typically located in regions with lower socio-economic development and a smaller youth population, such as the northwestern (Vidin, Montana, Vratsa, Lovech), southeastern (Ruse, Silistra, Shumen, Targovishte), central northern (Gabrovo), central southern (Kardzhali), and southeastern (Stara Zagora and Yambol) regions (Fig. 3).

Additionally, dual schools – which offer vocational training are integrated into standard curricula available in 19 of the 28 districts, further supporting vocational and training functions within the educational ecosystem. Over the last decade, these schools have adopted international practices tailored to the Bulgarian context.

The distribution of CPDSs, including residential schools, special schools, and centers for supporting students with disabilities and those from vulnerable backgrounds, does not permit definitive conclusions due to their limited numbers. This situation largely stems from the country’s long-standing social policy aimed at closing specialized educational institutions for these groups, a process known as the deinstitutionalization of specialized educational support. Over time, alternative family-based models have emerged to replace these institutions, such as foster care, daycare centers, and family-type accommodation centers (see Fig. 4).

Figure 4. Comparative data on the distribution of CPDS – Student hostels and Special Education Centers by Districts and Regions



A strong national and regional network for interdisciplinary support of students and children with special educational needs is provided by district-based Regional Centers for Support of Inclusive Education. These centers are coordinated by a national agency that facilitates their collaboration with CSPD student hostels and special education centers by district and region.

#### 4.2 Mapping connectivity between educational entities based on structural and functional complementarity

To better understand the distribution and complementarity of educational ecosystem agents, structural and functional connectivity mapping was conducted based on qualitative data regarding four structural and four functional dimensions (Table 4). Official documents, projects, media publications, and public data on organizational activities were analyzed in order to identify existing connectivity and complementarity relations between core educational actors included in the research model.

Results on Dimensions of Vertical Structural and Functional Connectivity and Compatibility Between Educational Actors (Table 4):

- Normative conditions have been established to promote ecosystemic coherence and complementarity among all agents within the education system, facilitating sustainable partnerships and encouraging collaboration (A).

Table 4. Mapping structural and functional connectivity between pairs of agents

Table 4	Structural (abiotic) ecosystemic connectivity				Functional (biotic) ecosystemic connectivity				
	N	T	F	R	TL	PD	VT	CO	
Schools and kindergartens									Centers for personal development support
Schools and kindergartens					F				Regional centers for support of the process of inclusive education
Schools and kindergartens									Special Education Support Centers
Schools and kindergartens					G				Dual schools
Centers for personal development support	A	B	D			C			Regional centers for support of the process of inclusive education
Centers for personal development support									Special Education Support Centers
Centers for personal development support									Dual schools
Regional centers for support of the process of inclusive education					E				Special Education Support Centers
Regional centers for support of the process of inclusive education									Dual schools

- Strong foundations exist for sustainable spatial connectivity among educational organizations and units, supported by the efforts of regional, district, and municipal administrations, as well as social partners (B).
- Connectivity across the ecosystem for shared goals of personal and social development (C) is extensive, encompassing a wide range of collaborative initiatives.

- Resource connectivity within the ecosystems currently prioritizes institutional needs over shared ones. While this arrangement fosters a sense of ownership within each organization, it limits opportunities for shared resource utilization, thereby lacking the characteristics of vertically sustainable ecosystem connectivity (D).

Results on Dimensions of Horizontal Structural and Functional Connectivity and Compatibility Between Educational Actors (Table 4):

- The only sustained and comprehensive horizontal connectivity exists between regional centers for inclusive education support and special education centers, effectively integrating their work, provisions, and management (E).
- A partially sustainable linkage exists between the network of schools and kindergartens and the regional centers supporting inclusive education. Both types of institutions are heavily involved in policies and tools for social-pedagogical work with children and students with special educational needs, attracting key stakeholders, including targeted children, their families, and professionals in special education support, social protection, and welfare (F).
- Partial connectivity is also evident in the partnership between the school network and emerging dual schools (G).

## 5. Discussion

The study presents a two-part analysis: the first part maps the typology and distribution of educational entities across Bulgaria, while the second examines their connectivity. Educational ecosystems are categorized based on three primary structural dimensions – personal and social development, vocational training, and social support. Key findings reveal disparities in distribution, with some regions lacking various types of Centers for Personal Development Support (CPDS) despite a strong demand for these services. For example, while joint cultural centers for children are widely available, career centers remain scarce and unevenly distributed.

Moreover, vocational schools and training centers tend to align with local labor market needs, showing a positive correlation between the number of these institutions and regions with higher demand for skilled labor, such as Sofia and Plovdiv. However, public-private partnerships in vocational education are limited, with dual schools being a notable exception.

The study also investigates connectivity between these entities. Structural mapping indicates that certain ecosystems, particularly those focused on personal development, benefit from strong spatial and normative connections facilitated by local administrations. However, resource-sharing practices are minimal, which limits broader ecosystemic connectivity. Functional mapping identifies robust partnerships between regional inclusive education centers and special education support centers. There are also partially sustainable connections between schools and dual education programs, indicating potential for expanded inter-institutional cooperation.

