Smart specialisation at the regional level: from mapping regional potential to building innovation ecosystems

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To cite this article:
Russu, D., & Șavga, L. (2026). Smart specialisation at the regional level: from mapping regional potential to building innovation ecosystems. Romanian Journal of Economics, 63(2), 139-187.

Abstract. *As a fundamental framework for helping the Republic of Moldova develop a competitive economy, smart specialisation will be a tool to optimise the use of resources, both public and private, to concentrate efforts on sectors with the greatest capacity to create value, especially in the European integration context. Therefore, it is considered a strategic component of regional development.* ***The research objective*** *is to illustrate how evidence-based decision-making and stakeholder participation contribute to the development of regional capabilities that are sustainable and in line with the National Program of Smart Specialisation "Smart Moldova" for 2024-2027 and the objectives of the EU cohesion policy.* ***Method****: the research uses a two-stage methodological approach corresponding to the framework of the European Commission's Joint Research Centre (JRC) for the development of regional smart specialisation. The mapping of economic, scientific and innovation potential was carried out using a quantitative analysis of statistical indicators at the three-digit REV-2 NACE level. The qualitative validation was conducted using the Entrepreneurial Discovery Process (EDP), involving the representatives of the private sector, academia, public administration and development institutions.* ***Results****: applied methodological approach showed that although geographically close, the two regions are developing in terms of specialisation along different lines. The different outcomes of both regions highlight the importance of the Smart Specialisation (S3) approach as a policy tool that appreciates diversity and supports place-based innovation. This research offers a comprehensive analysis of the regional S3 implementation in the country and contributes to the academic and policy debate on place-based innovation governance.* ***The originality*** *of this research is to connect the analytical evidence with the practical implementation of policies, demonstrating how the mapping of data and the engagement of various stakeholders can turn economically peripheral regions into effective innovation ecosystems.*

Keywords*: smart specialisation, sustainable regional development, innovation ecosystems.*
JEL classification*: O00, O30*

1. Introduction

Regional smart specialisation has become the backbone for creating competitive and innovation-driven regional economies throughout the European Union, and as such it is becoming increasingly important in all EU candidate countries, including the Republic of Moldova. As part of this objective, the National Program of Smart Specialisation "Smart Moldova" for 2024-2027 (approved by the Government Decision no. 588/2024) seeks to create a systemic mechanism for determining

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regional comparative advantages, focusing the limited resources available to it on areas with the highest value creation potential, and promoting coordinated governance that can support long-term changes in its economy. Therefore, developing regional S3 strategies represents a key strategic action in the development of place-based innovation ecosystems and the promotion of coherence between national and regional policies.

The aim of this study is to examine the formation of regional smart specialisation strategies within the Republic of Moldova using the combination of analytical economic-innovation mapping and participatory governance mechanisms. The primary focus will be on the South Development Region and the Autonomous Territorial Unit of Gagauzia, which are the first regional pilot projects in the country that have used the entire methodology provided by the European Commission's Joint Research Center (JRC) at the subnational level. The aim of the research is to illustrate how the joint use of data-driven priority setting, institutional coordination and stakeholder involvement creates evidence-based regional innovation pathways.

The South Region and Gagauzia, although geographically proximate, possess different structural features, economic bases and innovation capabilities. The quantitative mapping developed for this project also demonstrated significant differences in terms of their industrial composition, degree of diversification, technological intensity and rate of growth. Additionally, complementary to the analytical mapping, the Entrepreneurial Discovery Process (EDP) was utilised to enable regional stakeholders (including firms, academia, public institutions and civil society) to validate the results, improve the suggested domains and highlight areas of specialisation corresponding to regional priorities.

Through the integration of both the quantitative data and qualitative insights, this research illustrates how regional S3 priorities are established through an iterative process that combines statistical analysis with stakeholder-driven interpretation. This research provides comparative evidence on how institutional capacity, economic structure and participatory governance influence paths towards developing functioning regional innovation systems in Moldova and thus contributes to the ongoing academic and policy debate concerning smart specialisation in catch up regions.

In order to develop the empirical part of the research, the following three hypotheses were formulated:

1. The closer the alignment of regional priorities with data-driven analytical mapping, the better defined and valid are the chosen specialisation domains.
2. The higher the institutional capacity and the more coordinated are the regional development agencies (RDA) involved in the S3 governance process, the better are the levels of involvement of all stakeholders and the more coherent is the S3 governance system.
3. Diversified yet complementary specialisation profiles of the regions increase national competitiveness due to inter-regional synergies generated by the innovation system.

These hypotheses are used in the comparative research of the South Region and ATU Gagauzia, and the validation of the hypotheses is presented in the discussion and conclusion parts of the research.

2. Literature review

2.1. Conceptual and empirical background on smart specialisation

The smart specialisation (S3) framework has become the cornerstone of the European Union's (EU) regional development and cohesion policy based on innovation-driven development. Conceptually, S3 builds on the premise that there will be no "one size fits all" solution for regions to develop their own specialised knowledge and capabilities in certain domains that they are uniquely well positioned to do so. The foundational contribution by Foray, David and Hall (2009) defined smart specialisation as a process of discovery through which regions identify the areas in which research, innovation, and industry can collaborate to produce competitive advantages. The conceptualisation has since been further incorporated into the larger EU growth strategy, specifically through the Europe 2020 agenda for smart, sustainable and inclusive growth (European Commission, 2010), and subsequently

via the EU regulation that links cohesion policy support to the existence of Research and Innovation Strategies for Smart Specialisation (RIS3) (European Parliament & Council, 2021).

From the perspective of the design of smart specialisation policy, there have been numerous important reference documents that have influenced the implementation of smart specialisation in the EU and beyond. The Guide to Research and Innovation Strategies for Smart Specialisation (RIS3 Guide) provided by the JRC S3 Platform (European Commission, 2012) provides methodological advice on how to combine quantitative analysis with stakeholder input, identify priority areas, and incorporate S3 into multilevel governance systems. The guide emphasises the importance of the use of evidence-based mapping of regional strengths, prioritising in a small number of domains, and the centrality of the Entrepreneurial Discovery Process (EDP) in the implementation of S3.

Additionally, complementary to EU guidance, the OECD report Innovation-Driven Growth in Regions: The Role of Smart Specialisation highlighted the role of S3 in promoting regional competitiveness and innovation across a range of different territorial contexts, including regions with low levels of development and transition economies (OECD, 2013). Together, these references provide the conceptual and methodological framework of reference for designing Moldova's smart specialisation efforts.

Within the literature regarding cohesion policy and regional development, smart specialisation has been examined both as a growth strategy and as a governance innovation. McCann and Ortega-Argilés (2015) presented a critical evaluation of the role of smart specialisation within EU cohesion policy, suggesting that RIS3 may be particularly useful for regions that face structural constraints, fragmentation and limited innovation capacity because it encourages a more strategic and selective approach to investments. Additionally, the effectiveness of S3 is heavily dependent on the existing institutions and governance systems. Rodríguez-Pose (2013) showed that institutional quality plays a significant role in determining the trajectory of regional development, indicating that the ability of smart specialisation strategies to enable catch up regions depends not only on the economic fundamentals, but also on institutional capacity to facilitate collaboration among actors, promote participation and guarantee policy continuity. Kroll (2017) noted the specific barriers to the successful implementation of S3 in less favoured regions, including lack of analytical capacity, poor engagement from stakeholders and the risk of developing a RIS3 without real change. These assessments have also been demonstrated within the context of transition countries, where Kleibrink, Larédo and Philipp (2017) described the trajectory of smart specialisation in systems that are experiencing changes in governance, emphasizing the need for learning and adaptation over the simple transposition of policy.

Outside the EU member states, smart specialisation has increasingly been applied in enlargement and neighborhood countries. The JRC's work on Innovation in the EU Enlargement and Neighbourhood Region and on S3 beyond EU documented how the S3 framework is being adapted in countries at various degrees of integration with the European Union, describing the unique opportunities and challenges associated with institutional capacity, access to data and policy coherence (European Commission, n.d.-a; n.d.-b). In this wider context, Moldova is an example of a country using S3 as a tool to comply with EU standards and as a framework for restructuring its national and regional innovation systems. Reports on Policy Support Facilities (PSFs), such as the Peer Review of the Moldovan Research and Innovation System (European Commission, 2016) and With Ambition for Transformation (European Commission, 2023), identified persistent challenges in funding research, in the relationship between science and industry, and in governance fragmentation, while simultaneously identifying S3 as an instrument for transforming the research and innovation landscape.

At the national level, the development of S3 in Moldova is embedded in a broader legal and strategic framework. The Code on Science and Innovation (Parliament of the Republic of Moldova, 2004) and the Education Code (Parliament of the Republic of Moldova, 2014) established the foundation for organizing the national research and higher education systems, which are essential components of the national innovation ecosystem. More recent strategic documents, such as the National Programme in the Fields of Research and Innovation for the years 2024 – 2027 (Government of the Republic of Moldova, 2023) and the National Program of Smart Specialisation “Smart Moldova” for 2024–2027 (Government of the Republic of Moldova, 2024), codified the use of S3 as a principal instrument for regional development and EU integration. These policies represent the alignment of Moldova's policies with European frameworks (European Commission, 2012 European Parliament &

Council, 2021), while also recognizing the necessity of adapting S3 to the unique structural characteristics and territorial disparities of Moldova.

Additional analytical work completed for Moldova has further assisted in translating the S3 concept into concrete regional strategies. The economic, innovative and scientific potential of Moldova was mapped by Hollanders for the JRC (Hollanders, 2017) providing a quantitative basis for identifying areas in which there are either existing or emerging strengths in the Moldovan economy. The mapping of preliminary priority areas for S3 and the identification of key stakeholders via network analysis were then completed (SIRIS Academic, 2018). The analytical work described above serves as the basis for the evidence-based element of S3 in Moldova and directly informs the regional analyses of the South Development Region and ATU Gagauzia. The present research expands upon the prior body of analytical work by combining the JRC-inspired analytical mapping with EDP-based stakeholder validation in order to examine how regional specialisation trajectories are created in practice.

More broadly, the literature provides three primary conclusions to serve as the empirical foundation for the remainder of this research. First, smart specialisation is most effective when regional priorities are aligned with robust and data-driven mapping of regional economic and innovation potential (Foray et al., 2009; McCann & Ortega-Argilés, 2015; OECD, 2013; European Commission, 2012). Second, the quality of the institutions and governance systems, including regional development agencies and the mechanisms for coordinating among levels of government, mediate the ability of less-developed regions to successfully implement RIS3 and to transform the results of analytical work into actionable strategies (Rodríguez-Pose, 2013; Kroll, 2017; European Commission, 2016, 2023). Third, in enlargement and neighbourhood contexts similar to Moldova, smart specialisation is not merely a technical activity focused on establishing priorities, but also a mechanism for reformulating the national research and innovation system in accordance with European standards while taking into account the differences in territory (European Commission, n.d.-a; n.d.-b; Government of the Republic of Moldova, 2023, 2024; Hollanders, 2017; SIRIS Academic, 2018). These assessments provide the conceptual and empirical background for the comparative examination of regional smart specialisation in the South Region and ATU Gagauzia that follows in the next section of the research. An important part of the S3 Framework is the Entrepreneurial Discovery Process (EDP), developed by Gianelle, Doussineau and their colleagues at the Joint Research Center as a structured, iterative, participative process in which all stakeholders, including firms, researchers, public authorities and civil society, jointly identify areas with potential (Gianelle et al., 2016). The bottom-up nature of the EDP allows for the integration of tacit knowledge, contextual understanding and the refinement by stakeholders of quantitative maps of innovation areas. Research emphasises that the functioning of the EDP requires good facilitation, multi-level governance and institutional learning, especially in the case of regions with developing innovation ecosystems (Aranguren et al., 2017; Guzzo & Gianelle, 2021).

In addition, the literature regarding S3 implementation in "catching-up" and peripheral regions indicates several problems: the fragmentation of industrial structures, the limited scale of research activity, the weakness of business-science collaborations and institutional instability. Tödtling and Trippl (2005; 2013) point out that the above-mentioned conditions are typical characteristics of peripheral or "thin" innovation systems, and therefore smart specialisation should be adapted to realistic possibilities. Kroll (2015; 2017) and Radosevic (2017) emphasise that analytical mapping is required, but it is not enough without the introduction of governance reforms and institutional capacity building. Rodríguez-Pose (2013; 2020) also emphasises that the quality of the institutional system plays a significant role in the formation of the trajectory of regional development, and thus S3 is not only a technical issue but also a governance one.

Additionally, another strand of the literature focuses on the mechanisms of related variety and path development, that allow for the transition from initial specialisation towards technological areas in proximity (Boschma, 2014; Balland et al., 2019). This perspective is important for understanding how regions with different starting points such as the South Region and Gagauzia can develop complementary but different specialisation profiles. Balland and Boschma (2020) show that interregional linkages with complementary capabilities support regional technological diversification. This suggests that complementary regional S3 priorities may generate synergies and help strengthen national competitiveness.

Finally, the scientific debate underlines the importance of place-based governance for the success of S3. Barca (2009) and Camagni & Capello (2013) indicate that the ability of the regional institutions to interpret the analytical results, to co-ordinate the participation of the stakeholders, and to provide continuity in the policy cycle is the decisive factor for the effectiveness of smart specialisation. Kolehmainen et al. (2016) emphasize that the local institutional agency is a precondition to translate the strategic priorities into concrete projects. These findings are very relevant for Moldova, because the regional development agencies have a very important role of mediators between the national policy level and the local innovation environment.

The scientific findings support the methodological choice made in this research: combining quantitative economic-innovation mapping and the participatory validation through the EDP provides a solid basis for the identification of areas of specialisation in regions with developing innovation ecosystems. Furthermore, the findings confirm the assumption that geographically adjacent regions may display structurally different innovation paths and complementary strengths as shown in the comparative analysis of the South Region and Gagauzia.

2.2. Contribution to the literature and policy relevance

This research is important to the literature on smart specialisation (S3), and place-based innovation policy in three areas.

1stly, the research will contribute to the empirical literature on S3 implementation in catch up and institutionally evolving environments, with an analysis at the subnational level of one small EU candidate country. Most existing literature is focused on developed EU regions or national level RIS3 processes, and very few look at how smart specialisation is implemented in regions with little R&D capacity, fragmented industry structure and are highly dependent on traditional sectors. By comparing two economically distinct geographic neighbours in Moldova, the research will show how different specialisation trajectories can develop from a common national S3 strategy.

2ndly, the research has a methodological contribution which links analytical mapping using JRC methodologies with the entrepreneurial discovery process (EDP) as a means of validating, prioritizing and refining; rather than seeing mapping and EDP as separate or sequential, the research shows how these processes interact iteratively and how stakeholder involvement changes analytically derived domains, transforms broad opportunity sets into niches and improves strategic focus. This provides a reproducible path for regions that lack data and have developing institutional capacities to implement S3.