The analysis of the case data suggests that, in the Bulgarian context, national-level strategic directions and regulatory frameworks can encourage the formation of ecosystem interactions among educational actors at the district and regional levels. This process is further supported by territorial connectivity, which serves as a fundamental abiotic factor facilitating ecosystem functionality. However, local functionality depends significantly on socio-economic and institutional characteristics specific to each area, rather than demographic factors alone. Central to this ecosystem is a shared focus on personal development and inclusion, as established by Bulgaria's 2017 Inclusive Education Regulation, which outlines general and additional support mechanisms aimed at assisting students facing diverse challenges.

The regulation specifies two types of support mechanisms for the personal development of children and students within the national and municipal networks of educational organizations and units. The first mechanism, termed general support, encompasses a wide range of temporary academic assistance activities for students facing learning difficulties due to unequal starting points or status within the education system. For instance, it provides additional Bulgarian language classes for students encountering language barriers, such as those who do not speak Bulgarian at home. The second type, additional support, aims to foster personal development for three main student groups: students with disabilities and corresponding educational challenges, students with exceptional talents, and those from socially vulnerable families and communities.

To implement inclusion policies and practices through personalized support, the regulation mandates interdisciplinary partnerships among a wide range of specialists and institutions. This ensures that all parties are incorporated into a unified network at the municipal or district level, which includes schools, kindergartens, personal development support centers, regional inclusive education support centers, special education centers, and various social and educational services at the local level.

At the same time, an analysis of inter-institutional interactions among various educational actors reveals that, despite favorable structural and regulatory conditions and shared value-oriented functionalities in supported personal development, the degree of role-based integration varies significantly across different regional and district contexts. The data gathered at this stage of the study does not allow for definitive conclusions regarding the reasons for this variability. However, it warrants special attention and further in-depth research.

The results of the structural-functional analysis of the territorial distribution of educational actors involved in vocational education, training, and counseling raise several questions regarding the ecosystemic potential of current conditions and factors influencing their connectivity and complementarity. As indicated by the accumulated quantitative data, their distribution across regions and districts is quite uneven. Furthermore, the analysis of regional and municipal strategies for educational development and support for personal growth does not clearly identify factors that drive local dynamics and synchronization. Notably, models of public-private partnership are still applied sporadically in the field of vocational education and training. Dual schools are an exception, while most vocational training centers operate as independent private initiatives, often lacking direct connections to subsequent employment opportunities in the field. However, there are some exceptions to this trend, such as partnership practices in ICT training exemplified by SoftUni and Telerik Academy.<sup>2</sup> This finding underscores the need for expanded collaborative frameworks to enhance connectivity and complementarity across regions.

## 6. Conclusion

This paper emphasizes the potential of a cumulative case study approach to understanding regional educational systems through an ecosystemic lens. It offers a comprehensive view of how various regions adapt and evolve under different pressures. By identifying the interrelations among educational models and practices in Bulgaria, it explores not just isolated teaching methods but also the interactions among different educational entities within broader socio-political and cultural contexts. The focus on biotic components (living elements, such as communities and stakeholders) and abiotic components (non-living elements,

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<sup>2</sup> SoftUni and Telerik Academy are leading Bulgarian training organizations that offer certified IT programs for further education.

such as policies and infrastructure) reflects a nuanced perspective on educational connectivity and resilience.

The findings regarding balance – where some ecosystems are more internally focused and resilient, while others depend on external support – underscore the complexity of maintaining sustainability in education.

The study reveals both structural strengths and gaps in Bulgaria’s educational ecosystem, particularly concerning inclusivity, connectivity, and alignment with local labor needs. At the national level, strategic regulations like the 2017 Inclusive Education Regulation provide a framework that supports ecosystem interactions among educational institutions. This regulatory support, coupled with territorial connectivity, establishes a solid foundation for regional and district cooperation aimed at fostering personal development and inclusion.

Moreover, the study reveals significant variability across regions in terms of both resource distribution and role-based integration. For example, Centers for Support of Personal Development (CPDSs) vary widely in accessibility, especially career centers, which are unevenly distributed and limited in number. Disparities in CPDSs’ availability highlight a lack of coherence in addressing local needs comprehensively, impacting certain regions more than others.

The educational ecosystem also faces challenges in vocational training. Despite alignment between vocational schools and labor market demands in populous districts, public-private partnerships are limited, with dual education programs being a rare exception. Most vocational training centers are privately managed and often lack direct ties to employment pathways, underscoring the need for a stronger, collaborative framework to link training with job opportunities.

In conclusion, while Bulgaria’s educational ecosystem benefits from a regulatory framework that promotes connectivity and inclusivity, the effectiveness of these policies varies by region. Addressing the gaps in inter-institutional cooperation and expanding public-private partnerships, especially in vocational training, could significantly enhance the ecosystem’s functionality and responsiveness to regional needs. Further in-depth research could help uncover the factors underlying these regional discrepancies and identify targeted strategies to support balanced educational development across the country.

#### Acknowledgements

This research is funded by the European Union – NextGenerationEU, through the National Recovery and Resilience Plan of the Republic of Bulgaria, project NoBG-RRP-2.004-0008-C01.

The author declares no competing interests.

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