3rdly, the research will provide new information regarding S3 governance by showing how regional development agencies (RDAs) act as institutional mediators and therefore play a key part in the governance of smart specialisation. The comparison of RDAs indicates that they do not just enable participation, but also determine the coherence, credibility and operationalization of smart specialisation priorities through their coordination capacity, continuity of engagement and alignment with national strategies. Therefore, the research will add evidence on how institutional arrangements translate analytical evidence into actioned regional innovation pathways.

In addition to its national significance, the Moldovan example will offer transferable knowledge to other enlargement and neighbourhood countries as well as to periphery regions with similar structural limitations. The research will show that smart specialisation can serve as a learning-oriented governance mechanism enabling varied regional paths to be developed while maintaining national coherence. Therefore, the research will increase our understanding of how place-based innovation governance can be established incrementally in catch-up regions.

3. Methodology and data

This research is based upon a methodological approach that has been defined as part of the European Commission's Joint Research Center (JRC) official framework for developing Smart Specialisation Strategies. The RIS3 Guide describes how the combination of detailed quantitative analytical mapping of regional priorities along with qualitative validation via the Entrepreneurial Discovery Process (EDP) provides a robust framework for defining regional priorities.

Therefore, the methodological design was divided into three interdependent stages: Stage 1: Economic Potential Mapping, Stage 2: Innovation Potential Mapping and Scientific Potential Analysis, and Stage 3: Integration of all three analyses into a Combined Potential Matrix, followed by the EDP validation stage.

Quantitative analytical mapping used in this research followed the methodological guidelines as described by the Joint Research Centre (JRC) and relied upon a collection of standardized, quantitative indicators that are intended to measure economic, innovation and scientific potential of the region. Economic analysis is performed using disaggregated NACE Rev.2 data at the 3-digit level for employment and turnover, these being the best available proxy measures for determining regional strengths. The mapping includes both a static evaluation of current structural advantages and a dynamic evaluation of long-term growth trends between 2018-2023.

Static evaluation determines comparative advantages through the use of two primary indicators: location quotient (LQ); a measure of relative concentration of employment or turnover of a sector versus the national structure; and critical mass; an indication of the scale of activity within the region. All sectors with values greater than predefined threshold values for both LQ and critical mass are classified as having current economic potential. Specialisation alone is insufficient to establish economic potential, because an industry's small share of the regional economy may limit its relevance to policy design and implementation. Its scale must also be considered: 'critical mass' measures the industry's share of regional employment or turnover. The dynamic evaluation identifies emerging potential by identifying industries with consistent above-average employment and turnover growth rates when compared to both regional and national averages and therefore potentially indicative of emerging specialisation paths.

Two complementary sources of information were used to determine innovation potential: first, a sample of the National Enterprise Innovation Survey (2021-2022) that provided the number of firms introducing new types of innovations; second, patent data for the time period 2018-2023 categorized by technological field. Industries that had both sufficient numbers of firms to meet the minimum critical mass requirement and that exhibited above-average innovation specialisation (i.e., LQ > 1) were identified as possessing high levels of innovation potential, and those exhibiting patent share values of 1% or higher indicated that they possessed advanced technological capabilities.

Regional scientific potential was evaluated using research output data obtained from publications and categorized by scientific domain. As such, the distribution of research activity within regions related to scientific disciplines that are relevant to the regions' economic structures (e.g., agriculture, materials science, chemistry, biotechnology, and/or environmental sciences) served as a measure of the knowledge base that can be used to support innovation and technological upgrading.

Together, the three individual assessments formed a Combined Potential Matrix, which was then subject to validation and refinement via the Entrepreneurial Discovery Process (EDP).

4. Research results and comment

Smart specialisation strategies are evidence-based, based on rigorous data and analysis. They are built starting from mapping the development potential of regions, an essential process for identifying priority economic sectors that will support future development. In this context, the mapping of the economic and innovation potential of the both development regions were carried out following a clearly defined methodology, adapted to local specifics and based on comparative analysis at the national level.

The mapping is a complex statistical exercise, aimed at providing a clear picture of the areas with growth and innovation potential in the region. The process focused on identifying the competitive and comparative advantages of the region in relation to the other regions of the Republic of Moldova, using specific indicators. These include economic potential, measured by detailed data at the 3-digit NACE Rev-2 level on employment, turnover and wages, as well as innovation potential, assessed by indicators such as the number of innovative enterprises and patents.

This methodological approach ensures a detailed understanding of existing capacities and resources, allowing the formulation of precise intervention strategies, oriented towards the sectors with the greatest capacity to stimulate sustainable economic growth and innovation. At the same time, the

mapping provides essential information for substantiating political decisions, contributing to the efficient targeting of resources and support towards those areas that present the greatest potential for development and capitalization of regional advantages.

4.1. South Development Region: from structural diversity to coherent specialisation trajectories

4.1.1. Socio-economic analysis

The South Development Region of the Republic of Moldova is characterised by an area of 7,379 km², or approximately 24.2% of the national territory, and has considerable agricultural, natural resource and strategic positioning (due to its location on the Black Sea) characteristics due to its proximity to the Giurgiulesti international port. The demographic dynamics clearly indicate the scope of structural constraints. From 2018 to 2024, the number of residents in this region decreased from 386,427 to 323,866 inhabitants, representing a cumulative decrease of 16.2% between 2018 and 2024. The same can be said about labour market indicators that show how the region is affected by demography. In 2023, the labour force in the South Region comprised 141.6 thousand people, as indicated in Table 1, the smallest number of all the development regions in the country, with an employment rate of only 35.8% and a labour force participation rate of 37.6%.

The overall economic conditions of the South Development Region (as shown in Figure 1) based on 2018-2023 averages, clearly indicate some of the most significant contributors to the South's regional economy and correlate with the priority areas of smart specialisation.

Agriculture, forestry and fishing are particularly evident, representing approximately 22% of total sales revenues, 28% of regional employment and 27% of all registered enterprises. The statistics provide further evidence of the significance of agriculture within the South Development Region and support the opportunity for smart specialisation in "Advanced Agri-Food Systems". Increased investment in processing technology and innovative solutions in the agricultural sector can generate increased value from the agricultural products processed and ultimately enhance sustainability in the region by improving regional competitiveness.

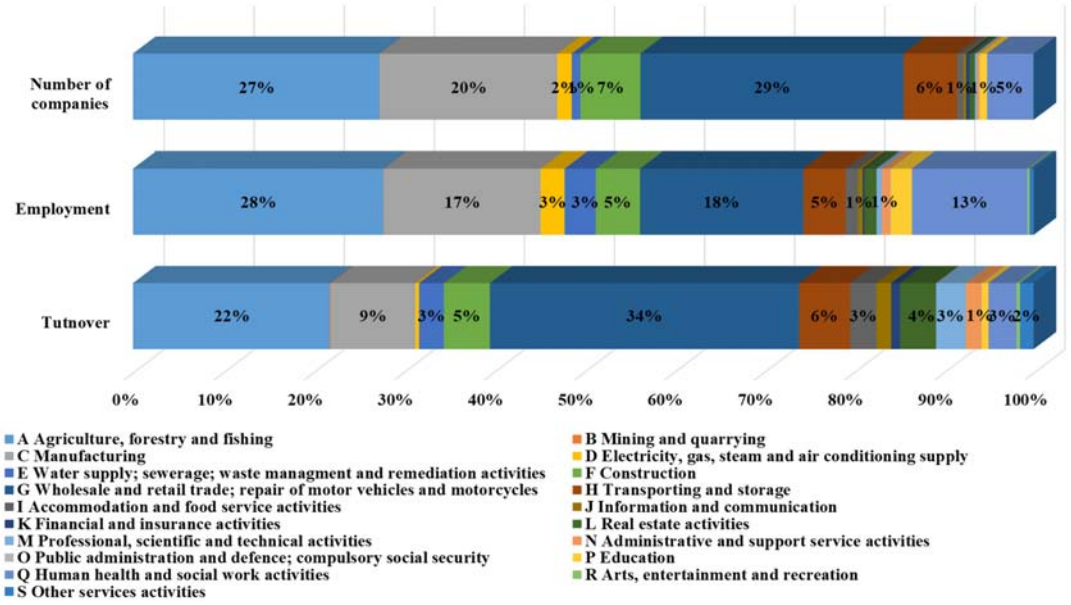
Manufacturing represents 9% of total sales revenue, 17% of employment and 20% of registered enterprises, which indicates a high degree of developmental potential. In the context of smart specialisation, manufacturing has a large developmental role to play in the priority area of "Advanced Materials and Technologies for Energy-Efficient Construction". Increased investment in technological innovation and the modernisation of production processes will potentially drive the sector forward, thereby increasing the regions' economic diversification and utilisation of available local natural resources, including clay and other construction materials.

Table 1. Population aged 15 and over by labour force participation by statistical regions in 2023 (thousands of people)

	Total	Statistical regions			
		Chisinau Municipality	North	Centre	South
Labor force, total	**929.5**	**280.0**	**277.7**	**230.3**	**141.6**
Employed population	886.9	268.2	264.5	219.3	134.8
ILO unemployed	42.6	11.7	13.1	11.0	6.8
Population outside the labour force	1,129.9	266.0	285.5	343.8	234.6
Young people in the NEET group (15-29 years old)	91.2	30.1	21.9	22.8	16.4
Labour force participation rate, %	45.1	51.3	49.3	40.1	37.6
Occupancy rate, %	43.1	49.1	47.0	38.2	35.8
Unemployment rate, %	4.6	4.2	4.7	4.8	4.8
Unemployment rate, %	4.6	4.2	4.7	4.8	4.8

Source: National Bureau of Statistics of the Republic of Moldova (2024).

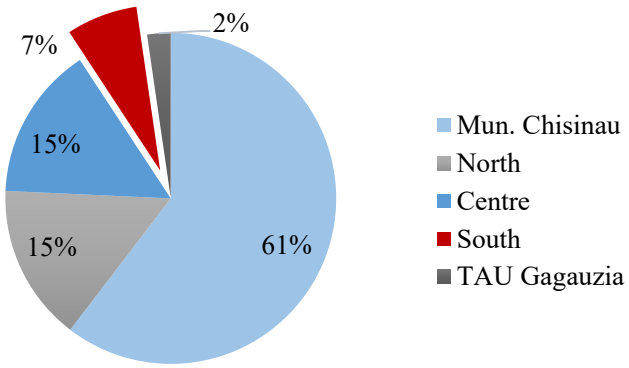
Figure 1. Economic structure of the South Development Region (2018–2023 average)



Source: National Bureau of Statistics of the Republic of Moldova (n.d.).

The analysis of the Gross Domestic Product (GDP) for the South Development Region of Moldova in 2021 has shown that this area contributes to the overall economy of the country at a relatively low level, representing an approximate 7% share of the total GDP of Moldova. The GDP of the South Development Region was estimated to be approximately 16.8 billion lei, significantly lower than the GDP of the city of Chișinău, the capital of Moldova, with an estimated 60% of the total GDP of Moldova (approximately 146.2 billion lei) (Figure 2).

Figure 2. Contribution of regions to regional GDP formation (%, 2021)



Source: National Bureau of Statistics of the Republic of Moldova (n.d.).

Therefore, the significant difference in GDP is indicative of the centralization of economic activities, investments and development of infrastructure in the capital city, and the predominantly rural areas of the North, Centre and South Development Regions have much lower proportional contributions to national GDP.

Compared to the North and Centre Regions, which together produce roughly double that of the South Region's GDP contribution, about 15% to the national GDP, respectively, the South Region is mostly composed of an agricultural economy with less of an industrial/construction presence in the economy as a whole. This shows why the South Region will have to be specifically targeted for economic growth through increasing industrialisation and/or by increasing innovative production

processes so that there is an overall increase in value-added in the local economy and, therefore, an overall increase in the South Region's contribution to the nation's GDP.

4.1.2. Assessment of economic potential

The identification of the economic potential of the region's industries was carried out by applying the described methodology on two dimensions: the analysis of the current economic potential, which identifies established industrial strengths, and the dynamic assessment, which identifies industries in which employment and turnover growth exceed both the regional average and that of the corresponding industry nationally. The analysis of trends over time is important, as they can identify industries that currently do not exceed the threshold levels in the static analysis but which are expected to cross these thresholds and emerge as specialisation candidates in the near future.

The initial selection included 237 industries, of which 121 passed the predefined threshold of at least one of the 2 employment-based selection criteria (specialisation or critical mass). Table 2 summarises the overall results of the analysis for Development Region South (DRS), using the predefined thresholds of the applied methodology.

Table 2. Mapping the economic potential of the Southern Development Region

Criteria	Criteria threshold	No. of selected industries
Initial number of industries included in the analysis	--	**237**
Current Analysis - Employment		
Level of specialisation (LQ)	1.25	34
Critical mass	0.1%	119
both	--	32
Current analysis - Turnover		
Level of specialisation (LQ)	1.25	42
Critical mass	0.10%	92
both	--	37
Current analysis All: employment and turnover	--	**25**
Dynamic analysis - changes in employment		
In relation to the region	3 out of 5 years and the period 2018-2023	93
In relation to the aggregate industry	3 out of 5 years and the period 2018-2023	84
both	--	71
Dynamic analysis - changes in turnover		
In relation to the region	3 out of 5 years and the period 2018-2023	111
In relation to the aggregate industry	3 out of 5 years and the period 2018-2023	99
both	--	83
Dynamic analysis All: changes in employment and turnover	**--**	**44**
Both: current and dynamic analysis	**--**	**3**

Source: authors' own calculations.

The current analysis identified 32 industries with economic potential - using employment data and 37 industries - using turnover data. Combining both criteria, following the mapping methodology, 25 industries with current economic potential were identified in the Southern region.

At the same time, the dynamic analysis identified 71 industries with emerging economic potential using data on changes in employment and 83 industries using turnover-change data. Combining both criteria, 44 industries were confirmed with emerging economic potential. Only 3

industries passed the predefined thresholds of the selection criteria, both of the current and dynamic analyses.

These economic sectors are vital to build up the strength of the regional economy and therefore will be the focal point of all development strategies. In addition, economic sectors that have a growing economic potential should receive extra support, because they provide an opportunity for "open innovation" co-operation processes, and by this they can encourage the production of new and innovative ideas and solutions (between enterprises, research institutions and other parties).

Furthermore, these industries create a suitable atmosphere for the emergence of new value chains, and they promote the diversity of the regional economy and the competition of the regional economy. Support for these emerging economic sectors could also enhance the speed of regional development, and it offers large possibilities for investment, innovations and employment.

In order to identify the general areas with an economic potential, which show a higher degree of interest and a large part of total employment and turnover, the DRS Economic Potential Mapping has made use of: Agriculture and food processing; Textile and clothing industry; Chemical industry; Metal construction and metal products industry; Creative industries; Construction.

Annex 1 includes industries classified using NACE Rev-2 disaggregated at the 1-, 2- and 3-digit level, which exceed the defined threshold values to identify economic potential within the years 2018 – 2023. The identified groups of broad economic sectors are almost identical to the priorities for smart specialisation on national level and with the strategic economic sectors described in national policy documents.

Overall, the economic potential mapping for the South Development Region shows a dual structure. The region has high specialisation and a significant scale in traditional sectors such as agriculture, food processing and selected manufacturing activities, which are still the dominant employers and generate the majority of turnover. The dynamic analysis also shows that there is a considerable number of industrial sectors with an emerging economic potential, which can be taken as evidence for structural change in the region, instead of a stagnant economy.

Therefore, the region's development problem does not lie in the lack of economic activity but rather in the fact that it needs to develop its current supply chain and support a limited number of new industries that have the potential to create a higher value-added. In this sense, smart specialisation in the South Development Region should focus on technological development, diversification in the existing sectors, and the gradual transformation of the volume-based into knowledge intensive production.

4.1.3. Identification of innovation potential

Innovation potential for DRS assesses local industry capabilities to foster technological innovation and knowledge transfer. The innovation mapping uses two key indicators: innovation activity in regional enterprises and patenting activity.

Table 3 presents an overview of the research findings and includes 55 representative industries for this region. From those 55 industries, using the critical mass and specialisation (LQ) criteria, 28 enterprises were selected as having innovation potential, based on their significance as having considerable critical mass, and 20 industries were selected as having innovation potential based on the number of patents they had relative to the remaining enterprises in the region.

It should be noted that 18 of the selected industries meet the critical mass and specialisation criteria, indicating a substantial amount of flexibility in each of them, which could result in investments in technological innovations and R&D. For patenting activity, 10 of the selected industries surpassed the 1% threshold, which shows increased interest in protecting intellectual properties and transferring technologies between enterprises.

Many industries that met the specialisation and regional weighting criteria clearly indicate there are new and developing fields with the potential for smart specialisation, particularly where patenting activity has been observed.

Construction is the smallest contributor to total sales revenues; however, the sector provides 5% of employment and 7% of registered enterprises and therefore is an area of relevance for the

development of the regional infrastructure. As stated previously, the construction sector has a similar relationship with the niche areas of the priority domain "Advanced Materials and Technologies for Energy-Efficient Construction" and therefore has considerable potential to develop solutions that are both sustainable and environmentally friendly. Projects focused on energy efficiency and utilising local resources in the construction process have the potential to be highly effective in achieving the South's sustainable development goals.

Table 3. Mapping the innovation potential of the Southern Development Region

Criteria	Predefined threshold	Number of enterprises	No. of selected industries
Initial number of industries included in the analysis	--	--	55
Critical mass	1	28	--
Specialisation (LQ)	1	--	20
Share (relative to region)	10%	--	23
Both: share and specialisation	--	--	18
Share of patents	> 1%	--	10
LQ or %-share or Patents	--	--	32

Source: authors' own calculations.

The qualitative analysis of the innovation capacity for the DRS based on the available information for the period of 2021 - 2022, showed a heterogeneous distribution of the various industrial branches and a high degree of specialisation within some strategic sectors, with an important role in the local economy. The analysis was conducted using three specific parameters – critical mass, economic specialisation (LQ) and patenting activity – to identify those branches that have the highest level of innovation capacity and therefore the highest development potential in terms of both technology and economy.

As far as the technological sectors of major interest for the patent applicants in the DRS are concerned, it can be observed from the analysis of the percentage of patents that there is a high degree of specialisation within a few major industrial branches, which correspond to the most important economic and development priorities of the region (Annex 2). These are:

- Manufacturing of basic pharmaceutical products and pharmaceutical preparations – 28.9% (a very high percentage of patents in this branch indicates a strong specialisation and a large interest in R&D in the pharmaceutical industry; it is also indicative of the great potential for developing new innovative solutions for the healthcare market).
- Manufacturing of machinery and equipment for agriculture and forestry – 10.5% (the importance of this branch indicates a possible development of agricultural technology in the region; a strategic branch for the region).
- Manufacturing of medical devices and apparatus – 10.5% (highlights innovative medical technologies; confirms the need for an infrastructure to support the development and marketing of high-tech products).
- Beverage manufacturing – 7.9% (indicates a high level of patenting activity; suggests a tendency towards continuous innovation in the production techniques and product diversification).
- Manufacture of soaps, detergents and cosmetics – 7.9% patent share (newly emerging branch; with a focus on personal care and household products; demonstrates an increasing interest in intellectual property and product innovation).

The increase in the number of international patent applications in the field of food chemistry, biotechnology, basic materials chemistry and engineering corresponds to the economic mapping results for the region, where the predominant economic specialisation is agriculture and building materials.

In the economic mapping of the region, patents were also used to demonstrate the scientific potential of the proposed priority areas for smart specialisation (Annex 3). On combining the data on innovation activity of enterprises in the Republic of Moldova, with the data on patents, were identified

the industries with the innovation potential, which exceeded at least one of the three threshold criteria established by the mapping methodology: specialisation, critical mass and percentage share of patents granted (Table 3).

Thus, in the DRS, 32 industries with innovation potential were identified, of which 5 industries, in addition to having innovation potential, also have economic potential and are of greater interest for smart specialisation: Manufacture of milling products, starch and starch products; Manufacture of bakery products and flour products; Beverage manufacturing; Manufacture of other non-metallic mineral products; Metallurgy.

These are traditional branches in the region, but they have the potential for modernization and innovation through new technologies and products.

The results of the innovation potential analysis show that innovation activity in the South Development Region is unevenly distributed and concentrated in only a few areas of the manufacturing industry including food processing, beverages, selected chemical products and metal related production. There are some sectors which have shown high levels of innovation or patenting; however, there are also many important sectors where the level of innovation is relatively low. This discrepancy can be seen as an indication that innovation is not currently integrated into the South Development Region's main economic sectors. Therefore, smart specialisation policy interventions should include mechanisms for stimulating the adoption of technology, business–research partnerships and innovation transfer within existing sectors, with less emphasis on creating new sectors.

4.1.4. Evaluation of scientific potential

An essential aspect of the research and innovation activity in the DRS is to be represented by the presence of trained human capital. This is ensured through an educational network consisting of two higher education institutions, six secondary vocational education institutions and two post-secondary vocational education institutions.

Thus, DRS holds 15% of the total number of secondary vocational education institutions in the Republic of Moldova, which, although representing a modest share in the national framework, totals a relatively high number of students, namely 1882 students (14% of the national total), and a number of 705 graduates in 2023, equivalent to 13% of the total graduates in this sector at the national level. This proportion indicates a reasonable degree of absorption of young people in secondary technical education in the region but also highlights the need to expand these programmes to better support the demand of the regional labour market (Table 4).

The DRS has two higher education institutions, accounting for 9% of all such institutions in the Republic of Moldova. Together, they enrol 1063 students and have 299 graduates, representing 2% of the respective national totals for higher education students and graduates. The low share of students and graduates in the DRS indicates a limited capacity to train highly qualified specialists at the regional level, which may limit development opportunities in innovative and technical sectors.

At the university level, specialisations relevant to smart specialisation are available. In the undergraduate cycle, DRS counts 266 students and 60 graduates in specialisations relevant to smart specialisation.

The most frequented fields are economic sciences, with 159 students (15% of total enrolment) and 37 graduates (14%), while the field of information and communication technologies includes only 45 students (4%) and 7 graduates (3%). Engineering and engineering activities have 40 students (4%) and 9 graduates (3%), highlighting a growth potential necessary to support technical industries.

At the master's level, the number of students is 124 and that of graduates is 84. Of these, 10% of students and 17% of graduates are in the field of Economic Sciences, highlighting the modest academic orientation towards the S3 sectors. However, there is a lack of sufficient representation in technical and innovation fields.

These data indicate that the DRS faces challenges in developing the skilled human capital needed to support smart specialisation. The scientific potential analysis uses different data classification schemes than those used for economic and innovation data, which cannot be directly linked to the

economic and innovation potential results. Therefore, it was only used to corroborate scientific potential in the proposed smart specialisation priority areas.

Table 4. Distribution of the number of beneficiaries of secondary vocational, post-secondary vocational and higher education in the Republic of Moldova by regions (academic year 2023-2024)

	Institutions (2023)	%-share	Pupils / students	%-share	Graduates (2023)	%-share
Secondary education (ISCED 4)						
Moldova	**40**	**--**	**13,860**	**--**	**5,368**	**--**
Chisinau	11	28%	5,304	38%	1,975	37%
North	13	32%	3,945	28%	1,522	28%
Centre	7	17%	1,737	13%	789	15%
South	6	15%	1,882	14%	705	13%
ATU Gagauzia	3	8%	992	7%	377	7%
Post-secondary vocational education (ISCED 5)						
Moldova	**48**	**--**	**32,273**	**--**	**6,487**	**--**
Chisinau	22	46%	19,806	61%	3,742	58%
North	15	31%	6,883	21%	1,500	23%
Centre	7	15%	2,797	9%	651	10%
South	2	4%	1,583	5%	365	6%
ATU Gagauzia	2	4%	1,204	4%	229	3%
Higher education (ISCED 6)						
Moldova	**21**	**--**	**56,527**	**--**	**13,882**	**--**
Chisinau	17	81%	50,319	89%	12,237	88%
North	1	5%	3,534	6%	868	6%
Centre	--	--	--	--	--	--
South	2	9%	1,063	2%	299	2%
ATU Gagauzia	1	5%	1,611	3%	478	4%
South Development Region						
South - First Cycle - Bachelor's Degree	**--**	**--**	**1071**		**259**	
Including - relevant specialties S3:			**266**		**60**	
Economic sciences	--	--	159	15%	37	14%
Information and communication technologies	--	--	45	4%	7	3%
Engineering and engineering activities	--	--	40	4%	9	3%
History	--	--	22	2%	7	3%
South - Cycle II - Master	**--**	**--**	**124**		**84**	
Including - relevant specialties S3:						
Economic sciences	--	--	13	10%	14	17%

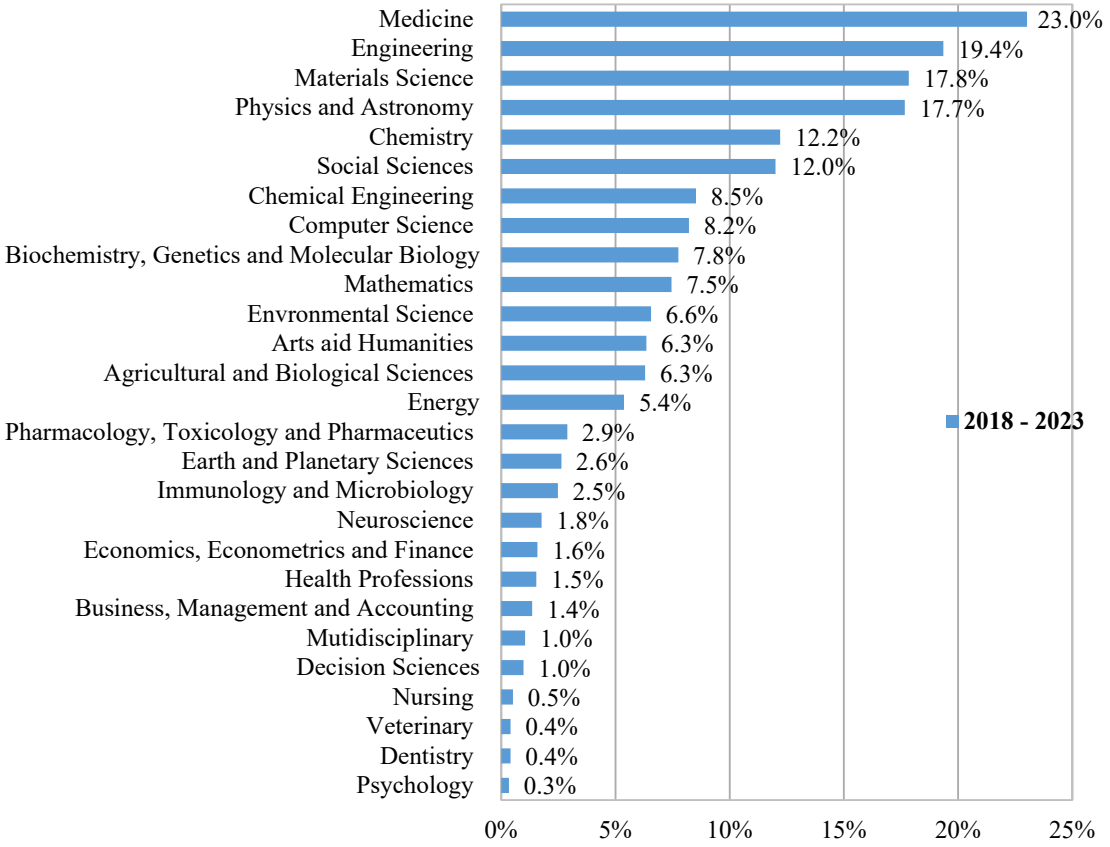
Source: National Bureau of Statistics of the Republic of Moldova (n.d.).

According to Scimago Journal & Country Rank (SCJ) data[1], the total number of publications by authors from the Republic of Moldova in international scientific journals, during the period 2018-2023, reflects a distribution of research activities relevant to the priority areas identified in the DRS. These publications, although fewer in number compared to national publications, are published in

[1]The Scimago Journal & Country Rank is a publicly accessible portal that provides journal metrics and country-level scientific indicators, developed based on the information contained in the Scopus® database (Elsevier B.V.). https://www.scimagojr.com/

international peer-reviewed journals, thus being of increased importance for assessing the scientific potential of the region (Figure 3).

Figure 3. Distribution of publications by fields (SCJ data)



Source: The Scimago Journal & Country Rank.

Preliminary priority areas identified through mapping and supported by international research activity include Engineering (19.4% of total publications), which highlights a major interest in the development of industrial infrastructure and innovation in technological processes. Also, the field of Materials Science (17.8%) represents a key area for innovations in the production of advanced materials, important for sectors such as construction and the automotive industry.

At the same time, Physics and Astronomy (17.7%) and Chemistry (12.2%) contribute substantially to the knowledge and technologies applicable in the processing and manufacturing industries, which are relevant for the region's orientation towards value-added products. The field of Informatics (8.2%), although with a smaller share, is particularly important for developing digital capabilities and supporting digital transformation, essential aspects for attracting investments in the IT sector and for stimulating technological entrepreneurship in the region.

These international publications emphasize the existence of a solid knowledge base and human resources at the national level in priority areas for DRS, thus supporting the objectives of smart specialisation and orientation towards industries with potential for innovation and international competitiveness.

4.1.5. Consolidated results of the analysis of potential smart specialisation areas

By bringing together the findings of the analysis of economic, innovation and scientific potential, industries with potential for smart specialisation were identified (Annex 3), namely:

1. Advanced agro-industry, including niches:

- Functional and sustainable foods with high added value;
- Smart-beverages: Advanced beverage production technologies.

2. Advanced materials and technologies for energy-efficient construction, including niches:
   - Innovative materials and technologies for energy-efficient construction;
   - Advanced metalworking technologies and metal constructions.
3. Sustainable resource management, including niches:
   - Water treatment with advanced and efficient technologies;
   - Recycling and recovery of materials through innovative solutions.
4. Experience-based industries, including niches:
   - Services for niche tourism (gastronomic, wine, wellness);
   - Eco-Tourism.

The DRS smart specialisation study examined the region's economic structure and the number of innovative firms. The findings highlight an urgent need to select priority areas with the potential to stimulate both economic growth and innovation. In contrast to other regions, which have had the opportunity to develop smart specialisation around waste management, the DRS has municipal companies, which limit the selection of this area as one of relevance for the development of smart specialisation. Additionally, water capture, treatment and distribution are also considered to be less attractive options, given they are primarily public in nature, and therefore do not fit into the type of smart specialisation focused on the private sector.

Conversely, regional authorities can influence the development in the next few years of this area of the circular economy by implementing public support policies to stimulate the private sector. Thus, while there may be little activity currently in this area, the relevant activities related to the circular economy can already be mixed into the three other identified niches. Developments in the field of circular economy can unlock considerable potential for economic, social and environmental development in developing regions. Initiatives in the circular economy such as recycling, repair, re-manufacture and upcycle can generate new employment opportunities and business opportunities in areas that historically have been dependent on linear industries. The development of these types of businesses generates opportunities for entrepreneurship and diversification in a region that historically has depended upon a small number of industrial sectors, thereby increasing the resilience of the region during periods of economic recession. Innovations that promote resource efficiency will decrease costs and dependence on foreign raw material supplies. For example, when recycling and waste recovery technologies are adopted, valuable materials can be reused. This reduces costs in the production process, creating opportunities for the development of the local industry, and reducing environmental impacts.

Examples of circular economy practices in agriculture include composting, nutrient recycling and biowaste valorisation and can increase soil quality and productivity in the absence of additional dependence on external inputs. Innovations in the bio-economy such as utilizing waste from agricultural sources to produce bio-energy or bi-products provide sustainable solutions that can provide direct benefits to rural economies.

The results of the Entrepreneurial Discovery Process (EDP) conducted in the South Region confirmed and refined the priorities obtained through analytical means. Thematic workshops and sector-specific focus groups were used to gather the quadruple helix (enterprises, local authorities, research organizations and support institutions) to verify the proposed domains and to identify specific niches and project ideas.

The participants emphasized high-value horticulture and functional foods in the agri-food domain, innovative and sustainable materials in the construction domain and eco-tourism, wine tourism and cultural routes in the experience-based industries. Horizontal needs such as improving the transportation and logistics infrastructure, enlarging testing and certification facilities, reinforcing vocational and higher education training, and improving digital connectivity were also emphasized.

Therefore, through this iterative process, the EDP translated the results of the mapping (Table 5) into a shared strategic vision expressed in terms of concrete actions and joint projects. The regional development agency (RDA) Sud was central in this process in the sense that it coordinated the meetings and ensured the continuity between the different stages of the EDP and linked the local realities to national strategic frameworks.

As the result, the final configuration of the smart specialisation domains for the South Development Region is based on both the quantitative information gathered through analytical mapping and the qualitative information collected through the entrepreneurial and institutional actors of the region, thus providing a consistent and credible base for future innovation-oriented interventions.

Table 5. Validation of preliminary domains and niches with S3 potential

Identified through quantitative analysis	Validated through qualitative analysis
Advanced agro-industry: 1. Functional and sustainable foods with high added value 2. Smart beverages: Advanced technologies for beverage production	**Advanced agro-industry:** 1. Technologized agri-food value chains and high added value food products 2. Advanced technologies for beverage production: Smart beverages
Advanced materials and technologies for energy-efficient construction: 1. Innovative materials and technologies for energy-efficient construction 2. Advanced metal processing technologies and metal constructions	**Advanced materials and technologies for construction:** 1. Innovative materials and technologies for energy-efficient construction 2. Eco-friendly construction materials made from local resources
Experience-based industries: 1. Services for niche tourism (gastronomic, wine, wellness) 2. Eco-tourism	**Experience-based industries:** 1. Services for niche tourism (gastronomic, wine, spa, cultural) 2. Eco-tourism

Source: authors' own elaboration.

4.1.6. Analytical synthesis: how did we find that these specialisation outputs are present in the South Development Region

The results show that there is an economically diverse structure in the South Development Region in terms of both traditional economic activities and new, emerging innovative niches. Food and agricultural products are the dominant employment and sales areas but the innovation potential in these areas is quite low. There are several reasons for the lack of innovation in these areas including a lack of technology to improve productivity, a lack of integration of research and development into food and agricultural product production and a lack of transfer of innovation capability throughout the large-scale sectors of the regional economy.

On the other hand, some innovation signals have been observed in selected niche areas of the manufacturing sector. These include food processing, beverages, building materials and construction-related areas. Proximity to existing supply chains has provided benefits to these sectors along with incremental innovation opportunities; they do not rely on radical, technological changes. The diversity of the regional economy accounts for the broad opportunity area identified through the analytical mapping being narrowed down by the Entrepreneurial Discovery Process to more precise niche areas (functional foods, smart beverages, eco-tourism).

The South Region's specialisation outputs therefore represent a diversification based S3 pathway. In this context, smart specialisation serves less as a means for radically transforming the structure of the regional economy and more as a means for gradually improving it through coalition-building and increasing its resilience. The variety of domains selected is also consistent with the need to involve a wide array of stakeholders and to maintain a balance between focus and feasibility in a region characterized by heterogeneity in terms of the structure of its economy.

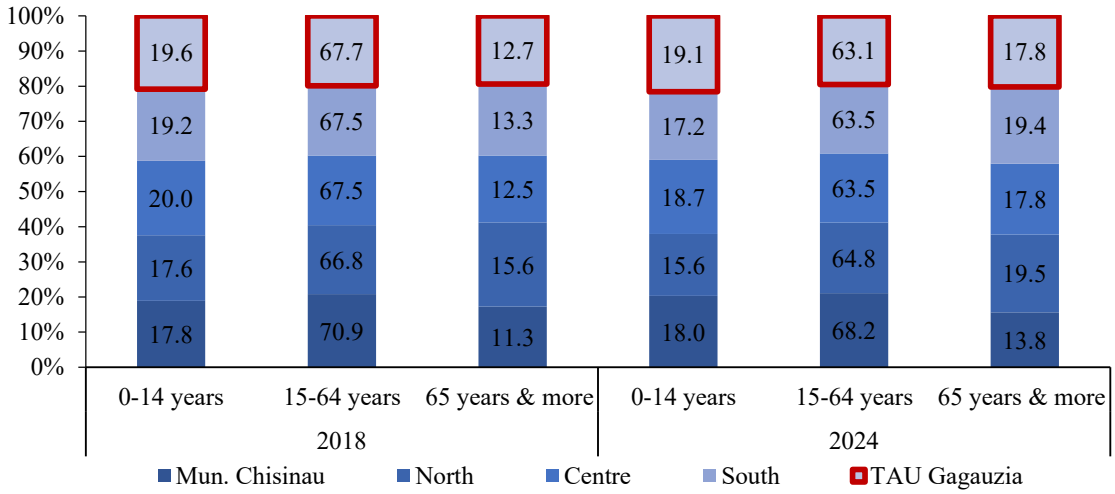
4.2. ATU Gagauzia: concentrated industrial structures and the emergence of bio-innovative niches

4.2.1. Socio-economic analysis

The Autonomous Territorial Unit of Gagauzia (ATU Gagauzia) can be distinguished from the South Development Region in terms of its socio-economic characteristics; it has a greater level of industrialisation, a more cohesive geographical area and specific demographic and labour-market features. In comparison to other regions in Moldova, Gagauzia is the smallest in size (1,848 km²) and had a population of about 161,900 people as of 2024 (4.6 percent of the country's total population). Like the rest of the country, Gagauzia experienced significant depopulation between 2014-2024. Over this time period the population decreased due to sustained external migration and decreasing birth rates and was less than that seen in the South Region.

Demographic trends are reflected in the labour market: the percentage of working-age individuals who were in the workforce decreased by approximately 5 percent between 2018 and 2024 (from 68 percent to 63 percent; see Figure 4). As noted earlier, the employment rate in Gagauzia is significantly lower than the national average. Additionally, firms continue to report shortages of skilled workers across all sectors but especially in the manufacturing sector and agri-food processing.

Figure 4. Population distribution by age group and region, at the beginning of 2018 and 2024



Source: National Bureau of Statistics of the Republic of Moldova (n.d.).

From an economic standpoint, Gagauzia is distinguished by a highly concentrated industrial structure dominated by agrifood and textiles and apparel manufacturing.

The economic structure of the Development Region Gagauzia (DRG), analysed on the basis of the average of the years 2018-2023 (Figure 5), highlights the key sectors that contribute substantially to the regional economy and that align with the identified priority areas areas with potential for smart specialisation and that play a significant role in the economy of the region. These sectors are closely linked to the identified priority areas for smart specialisation. The data reflects a diversified economy, in which agriculture has a dominant share.

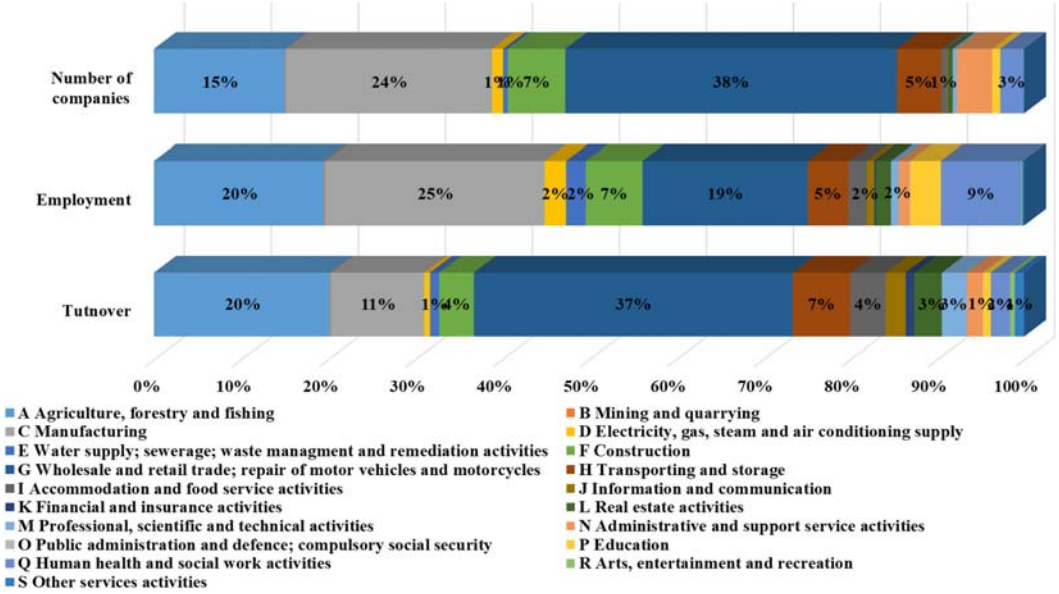
Agriculture, forestry and fishing are thus a core sector in the DRG economy, contributing 20% to sales revenue, 20% to the average number of employees and 15% to the number of businesses. This share underlines the strategic importance of the agricultural sector, especially within the food value chain. By investing in modern technologies and sustainable solutions, the region can increase the added value of this sector, transforming it into a competitive and sustainable agricultural model.

The manufacturing industry, which also includes the textile industry, contributes 11% to total income, 25% to the average number of employees and 24% to the number of companies. This sector has significant development potential in the fields of pharmaceuticals and the textile and clothing

industry. By promoting advanced technologies and sustainable solutions, these can become important factors for regional economic growth and for strengthening the DRG's position on international markets.

Trade, with 37% of total revenues, 19% of the average number of employees and 38% of the number of enterprises, remains the most important economic sector in the DRG. Although not part of the S3 priority areas, trade supports the economic integration of the region and facilitates the access of local products to foreign markets. The development of trade infrastructure can indirectly support the other priority sectors and contribute to increasing regional competitiveness.

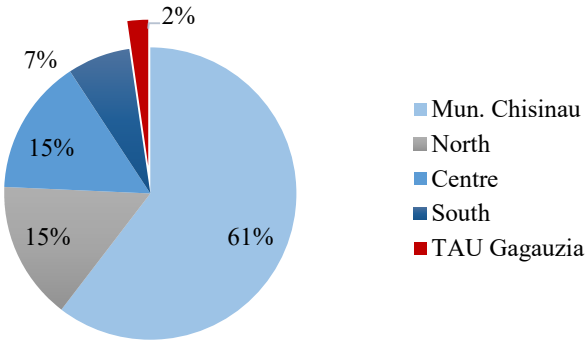
Figure 5. Economic structure of the Gagauzia ATU Development Region (average for 2018-2023)



Source: National Bureau of Statistics of the Republic of Moldova (n.d.).

The analysis of the Gross Domestic Product (GDP) for the RDG in 2021 highlights a modest contribution to the national economy. The region recorded a GDP of approximately 5.57 billion lei, which represents only 2.3% of the total GDP of the Republic of Moldova, which amounted to 242.08 billion lei (Figure 6). This modest contribution places the RDG far behind the Chisinau Municipality, which dominates the national economy with a GDP of 146.2 billion lei (60.4%), and the North (15.3%) and Centre (15.0%) regions.

Figure 6. Contribution of Regions to the formation of regional Gross Domestic Product (%, 2021)



Source: National Bureau of Statistics of the Republic of Moldova (n.d.)

These differences in distribution are reflective of the largely agricultural (rural) structure of the economy of the DRG, where traditional farming and trading depend on lower added value areas,

compared to that of Chisinau Municipality, an area benefiting from higher levels of urbanisation, advanced infrastructure and a large number of economic activities with a high added value, i.e., the IT sector and financial services.

4.2.2. Assessment of economic potential

For the DRG, out of a total of 239 industries initially analysed, 117 passed the predefined threshold for at least one of the two selection criteria, based on employment data (specialisation or critical mass). Table 6 summarises the overall results of the analysis for the DRG, using the thresholds established in the applied methodology.

The static analysis identified 31 industries with current economic potential based on employment level (LQ) data and 25 industries based on turnover. Taking critical mass into account, 115 industries were identified with potential based on employment and 80 based on turnover. Applying both criteria simultaneously, 22 industries with current economic potential were confirmed for the DRG.

Table 6. Mapping the economic potential of the Gagauzia ATU Development Region

Criteria	Criteria threshold	No. of selected industries
Initial number of industries included in the analysis	--	239
Current Analysis - Employment		
Level of specialisation (LQ)	1.25	33
Critical mass	0.1%	115
both	**--**	**31**
Current analysis - Turnover		
Level of specialisation (LQ)	1.25	29
Critical mass	0.10%	80
both	**--**	**25**
Current analysis All: employment and turnover	--	**22**
Dynamic analysis - changes in employment		
In relation to the region	3 out of 5 years and the period 2018-2023	64
In relation to the aggregate industry	3 out of 5 years and the period 2018-2023	86
both	**--**	**56**
Dynamic analysis - changes in turnover		
In relation to the region	3 out of 5 years and the period 2018-2023	97
In relation to the aggregate industry	3 out of 5 years and the period 2018-2023	77
both	**--**	**65**
Dynamic analysis All: changes in employment and turnover	--	**34**
Both: current and dynamic analysis	--	**4**

Source: authors' own calculations.

At the same time, the dynamic economic analysis identified 56 industries with emerging economic potential using dynamic employment change data and 65 industries using dynamic turnover change data. Combining both criteria, 34 industries with emerging economic potential were confirmed.

Only 4 industries met the thresholds set in both the static and dynamic analyses, indicating particularly promising sectors for smart specialisation in the DRG.

Thus, the mapping analysis identified the following general areas of strategic interest for the DRG, which have a significant share in employment and turnover:

1. Agriculture and food processing;
2. Pharmaceutical and chemical industry;

3. Textiles and clothing;
4. Construction and engineering works;
5. Non-metallic and metallic materials industry;
6. Education and related services;
7. Processing of coke oven products and crude oil.

These broad industry groups identified correlate with 3 of the 4 priorities set for smart specialisation at the national level, highlighting significant compatibility with the strategic directions mentioned in national policy documents. This correspondence reflects a common development potential, which can support both regional and national objectives, with a view to economic growth and stimulating innovation.

Annex 4 includes industries classified according to NACE-2 and disaggregated at 1-, 2- and 3-digit levels, which exceeded predefined thresholds for identifying economic potential during the period 2018-2023.

The economic analysis of ATU Gagauzia has identified an even greater level of concentration of its economy than the South Development Region. Thus, a smaller number of industrial branches produce a significant portion of employment and turnover of Gagauzian enterprises, especially in agro-industrial food processing, textile production, pharmacy products and several types of manufacturing.

Therefore, both static and dynamic analyses of Gagauzia's economy have shown a very narrow list of sectors that combine current success with growth prospects. Thus, the concentration of economic activity in a smaller number of sectors allows the Gagauzian government to establish more clearly defined goals as part of its strategy for developing the economy, and reduces the need for a broad and general diversification of the economy. As well, from the perspective of smart specialisation, this provides favourable conditions for concentrating the resources of the government (policy support) to focus on a smaller number of sectors where there is the possibility to grow, modernize and connect to the higher value-added segments of regional and global supply chains.

4.2.3. Identification of innovation potential

An examination of the DRG's potential for innovation provides insight into the capacity and structure of regional industry to provide technological development and to allow the flow of knowledge. An analogous evaluation of the DRS' potential for innovation has been conducted using a similar methodological approach; this was carried out across two primary dimensions: an evaluation of innovation activity amongst companies in the DRG and an evaluation of the patenting activity amongst the companies in the DRG.

Table 7 reports the findings of the evaluation as follows: from an original selection of 61 representative industries for the DRG contained within the initial selection, only 14 companies with a significant critical mass and 17 industries that surpassed the specialisation threshold relative to other parts of the DRG were selected using the critical mass and specialisation (LQ) criteria.

Table 7. Mapping the innovation potential of the Gagauzia ATU Development Region

Criteria	Predefined threshold	Number of enterprises	Number of selected industries
Initial number of industries included in the analysis	--	--	61
Critical mass	1	14	--
Specialisation (LQ)	1	--	17
Share (relative to region)	10%	--	16
Both: share and specialisation	--	--	**16**
Share of patents	> 1%	--	8
LQ or %-share or Patents	--	--	**22**

Source: authors' own calculations.

Additionally, sixteen of these 31 industries simultaneously met both criteria of critical mass and specialisation; therefore, there is a considerable potential for companies in those industries to be adaptable and to invest in technologies and innovations.

Eighteen of the thirty-one industries also had a higher-than-1 percent patenting rate; therefore, the companies in those industries are likely interested in protecting their intellectual property rights and in encouraging technology transfer.

These trends suggest that there may be considerable strategic priority potential for the industries that have demonstrated a high patenting rate in the process of developing a smart specialisation strategy.

The analysis of the DRG's innovation potential using data from 2021-2022 for the different aspects of the economy indicates that there are a variety of important and strategic sectors for the economy of the region. A detailed mapping of the DRG's innovation potential was conducted, identifying the sectors with a high level of innovation and technological development; this will assist in the economic transformation of the region.

The evaluation of the DRG's industry showed an interesting relationship between the number of patent applications submitted per sector and those sectors with strong strategic economic significance, including:

- Food industry – 30.6% (of this sector has the highest patent application rate and therefore represents the greatest opportunity for the use of technology and innovation in the food sector to develop new, sustainable food products and further increase the value of existing products. The potential for investment in the food industry would be enhanced by the adoption of sustainable and technologically advanced food processing methods and systems.
- Manufacturing of basic pharmaceutical products and pharmaceutical preparations – 30.6% (this high share indicates a high degree of specialisation in the pharmaceutical industry and a significant amount of resources invested in R&D).
- Manufacture of soaps, detergents and cosmetics – 5.6% (of this sector has a relatively low but stable patent application rate; it is also an indicator of ongoing development in the area of personal and household care products.
- Manufacture of other special-purpose machinery and equipment – 8.3% (the industry is showing evidence of a potential for development in the manufacture of specialised agricultural equipment and equipment for other industrial sectors).
- Manufacturing of medical devices, apparatus and instruments – 13.9% (therefore, the industry is showing strong interest in developing innovative products in medical and dental equipment; it is therefore considered a very promising sector for developing high-tech products).
- Beverage manufacturing – 2.8% (patent application rates in this sector indicate an ongoing process of innovation in beverage production methods and the introduction of new products).

The findings of the mapping are outlined in detail in Annex 6 and have been able to identify sectors which make a significant contribution to the economy of the region and have the ability to create innovative solutions to support sustainable economic growth. Increased interest in international patent applications in fields like food chemistry, pharmaceuticals, and biochemistry, correspond to the priorities identified in the smart specialisation strategy of the DRG. Therefore, these fields represent the major specialisations of the region, and they present an important source of innovation potential.

In addition to providing the scientific basis for the proposed priority areas for smart specialisation, within this framework, patents were used to confirm the potential for the implementation of advanced technological solutions and sustainable value chains in the priority areas for smart specialisation of the region.

Therefore, the identification of industries with the innovation potential, according to the integrated analysis of statistical data regarding innovation activity of the enterprises from the Republic of Moldova and data on patents, were identified and presented in Annex 5 as meeting at least one of the three criteria established by the methodological approach for mapping: specialisation, critical mass or percentage share of patents.

Innovation activity in ATU Gagauzia is modest but the proportion of patents in sectors which are economically important to the region is reasonably good. A high level of patent registration in food processing and chemical production indicates there is better linkage between the economy's sectoral composition and the nature of innovation activity compared to the South Development Region.

The fact that innovation policy in Gagauzia could be based on existing technological capabilities (and not a blanket approach) means that smart specialisation initiatives should focus on vertical (depth), e.g., developing new or improved products; upgrading products through the introduction of new technology; and providing R&D support for knowledge intensive processes, in a smaller number of strategically important sectors.

4.2.4. Evaluation of scientific potential

A central element of the research-innovation potential of the Gagauzia ATU Development Region is the presence of the local educational network, consisting of one higher education institution, three secondary vocational education institutions (one of which recently ceased its activity) and two post-secondary vocational education institutions.

The DRG constitutes 8% of all secondary professional schools in Moldova, with 992 students and 377 graduates in 2023; each being 7% of their respective national totals (Table 8). While these figures represent a relatively high level of participation among youth, they point to the need for a wider array of programs that reflect more accurately labor market requirements at a local/territorial level.

Table 8. Distribution of the number of beneficiaries of secondary vocational, post-secondary vocational and higher education in the Republic of Moldova by regions (academic year 2023-2024)

	Institutions (2023)	%-share	Pupils / students	%-share	Graduates (2023)	%-share
Secondary vocational education (ISCED 4)						
Moldova	**40**	**--**	**13,860**	**--**	**5,368**	**--**
Chisinau	11	28%	5,304	38%	1,975	37%
North	13	32%	3,945	28%	1,522	28%
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South	6	15%	1,882	14%	705	13%
ATU Gagauzia	3	8%	992	7%	377	7%
Post-secondary vocational education (ISCED 5)						
Moldova	**48**	**--**	**32,273**	**--**	**6,487**	**--**
Chisinau	22	46%	19,806	61%	3,742	58%
North	15	31%	6,883	21%	1,500	23%
Centre	7	15%	2,797	9%	651	10%
South	2	4%	1,583	5%	365	6%
ATU Gagauzia	2	4%	1,204	4%	229	3%
Higher education (ISCED 6)						
Moldova	**21**	**--**	**56,527**	**--**	**13,882**	**--**
Chisinau	17	81%	50,319	89%	12,237	88%
North	1	5%	3,534	6%	868	6%
Centre	--	--	--	--	--	--
South	2	9%	1,063	2%	299	2%
ATU Gagauzia	1	5%	1,611	3%	478	4%
Gagauzia ATU Development Region						
UTAG - First Cycle - Total Bachelor's Degree	--	--	***1,312***		***306***	
including - relevant specialties S3:			**518**		**124**	
Economic sciences	--	--	417	*32%*	101	*33%*
Engineering and engineering activities	--	--	78	*6%*	15	*5%*
Agricultural Sciences	--	--	12	*1%*	--	--
Hotel services, tourism and leisure	--	--	11	*1%*	8	*3%*
UTAG - Cycle II - Master	--	--	***299***		***172***	

	Institutions (2023)	**%-share**	**Pupils / students**	**%-share**	**Graduates (2023)**	**%-share**
including - relevant specialties S3:			***60***		***36***	
Economic sciences	--	--	52	17%	36	21%
Agricultural Sciences	--	--	8	3%	--	--

Source: National Bureau of Statistics of the Republic of Moldova (n.d.).

The lack of sufficient representation in technical and innovation fields reveals the need for additional support to attract young people to specialisations relevant to the knowledge-based economy, thus strengthening the region's potential to become a development pole.

At the university level, specialisations relevant to smart specialisation are available. In the undergraduate cycle, DRS counts 518 students and 124 graduates in specialisations relevant to smart specialisation.

The most frequented fields are economic sciences, with 417 students (32% of total enrolment) and 101 graduates (33%), while the field of engineering and engineering activities includes only 78 students (6%) and 15 graduates (5%). Agricultural sciences have 12 students (1%).

At the master's level, the number of students is 299 and that of graduates is 172. Of these, 20% of students and 21% of graduates are in the field of economic and agricultural sciences, as in the southern development region, the modest academic orientation towards the S3 sectors.

The scientific potential analysis uses different data classification schemes than those used for economic and innovation data, which cannot be directly linked to the economic and innovation potential results. Therefore, it was only used to corroborate scientific potential in the proposed smart specialisation priority areas.

According to data published by Scimago Journal & Country Rank (SCJ), between 2018-2023, researchers from the Republic of Moldova contributed to a significant number of international scientific publications. These works, although less numerous compared to national ones, were published in peer-reviewed international journals, underlining their relevance for evaluating the region’s scientific potential.

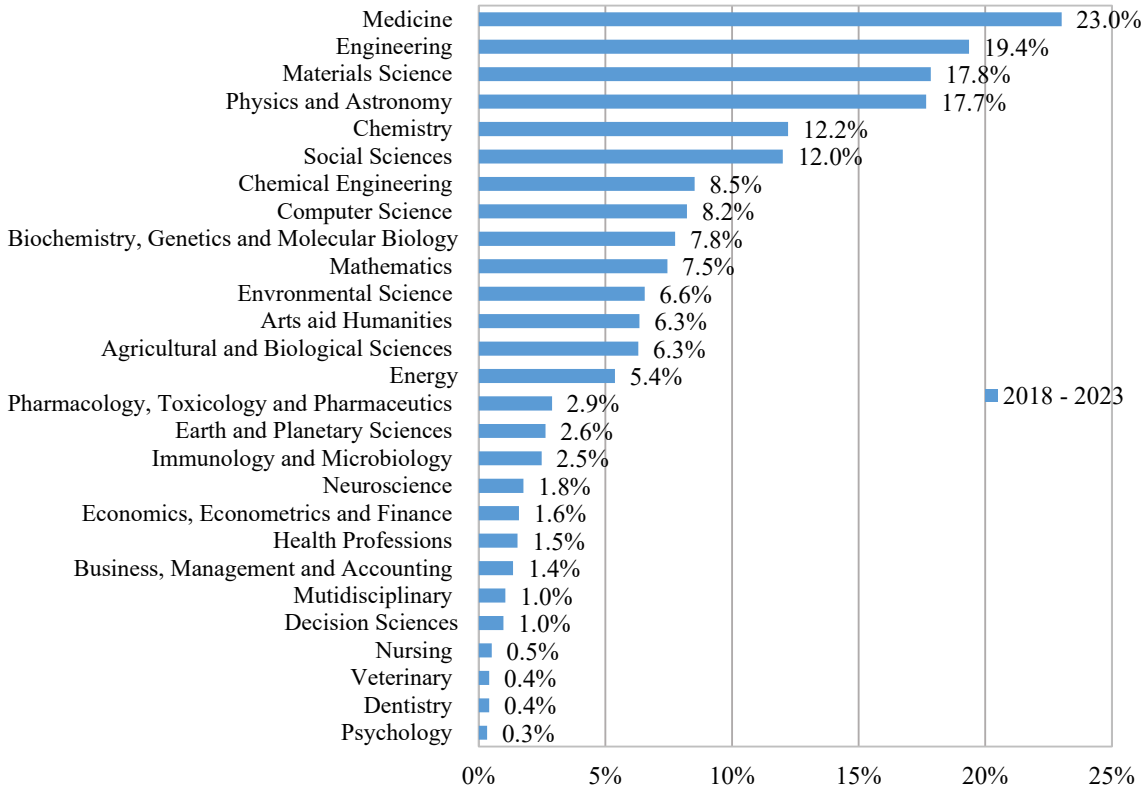
The preliminary priority areas identified through mapping and supported by international research activity reflect the strategic directions for developing the DRG’s economy. According to the data in Figure 7, Medicine is the most significant area, with 23% of all international publications. This share underlines the importance of research and innovation in the health sector, with direct relevance for the smart specialisation in Bio-innovative Technologies for Pharmaceuticals, Cosmetics and Care Products. Pharmacology, Toxicology and Pharmacy, with a share of 2.9%, completes this picture, confirming a consolidated interest in the development of pharmaceuticals and personal care solutions.

At the same time, Engineering, with a share of 19.4%, demonstrates a substantial orientation towards the development of industrial infrastructure and the implementation of advanced technological processes. This field is essential for the creation of innovative solutions in the sustainable and innovative food value chain, as well as for the modernization of the textile and clothing industry.

Biochemistry, genetics and molecular biology, with a share of 7.8%, represent an important basis for research applied in agriculture and the pharmaceutical industry, highlighting the region's potential for high-value-added agri-food products and innovative health solutions.

Agricultural and biological sciences, with 6.3%, highlight the direct contribution of research to innovation in agricultural production and the development of a sustainable food value chain. The integration of results from this field into industrial processes can stimulate economic growth and strengthen the DRG's position on international markets.

Figure 7. Distribution of publications by fields (SCJ data)



Source: The Scimago Journal & Country Rank.

These publications highlight the DRG's innovation potential and human resources in strategic sectors identified for smart specialisation, contributing to the goals of economic development and international competitiveness.

4.2.5. Consolidated results of the analysis of potential smart specialisation areas

By combining the results of the analysis of economic, innovation and scientific potential, industries with potential for smart specialisation were identified (Annex 6), namely:

1. Sustainable and innovative food value chain, including niches:
   - Foods with Personalized Nutritional Value
   - Circular Food Processing
   - Precision and Ecological Agriculture
2. Advanced textile technologies and sustainable materials, including niches:
   - Smart and Functional Garments
   - Sustainable and Circular Production in the Textile Industry
3. Advanced Chemistry and Biopharmaceuticals for Health and Care, including niches:
   - Biotechnologies for Personalized Pharmaceutical Products
   - Ecological Cosmetics and Care Products Based on Green Chemistry

These areas present opportunities both through their economic potential and through their scientific support and innovation capacity.

The food value chain is one of the strongest economic sectors in the DRG, supported by agriculture and the food industry. This sector benefits from a good scientific basis, fueled by research in agricultural sciences, biotechnology and chemical engineering. Investments in innovation and

knowledge transfer in these areas can contribute to strengthening the food value chain, transforming the DRG into a regional centre of excellence.

The textile industry, although currently less developed, presents significant potential for smart specialisation. Research in chemistry, immunology and microbiology provides a scientific basis for this sector, supporting the integration of innovative solutions into production processes and the development of high-performance textile materials. Modernizing this sector could diversify the region's economy and create export opportunities.

The industry of advanced chemistry and biopharmaceuticals is one of the most promising for the DRG, due to the combination of economic potential and scientific support. The manufacture of soaps, detergents and cosmetics and perfumery products represent a segment with patenting activities and emerging economic potential, suggesting opportunities for the creation of innovative products, oriented towards international markets.

These identified smart specialisation areas and niches were consulted with representatives of the quadruple helix (representatives of academia, private, public and civil society) within the EDP - 3 focus groups organized in the context of the qualitative analysis of the areas for the smart specialisation of the region.

Representatives from the private sector, academia, local authorities and civil society actively participated, contributing diverse perspectives and providing a solid basis for validating niches.

Through this iterative approach, the EDP transformed the findings from the mapping (Table 9) into a shared vision for strategic development as a set of common activities and collaborative projects. The Regional Development Agency Gagauzia provided key support for the EDP by convening meetings, ensuring continuity across all its phases and aligning regional specificities with national strategic objectives.

In conclusion, the Smart Specialisation Areas of the South Development Region were defined using data from both the qualitative and quantitative data collected from entrepreneurial and institutional actors of the region and analytical mapping, thus creating a solid and reliable foundation for future innovation-orientated interventions.

Table 9. Validation of preliminary domains and niches with S3 potential

Identified through quantitative analysis	Validated through qualitative analysis
Sustainable and innovative food value chain: 1. Personalized Nutritional Value Foods 2. Circular Food Processing 3. Precision and Organic Agriculture	**Sustainable and innovative food value chain:** 1. High added value food industry based on local raw materials 2. Regenerative agriculture and circular food value chains
Advanced textile technologies and sustainable materials: 1. Smart and Functional Clothing 2. Sustainable and Circular Production in the Textile Industry	**Innovative and functional textile and apparel industry:** 1. Advanced Textile Technologies and Durable Materials 2. Sustainable and Circular Production in the Textile and Apparel Industry
Advanced chemistry and biopharmaceuticals for health and care: 1. Biotechnologies for Personalized Pharmaceutical Products 2. Eco-friendly Cosmetics and Personal Care Products Based on Green Chemistry	**Bio-innovative technologies for pharmaceuticals, cosmetics, and care products:** 1. Natural Cosmetics and Care Products from Local Resources 2. Biotechnologies for Pharmaceutical Products

Source: authors' own elaboration.

4.2.6. Analytical synthesis: how did we find that these specialisation outputs are present in the ATU Gagauzia Region

The research shows that ATU Gagauzia has a more concentrated industrial structure with higher alignment of economic and innovation potential. Clear peaks were identified by the mapping for agri-food processing, pharmaceuticals and chemicals, and some selected manufacturing niches along with related patenting activities. The concentration of the regional innovation system is based on a small number of areas of competence with a high upgrading potential.

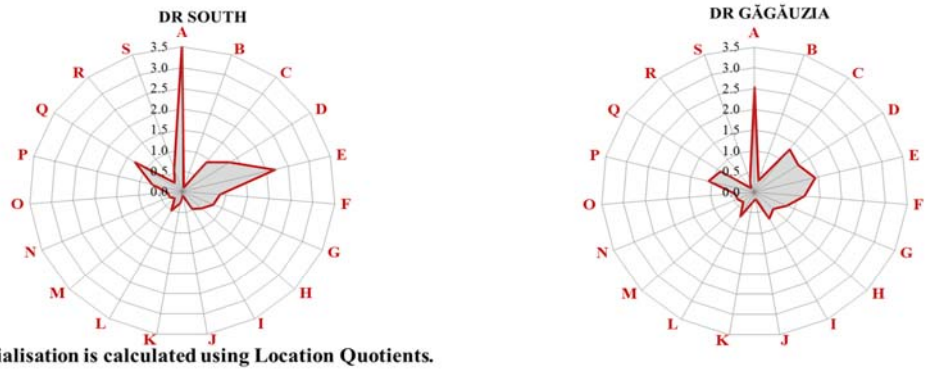
The Entrepreneurial Discovery Process validated this analytical result and confirmed that a low number of domains have the combination of economic relevance and technological opportunities. The stakeholders agreed on a few domains such as bio-innovative health and care products, advanced textiles and sustainable food value-chains, which show a preference for depth instead of breadth. These results can be explained by both structural factors (the industrial concentration), and governance factors (the coordination capacity and the continuity of the stakeholder's engagement).

Therefore, ATU Gagauzia represents a "depth" strategy of S3, with a focus on fewer domains allowing for an easier definition of priorities, a stronger pipeline of projects and a possibly faster dynamic of innovations. The case also demonstrates how focused regional structures, when combined with efficient governance, may link the analytical evidence into applicable and feasible smart specialisation strategies.

4.3. Comparative insights: differentiated but complementary regional trajectories

A comparative assessment of the South Development Region and ATU Gagauzia reveals two structurally distinct but potentially complementary regional economies, each characterised by its own evolution, constraints and innovation trajectories. The analysis of the region's economic specialisation model, using employment data for the period 2018–2023 (Figure 8), shows predominant specialisation in agriculture, followed by electricity and heat supply, gas, hot water and air conditioning, as well as manufacturing activities, reflecting the traditional economic foundations of the regions and the enduring significance of primary and processing activities for employment, turnover and local value creation. However, the two radar charts demonstrate that the South Region presents a broader distribution of relative specialisation across sectors, whereas Gagauzia exhibits a much sharper concentration around a limited number of activities.

Figure 8. The economic specialisation model of the regions



Specialisation is calculated using Location Quotients.

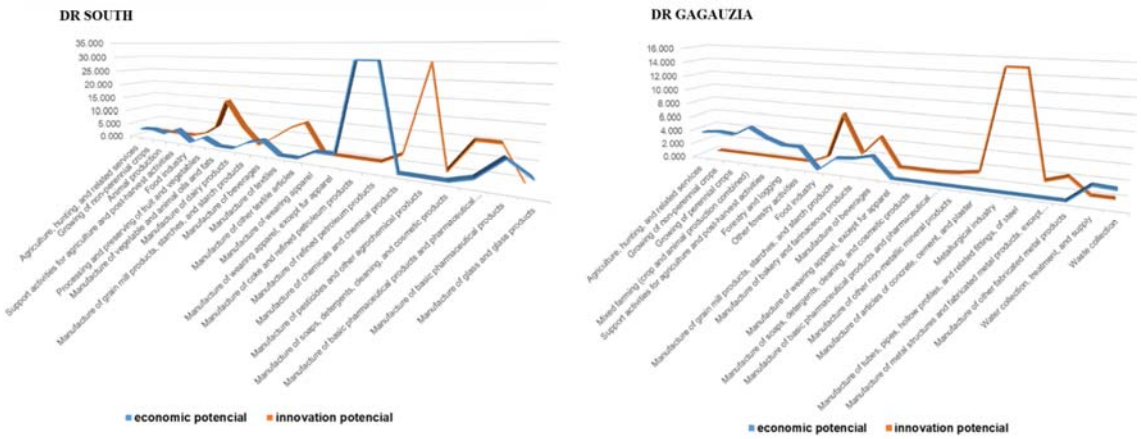
Letters show NACE one-digit codes: A: Agriculture, forestry and fishing; **B**: Mining and quarrying; **C**: Manufacturing; **D**: Electricity, gas, steam and air conditioning supply; **E**: Water supply; sewerage; waste management and remediation activities; **F**: Construction; **G**: Wholesale and retail trade; repair of motor vehicles and motorcycles; **H**: Transporting and storage; **I**: Accommodation and food service activities; **J**: Information and communication; **K**: Financial and insurance activities; **L**: Real estate activities; **M**: Professional, scientific and technical activities; **N**: Administrative and support service activities; **O**: Public administration and defence; compulsory social security; **P**: Education; **Q**: Human health and social work activities; **R**: Arts, entertainment and recreation; **S**: Other services activities

Source: National Bureau of Statistics of the Republic of Moldova (n.d.) / authors' own calculation.

As shown in Figure 9, the distribution of industries with economic and innovation ~~potential~~ in the South Region and Gagauzia reveals both similarities and structural differences. The unevenness of the relationship between economic performance and innovation intensity is evident in both territorial entities; however, the patterns exhibited in this unevenness differ significantly.

In the South Region, the economic potential curve is relatively stable, whereas the innovation potential curve fluctuates over a broader range of industries. As such, it is clear that there are various degrees of innovation activity within many sectors, suggesting a greater diversity of industrial structure. There are several peaks in innovation potential in manufacturing related to the production of food, beverages, chemicals and/or bio-products. However, despite the ongoing significance of agriculture and primary processing as major contributors to the regional economy, their relative innovation potential is somewhat modest and demonstrates a gap between the regional economic pillars and emerging innovation trends.

Figure 9. The innovation potential of the regions



Source: authors' own calculations.

Gagauzia has lower total levels of both economic and innovation potential compared to the South Region; nevertheless, the relationship between the two is somewhat better defined. Both curves (economic and innovation) are more aligned in Gagauzia than in the South Region, and the peaks of innovation potential are more concentrated in fewer industries. The most prominent increases in innovation potential are observed in textile-related industries and in certain food manufacturing sub-sectors. The concentration of innovation potential into fewer sectors illustrates that Gagauzia is operating with a narrower range of innovation niches than the South Region and that the regional innovation system is based upon a smaller number of key technological/industrial competences rather than a larger number of sector-specific competences.

Both regions share one similar characteristic: strong industries in terms of their economic value do not always show corresponding innovation potential. The greatest mismatch in this regard can be seen in primary agriculture, grain-related activities, and low-value food processing. These industries continue to represent significant proportions of the economies of both regions but are characterised by low innovation intensity. This indicates that these industries may be technologically stagnant or poorly connected to R&D activities.

The differences described above arise from how structural diversity and institutional capacity shape the process of translating innovation and economic signals to regional specialisation profiles. The amount of structural diversity within an economy influences the degree to which innovation is spread across different sectors. As such, while innovation potential may exist in many different areas (e.g., South Development Region), its presence is typically less readily observable through composite indicators that do not adequately capture the distribution of innovation potential, or through stakeholder interpretation using the Entrepreneurial Discovery Process.

In comparison, regions with highly concentrated structures tend to have a higher degree of embedding of innovation signals in fewer sectors; this allows for greater clarity in aligning economic

performance and innovation activities. Structural characteristics thus determine not whether there will be specialisation opportunities, but rather how clearly those opportunities emerge during comparative mapping exercises.

Collectively, the observations made above imply that the South Region may benefit from having the opportunity to diversify innovation possibilities across multiple sectors, which would provide the ability to build resilience and adaptability. On the other hand, Gagauzia's more focused approach could lead to building on innovation niches already established and growing competitive advantages through the expansion of those same niches. In addition, both regions have shown a need for policy interventions to support technological upgrading, improve collaboration between business and research institutions, and encourage innovation in industries currently demonstrating high economic relevance but low innovation performance.

The validation process confirmed the original data was accurate; however, some of the areas/niches were refined and clarified to reflect stakeholder feedback and regional priority concerns. Although geographically adjacent, the South Region and Gagauzia have significantly differing smart specialisation domains as a result of differing economic structures, resource endowments and development trajectories/innovation capacities that they have developed over time.

The South Region's S3 focus is primarily centred around an advanced agro-industrial base that is further supported by emerging experiences in sustainable construction materials and experience-based industries like tourism. The emphasis of S3 related to technology-enabled agri-food supply chains and high added-value foods reflects a region that has a significant portion of its economy engaged in agriculture and food processing; however, there is an aspiration to transition from traditional production to more knowledge-intensive and technologically advanced production methods. In addition to agro-industries, the inclusion of advanced technologies for beverage production – especially smart or functional beverages – represents a progression toward innovation-driven differentiation for the South Region that can capitalise on its rich history in viticulture and agro-processing. In addition to the primary agro-industry focus, the South Region's focus on developing innovative materials for energy-efficient construction and eco-friendly building technologies based on local resources indicates a role for natural assets and environmental sustainability in creating new growth paths. Simultaneously, the experience-based industries component of the South Region demonstrates how culture, gastronomy and natural heritage are strategically positioned as drivers of regional competitiveness, transitioning tourism into a value-creating sector that will generate additional value through food, hospitality and creative industries.

In comparison, the S3 focus of Gagauzia is more narrowly defined and consists of a few more narrow and well-defined innovation niches that represent both economic significance and technological advancement opportunity. The sustainable and innovative food value chain remains an important part of Gagauzia's S3, although it is focused on the creation of high added-value products from local raw materials, using regenerative agricultural techniques and circular food production systems. The focus on sustainability and the establishment of regional value chains that maximize the utilization of local resources illustrates a greater commitment to long term sustainability principles in Gagauzia than in the South Region. Another distinguishing feature of Gagauzia's S3 is the specialisation in the textile and apparel industry, in which advanced textile technologies, functional materials and circular production processes signal a path of modernization and international competition in a sector that has traditionally represented a significant economic presence in the region. Also, the emergence of bio-innovative technologies for pharmaceuticals, cosmetics and care products illustrate a growing capacity for Gagauzia to develop science-based industries based on local bio-resourced, and signify a significant movement to the higher value-added bioeconomy niches.

Collectively, when viewing the S3 structures of both regions, complementary strengths as opposed to overlapping priorities emerge. The South Region's S3 appears to be following a diversification-based model, combining agro-industrial transformation, sustainable construction materials and tourism-related services in order to form a broad platform for innovation. Conversely, Gagauzia's S3 is following a depth-based model, concentrating on fewer, though more focused and technologically demanding domains such as advanced textiles and bio-innovative products. The South Region utilizes a wide range of economic activity to increase its own resilience and competitiveness,

whereas Gagauzia is cultivating a strong position in specialized niches with the potential for significant upgrading and differentiation.

The distinction between these two approaches highlights the need to tailor innovation policy to regional context. The difference in S3 approaches also creates possibilities for inter-regional collaboration; the diverse food and tourism innovations of the South Region could be integrated with Gagauzia's specialized textile and bio-based industries to enable shared value chains, cross-sectoral experimentation and mutually reinforcing development paths. Collectively, the South Region and Gagauzia contribute to a more robust and multi-dimensional national S3 landscape characterized by both diversity and concentration.

A comparative assessment of the South Development Region and ATU Gagauzia reveals two structurally distinct but potentially complementary regional economies, each characterised by its own evolution, constraints and innovation trajectories. The figures illustrating the specialisation profiles of the two regions (Specialisation of the Regions, slide 11) provide a clear visual synthesis of these differences. In both cases, agriculture and manufacturing appear as dominant sectors, reflecting the traditional economic foundations of the regions and the enduring significance of primary and processing activities for employment, turnover and local value creation. However, the two radar charts demonstrate that the South Region presents a broader distribution of relative specialisation across sectors, whereas Gagauzia exhibits a much sharper concentration around a limited number of activities.

4.4. Interpretation of findings in relation to the research hypotheses

A comparative evaluation of the South Development Region and ATU Gagauzia identifies two structurally different but economically compatible regional economies; each has an evolutionary pattern, restrictions, and innovative trends, based on a variety of factors. The examination of the region's economic specialisation model, using data relating to employment for the years 2018-2023 (as shown in Figure 8) demonstrates that there is a high level of specialisation in agriculture, with the second highest being electricity and heat supply, gas, hot water and air conditioning, and the third highest being manufacturing activities; these represent the traditionally dominant sectors of the economy of both regions and demonstrate the continued importance of primary and processing activities to employment. Interpretation of findings in relation to the research hypotheses

This section is concerned with linking the results of the research to the three hypotheses presented in the introduction, and interpreting the comparative evidence from the South Development Region and ATU Gagauzia to show how differences in the specialisation outcomes are the product not just of structural characteristics of the sectors involved, but also of the institutional capacities of the regions, the quality of co-ordination, and the translation of the analytical findings to priority areas through the EDP.

4.4.1. Hypothesis 1: Analytical mapping alignment and the validity of selected domains

Hypothesis 1 ”The closer the alignment of regional priorities with data-driven analytical mapping, the better defined and valid are the chosen specialisation domains”, stated that the better the alignment of regional priorities with data-based, analytical mapping of the regional priorities, the clearer and more valid will be the identified specialisation domains for each region. Both regions confirm this hypothesis but through different mechanisms and varying degrees of precision.

ATU Gagauzia's mapping shows a highly concentrated pattern of regional development with large, clearly identifiable areas of significant economic and innovation potential in the agri-food processing industry; pharmaceuticals/chemicals; and textile production. As such, the specialisation domains validated through the EDP were similar to the analytical signals shown by the mapping; therefore, there is strong evidence to suggest that the priority setting among stakeholders were heavily influenced by regional capabilities as evidenced by measurable innovation activity and economic development. Therefore, when the economic base and signals of innovation are aligned, the EDP tends to refine and improve the clarity of the mapped domains rather than directing the mapped domains in new directions.

The South Development Region is an example of a diversified economy where there are multiple sources of innovation potential. As such, the mapping process has provided a broad opportunity set and the EDP has been used to narrow down the opportunity set by refining the broad domains into specific niches (functional foods; smart beverages; eco-tourism) thus providing a clearer strategic direction. Although the alignment of the mapping and EDP processes can still be observed in this region, the mechanism of how the mapping and EDP are being utilised differ; i.e. the mapping process has provided a broad opportunity set that has then been synthesised and prioritised using the EDP to provide a clear, actionable strategy that aligns with the stakeholders' perceptions and feasibility constraints.

The overall evidence from the comparison of the two regions demonstrates that the use of analytical mapping improves the internal consistency of S3 priorities by reducing the likelihood of arbitrary selection and by allowing stakeholders to base their selections on measurable indicators. Additionally, the alignment of the analytical mapping and the EDP is also influenced by the structural characteristics of the regional economy; i.e. diversified economies need stronger synthesis and niche-based prioritisation to turn the mapping results into a clear and coherent strategic framework.

4.4.2. Hypothesis 2: Institutional capacity and stakeholder involvement in S3 governance

Hypothesis 2 ” The higher the institutional capacity and the more coordinated are the regional development agencies (RDA) involved in the S3 governance process, the better are the levels of involvement of all stakeholders and the more coherent is the S3 governance system”, stated that there is a correlation between the institutional capacity of regional development agencies and the degree of coordination among them and their capacity for effective cooperation among stakeholders and thus an effective S3-governance in terms of coherence. The empirical findings confirm this hypothesis and explain the mechanisms by means of which institutional capacity affects the outcome.

The relationship between the consolidation of governance structures in ATU-Gagauzia (coordinated, structured participation formats, continuity in the participation of stakeholders) and a clear, direct derivation of the priority setting from the evidence can be explained well by the findings. In contrast, a concentration of industrial activity alone will not necessarily lead to coherent S3-governance; nevertheless, if this is combined with stable coordination formats and recurrent participation formats, it will increase the probability that stakeholders agree on a small number of feasible, innovative areas.

For the South Development Region, the RDA played a key role in the preparation of the EDP and ensured the linkage between the mapping of potential future activities and their validation by stakeholders. However, the much greater diversity of the economy and lower innovation intensity in major traditional sectors of the economy require that the governance process manages many different interests and a more complex prioritization task. Therefore, the findings suggest that institutional capacity is required to organize the participation of stakeholders, but also to manage conflicts of interest in regions characterized by a diversification of the economic base and low concentrations of innovation signals.

In summary, the findings show that institutional capacity acts as a "translation mechanism": institutional capacity determines whether the results of the mapping are merely descriptive or whether they represent strategic priorities of the stakeholders, and whether stakeholder engagement leads to consensus, learning and to concrete directions for implementation.

4.4.3. Hypothesis 3: Complementarity of regional profiles and national competitiveness

The diversified, complementary specialisation profiles of the two regional development areas (South Development Region and ATU Gagauzia), contribute to an increased national competitiveness of the country, as a result of the interregional synergies generated by the innovation systems according to Hypothesis 3” Diversified yet complementary specialisation profiles of the regions increase national competitiveness due to inter-regional synergies generated by the innovation system”. The results confirm the Hypothesis and show how the specialisation paths are differentiable yet compatible.

The South Development Region is characterized by a diversification-based path and therefore, its economic development is based on the combination of several industrial branches such as agro-food, construction-related materials and experience-based industries. On the other hand, ATU Gagauzia has followed a depth-based path and therefore its focus was limited to fewer, but technology intensive sectors (especially in the advanced textile industry and in the biotechnological products for the health and care sector). As opposed to the duplication of priorities in terms of regional strategies, the differentiation of the specialisation paths among the two regions can be seen as reducing policy fragmentation and increasing the opportunities for cross-regional linkages of value chains.

The potential synergy mechanisms include:

(i) the integration of agro-food innovation and packaging/material solutions;

(ii) the common logistics and export infrastructure, which is facilitated by the South's strategic location;

(iii) cross-sectoral experimentation linking bio-based input and green chemistry with agro-food and tourism branding;

(iv) common human capital initiatives (vocational training, testing/certification facilities) benefiting all the above-mentioned domains.

This suggests that the complementarity can lead to an increase in national competitiveness of Moldova if the multi-level governance will coordinate the investments and will avoid the isolated regional strategies.

Summarising, the comparative evidence confirms that the S3 in Moldova can contribute to national competitiveness not by the uniform specialisation, but by the coherent differentiation of the regional priorities which are based on the evidence and coordinated through the governance structures enabling the collaboration and the shared strategic infrastructure.

5. Conclusion

The empirical research findings clearly support the evaluation of the three hypotheses developed at the start of the research. First, the empirical findings demonstrate that regions whose smart specialisation priorities were based on data-driven analytical mapping are able to identify more coherent and economically relevant domains (the empirical findings show a high degree of correspondence between the results from the quantitative mapping and the EDP validated priorities for both regions). Second, the results of the research confirm that institutional capacity and coordination have a significant impact on the quality of smart specialisation governance, and subsequently influence both the level of stakeholder engagement in smart specialisation governance, and the strategic focus of the selected domains. Third, the comparative evidence found in this research supports the hypothesis that differentiated yet complementary specialisation profiles can exist for regions within an innovative small national innovation system, thereby supporting coherence and resilience rather than creating fragmentation.

Smart Specialisation has been shown through empirical research to be a highly effective tool for strategic guidance for regional innovation and development in the Republic of Moldova. The research's use of an approach fully aligned with the Joint Research Centre (JRC) methodology (quantitative mapping combined with the Entrepreneurial Discovery Process) represents one of the first territorial validations of regional smart specialisation processes in the country. The results show a strong relationship between the analytical mapping used to identify the regions' strength and the strategic objectives developed by stakeholders during the entrepreneurial discovery process. This alignment between analytical results and stakeholder-driven strategic choices validates the ability of the logical methodology of smart specialisation to capture regional strengths, structural dynamics and innovation potential in detail.

The results of the research showed that there was a very close correspondence between the analytical mapping and the strategic objectives developed for the two regions. In the case of the region of ATU Gagauzia, the priority areas developed by the stakeholders were advanced chemistry and biopharmaceuticals for health and care, advanced textile technologies and sustainable materials, and sustainable and innovative food value chains. These priority areas corresponded almost identically to the priority areas identified through the economic and innovation analysis that indicated those sectors

as either structurally solid or emerging rapidly. In the case of the South Region, the specialisation domains developed by the stakeholders included advanced building materials, agri-food systems and experience-based industries. These specialisation domains mirrored the results of the NACE-based analysis, which indicated construction materials, agricultural processing and cultural-experiential sectors as regional strengths. The alignment between the structural data and the validated priorities represents a powerful validation of the effectiveness of the interaction between the analytical mapping and the participatory validation to produce a strategic configuration that is both coherent and empirically grounded.

In addition to demonstrating the importance of having a well-established institutional capacity in order to develop effective smart specialisation governance, the research clearly shows the important role that institutional capacity plays in determining the quality and outcome of the smart specialisation governance process. The two Regional Development Agencies (RDA Sud and RDA UTA Gagauzia) served as the central coordinating bodies for both the analytical and participatory aspects of the smart specialisation process. As such, the agencies ensured methodological consistency, maintained continuity in the Entrepreneurial Discovery Process (EDP), and provided institutional anchorage for the strategy. The presence of a consolidated governance structure in Gagauzia, that includes a coordination committee, a Regional Innovation Council and a designated S3 management team, demonstrate how organizational arrangements can strengthen the level and quality of stakeholder engagement. Furthermore, RDA Sud played a significant role in facilitating dialogue among economic actors, academia and public institutions, thereby creating a sustained and iterative regional innovation process. Therefore, the comparative evidence supports the conclusion that the capacity of governance to articulate and implement a regional smart specialisation is not peripheral, but rather is critical.

Also, the comparative analysis shows that when different specialisation paths are developed simultaneously across different regions, they create increased national competitiveness compared to when regional specialisation efforts are pursued individually. For example, the emerging capabilities in biopharmaceuticals, sustainable textiles and innovative food processing in Gagauzia, work in tandem with the South Region's strengths in advanced construction materials, diverse agri-food production and cultural and experience-based sectors to provide opportunities for cross-regional value chain integration, transfer of technological knowledge in functional materials and packaging, and coordinated export strategies and shared branding or tourism infrastructure. While the development of the specialized paths does not lead to fragmentation of the national innovation system, rather it contributes to the coherence, resilience and long-term growth prospects of the system.

In addition, the comparative assessment regarding the South Development Region and the Autonomous Territorial Unit of Gagauzia was conducted against the backdrop of the three hypotheses presented at the outset of the research.

The combination of analytical economic-innovation mapping and participatory validation through the Entrepreneurial Discovery Process (EDP) has produced a solid evidence base that supports the determination and revision of the smart specialisation domains in both regions.

Hypothesis 1 stated that regions which establish their smart specialisation priorities based upon evidence-based analytical mapping will be more likely to identify smart specialisation domains with high innovation and business performance potential. The conclusions of this research support Hypothesis 1. Both regions demonstrated correspondence between the domains/niches validated during the EDP and the quantitative mapping results. Gagauzia validated domains and niches of bio-innovative technologies for pharmaceuticals, cosmetics and care products; innovative and functional textile and apparel industries; and sustainable and innovative food value chains; and these matched the competitive/emerging sectors identified through the economic and innovation potential analysis. Similar alignment exists in the South Region, where advanced agro-industry, innovative construction materials and experience-based industries correlate with the information obtained through NACE. This similarity of interest confirms that the combination of data-driven mapping with stakeholder validation enhances the internal logic of S3 priority establishment and diminishes the possibility of establishing arbitrary or politically motivated priority objectives.

Hypothesis 2 posited that the institutional capacity of regional development agencies serves as a mediator of the success of smart specialisation implementation and the quality of regional innovation

governance. The empirical findings support Hypothesis 2. Both RDA South and RDA Gagauzia have developed the necessary governance structures to enable organisation, coordination, and sustainability of the EDP and S3 management cycles. RDA Gagauzia has created a multi-tiered system including a Coordination Group, a Regional Innovation Council, and an S3 Management Team which allows for ongoing dialogue among stakeholders and feedback. In the South Region, the RDA oversees strategy management, monitoring and coordination of participation processes and ensures consistency of the region's S3 with the national Smart Moldova Programme. The creation of these governance structures demonstrates that structured governance, continued coordination and administrative capacity are crucial for transforming analytical results into operational innovation environments.

Hypothesis 3 asserted that interregional complementarity between different specialisation profiles produces greater national competitiveness than separate regional trajectories. Hypothesis 3 is supported by the research as well. The two regions have developed unique but complementary S3 domains: Gagauzia has developed a focus in biopharmaceuticals, sustainable textiles and circular food systems while the South Region has focused on advanced agro-industry, energy efficient construction materials and experience-based industries. Instead of duplicating efforts or competing for the same priorities, the two regions provide opportunities for synergy and cross-regional value chain linkage. Examples of synergies include the use of bio-based materials, agro-industrial innovation, export logistics, sustainable production systems and tourism related services. The existence of these types of complementarities can help diversify the national innovation environment and create the opportunity for coordinated policy interventions to enhance the overall competitiveness of Moldova.

Overall, the research highlights the need for continued institutional support, continuous engagement of all relevant stakeholders through the Entrepreneurial Discovery Process, and strategic investments in R&D, innovation and human capital development. The demonstration of complementarity between the two regions validates that the transition towards a smart, innovation-driven economy in Moldova, will depend not only on the unique strengths of each of the territories, but also on the capacity of these strengths to function together in a collaborative manner at the national level in a more integrated national innovation ecosystem. Therefore, smart specialisation is not simply a static decision-making process for identifying priority areas, but a flexible governance mechanism that facilitates structural change, promotes cross-regional cooperation, and enhances the long-term competitiveness of the country within the broader European and global contexts.

***Authors' contribution**: Introduction: Diana Russu and Larisa Savga. Literature review: Larisa Savga. Methodology and data: Diana Russu. Research results and comments: Diana Russu. Conclusion: Diana Russu and Larisa Savga*

***Acknowledgement:** The authors gratefully acknowledge the valuable support provided by the Regional Development Agency South and the Regional Development Agency Gagauzia of the Republic of Moldova throughout the preparation of this research. Those studies were conducted as part of the regional analytical studies on smart specialisation in the Development Regions of South and ATU Gagauzia, funded by the European Union, under the "EU4Moldova: Local Communities" programme, funded by the European Union, the German Federal Ministry for Economic Cooperation and Development (BMZ), the Austrian Development Cooperation (ADC), and the Ministry of Foreign Affairs of the Republic of Poland – Polish Aid; and implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, the Austrian Development Agency (ADA), and the Solidarity Fund PL (SFPL) in Moldova (2024).*

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Annex 1. Industries identified with economic potential for the Southern Development Region

Industries	NACE rev 2	Current analysis			Dynamic analysis		
		Employment	Turnover	both	Changes/ variations in Employment	Changes/ variations in turnover	both
# selected industries		**32**	**37**	**25**	**71**	**83**	**44**
Agriculture, forestry and fishing	A	x	x	x			
Agriculture, hunting and related services	A01	x	x	x			
Growing plants from non-permanent crops	A011	x	x	x			
Growing plants in permanent crops	A012	x	x	x			
Activities in mixed farms (crop farming combined with animal husbandry)	A015	x	x	x			
Agricultural support activities and post-harvest activities	A016	x	x	x			
Forestry and logging	A02	x	x	x			

Industries	NACE rev 2	Current analysis			Dynamic analysis		
		Employment	Turnover	both	Changes/ variations in Employment	Changes/ variations in turnover	both
Forestry and other forest activities	A021	x	x	x			
Production, processing and preservation of meat and meat products	C101				x	x	x
Manufacture of milling products, starch and starch products	C106	x	x	x		x	
Manufacture of bakery and farinaceous products	C107	x	x	x	x	x	x
Manufacture of animal feed preparations	C109				x	x	x
Beverage manufacturing	C110	x	x	x		x	
Manufacture of wearing apparel by knitting or crocheting	C143	x	x	x			
Manufacture of paper and paper products	C17				x	x	x
Manufacture of paper and cardboard articles	C172				x	x	x
Printing and reproduction of records on media	C18				x	x	x
Printing and service activities related to printing	C181				x	x	x
Manufacturing of chemical substances and products	C20				x	x	x
Manufacture of basic chemicals, fertilizers and nitrogen products; manufacture of plastics and synthetic rubber in primary forms	C201				x	x	x
Manufacture of other non-metallic mineral products	C23				x	x	x
Manufacturing of clay building materials	C233	x	x	x	x		
Metallurgical industry	C24		x		x	x	x
Metal construction and metal products industry, excluding machinery, equipment and installations	C25				x	x	x
Manufacture of metal structures	C251				x	x	x
Electrical equipment manufacturing	C27	x	x	x	x		
Manufacture of wires and cables; manufacture of connecting devices therefor	C273	x	x	x	x		
Production, transmission and distribution of electricity	D351				x	x	x
Water collection, treatment and distribution	E360	x	x	x	x		
Waste collection, treatment and disposal; activities for the recovery of recyclable materials	E38	x			x	x	x
Waste collection	E381	x	x	x	x	x	x
Recovery of recyclable materials	E383				x	x	x
Civil construction works	F42	x	x	x		x	
Road and railway construction work	F421	x	x	x		x	

Industries	NACE rev 2	Current analysis			Dynamic analysis		
		Employment	Turnover	both	Changes/ variations in Employment	Changes/ variations in turnover	both
Construction work of other engineering projects	F429		x		x	x	x
Demolition and site preparation works	F431				x	x	x
Electrical and plumbing installation works and other installation works for buildings	F432				x	x	x
Motor vehicle trade	G451				x	x	x
Vehicle maintenance and repair	G452				x	x	x
Trade in motorcycles, related parts and accessories; maintenance and repair of motorcycles	G454				x	x	x
Retail sale in non-specialized stores	G471	x	x	x			
Retail sale of other household goods in specialized stores	G475	x	x	x			
Warehousing and auxiliary activities for transport	H52		x		x	x	x
Ancillary activities for transport	H522		x		x	x	x
Restaurants and other food service activities	I56				x	x	x
restaurants	I561				x	x	x
Information technology service activities	J620				x	x	x
Real estate transactions	IT				x	x	x
Real estate activities based on fees or contracts	L683				x	x	x
Professional, scientific and technical activities	M				x	x	x
Legal and accounting activities	M69				x	x	x
Accounting and financial auditing activities; tax consultancy	M692				x	x	x
Management consulting activities	M702				x	x	x
Architectural and engineering activities; testing and technical analysis activities	M71				x	x	x
Other professional, scientific and technical activities	M74				x	x	x
Other professional, scientific and technical activities n.e.c.	M749				x	x	x
Administrative service activities and support service activities	N				x	x	x
Rental and leasing activities	N77				x	x	x
Rental and leasing activities of other machinery, equipment and tangible goods	N773				x	x	x
Business support service activities n.e.c.	N829	x			x	x	x
Education	P				x	x	x
Secondary education	P853	x	x	x	x	x	x
Activities related to human health	Q86	x	x	x			
Hospital assistance activities	Q861	x	x	x			

Industries	NACE rev 2	Current analysis			Dynamic analysis		
		Employment	Turnover	both	Changes/ variations in Employment	Changes/ variations in turnover	both
Outpatient and dental care activities	Q862	x	x	x			
Repair of computers and communications equipment	S951				x	x	x

Source: Statistical research on innovation, National Bureau of Statistics of the Republic of Moldova (n.d.).

Annex 2. Industries with innovation potential of the SUD Development Region

Industries with innovation potential (LQ or %-share or Patents) NACE rev.2		Selected industries			Innovation activities		Patents
		Innovation activities		Patents	LQ (1)	Share (10%)	Share (> 1%)
		LQ	%-Share	%-Share			
10	Food industry	X	X	X	1.09	22.2%	2.6%
C106	Manufacture of milling products, starch and starch products	X	X	--	7.50	50.0%	--
C107	Manufacture of bakery and farinaceous products	X	X	--	2.14	23.1%	--
C110	Beverage manufacturing	X	X	X	4.80	40.0%	7.9%
C141	Manufacture of wearing apparel, except fur apparel	--	X	--	0.75	10.0%	--
C204	Manufacture of soaps, detergents and cleaning, cosmetic and perfumery products	--	--	X	--	--	7.9%
C21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	--	--	X	--	--	28.9%
C23	Manufacture of other non-metallic mineral products	--	X	--	0.94	20.0%	0.0%
C236	Manufacture of concrete, cement and plaster articles	X	X	--	1.36	33.3%	--
C24	Metallurgical industry	X	X	--	15.00	100.0%	0.0%
C242	Production of steel tubes, pipes, hollow profiles and accessories for them	X	X	--	15.00	100.0%	--
C25	Metal construction and metal products industry, excluding machinery, equipment and installations	X	X	--	1.25	20.0%	--
C259	Manufacture of other fabricated metal products	X	X	--	2.14	25.0%	0.0%
C281	Manufacture of general purpose machinery and equipment	--	--	X	--	--	15.8%
C283	Manufacture of machinery and equipment for agriculture and forestry	--	--	X	--	--	10.5%
C284	Manufacture of machinery and machine tools for metalworking	--	--	X	--	--	5.3%
C29	Manufacture of motor vehicles, trailers and semi-trailers	X	X	--	7.50	50.0%	--
C293	Production of parts and accessories for motor vehicles and engines	X	X	--	7.50	50.0%	0.0%
C32	Other industrial activities n.e.c.	--	--	X	--	--	5.3%
C325	Manufacturing of medical and dental devices, apparatus and instruments	--	--	X	--	--	10.5%
D35	Production and supply of electricity and heat, gas, hot water and air conditioning	X	X	--	1.88	20.0%	--
D352	Gas production; distribution of gaseous fuels through pipelines	X	X	--	5.00	25.0%	--
E360	Water collection, treatment and distribution	X	--	--	3.75	7.7%	--
F43	Special construction works	--	--	X	--	--	5.3%
G46	Wholesale trade, except of motor vehicles and motorcycles	--	X	--	0.88	18.5%	--
G461	Wholesale trade agents	X	X	--	15.00	100.0%	--
G462	Wholesale of raw agricultural products and live animals	X	X	--	1.50	25.0%	--
G463	Wholesale of food, beverages and tobacco	--	X	--	0.65	14.3%	--
G464	Wholesale of consumer goods	X	X	--	1.50	100.0%	--
G467	Specialized wholesale of other products	--	X	--	0.68	11.1%	--
H49	Land transport and pipeline transport	X	X	--	2.07	11.8%	--

Industries with innovation potential (LQ or %-share or Patents) NACE rev.2		Selected industries			Innovation activities		Patents
		Innovation activities		Patents	LQ (1)	Share (10%)	Share (> 1%)
		LQ	%-Share	%-Share			
H493	Other land passenger transport	X	X	--	3.46	14.3%	--
H494	Road freight transport and moving services	X	--	--	1.00	7.7%	--

Source: Statistical research on innovation, National Bureau of Statistics of the Republic of Moldova (2023)/ State Agency for Intellectual Property (data provided on upon request)

Annex 3. Industries and potential priority areas for smart specialisation of the Southern Development Region

NACE Rev2 Industries	Industries	Economic Potential (E) & Innovation Potential (I)		Scientific potential	
		Current economic potential	Emerging economic potential	National DRS patents (B)	Publications (P)
AGRO - ADVANCED INDUSTRY		E&I	E&I		Organic Chemistry, Aquaculture and Fish Technology, Agricultural Biotechnology and Animal Health Food Supplements, Biotechnology and Winemaking, Agricultural Technologies and Seed Treatment
A	Agriculture, forestry and fishing	E		P	
A01	Agriculture, hunting and related services	E			
A011	Growing plants from non-permanent crops	E		P	
A012	Growing plants in permanent crops	E		P	
A015	Activities in mixed farms (crop farming combined with animal husbandry)	E			
A016	Agricultural support activities and post-harvest activities	E			
A02	Forestry and logging	E			
A021	Forestry and other forest activities	E			
C101	Production, processing and preservation of meat and meat products		E		
C106	Manufacture of milling products, starch and starch products	E&I			
C107	Manufacture of bakery and farinaceous products	E&I	E&I		
C109	Manufacture of animal feed preparations		E		
C110	Beverage manufacturing	E&I	P	P	
ADVANCED MATERIALS AND TECHNOLOGIES FOR ENERGY EFFICIENT CONSTRUCTIONS		E	E&I	P	Construction and thermal insulation.
C23	Manufacture of other non-metallic mineral products		E&I		
C233	Manufacturing of clay building materials	E			
C24	Metallurgical industry		E&I		
C25	Metal construction and metal products industry, excluding machinery, equipment and installations		E&I		
C251	Manufacture of metal structures		It is		
F42	Civil construction works	E			
F421	Road and railway construction work	E			
F429	Construction work of other engineering projects		E		
F431	Demolition and site preparation works		E		

NACE Rev2 Industries	Industries	Economic Potential (E) & Innovation Potential (I)		Scientific potential	
		Current economic potential	Emerging economic potential	National DRS patents (B)	Publications (P)
F432	Electrical and plumbing installation works and other installation works for buildings		E		
EXPERIENCE-BASED INDUSTRIES		E	E		
I56	Restaurants and other food service activities		E		
I561	restaurants		E		
Q	Health and social assistance				
Q86	Activities related to human health	E			
Q861	Hospital assistance activities	E			
Q862	Outpatient and dental care activities	E			
SUSTAINABLE RESOURCE MANAGEMENT		E&I	E&I		
E360	Water collection, treatment and distribution	E&I			
E38	Waste collection, treatment and disposal; activities for the recovery of recyclable materials		E		
E381	Waste collection	E	E		
E383	Recovery of recyclable materials		E		
Other areas					
C143	Manufacture of wearing apparel by knitting or crocheting	E			
C17	Manufacture of paper and paper products		E		
C172	Manufacture of paper and cardboard articles		E		
C18	Printing and reproduction of records on media		E		
C181	Printing and service activities related to printing		E		
C20	Manufacturing of chemical substances and products		E		
C201	Manufacture of basic chemicals, fertilizers and nitrogen products; manufacture of plastics and synthetic rubber in primary forms		E		
C27	Electrical equipment manufacturing	E			
C273	Manufacture of wires and cables; manufacture of connecting devices therefor	E			
D351	Production, transmission and distribution of electricity		E		
J620	Information technology service activities		E		
M	Professional, scientific and technical activities		E		
M702	Management consulting activities		E		
M71	Architectural and engineering activities; testing and technical analysis activities		E		
M74	Other professional, scientific and technical activities		E		
M749	Other professional, scientific and technical activities n.e.c.		E		

NACE Rev2 Industries	Industries	Economic Potential (E) & Innovation Potential (I)		Scientific potential	
		Current economic potential	Emerging economic potential	National DRS patents (B)	Publications (P)
P	Education		E		
P853	Secondary education	E	E		
S951	Repair of computers and communications equipment		E		

Source: authors' own calculations.

Annex 4. Industries identified with economic potential for the Gagauzia ATU Development Region

Industries	NACE rev 2	Current analysis			Dynamic analysis		
		Employment	Turnover	both	Changes/ variations in Employment	Changes/ variations in turnover	both
# selected industries		**31**	**25**	**22**	**56**	**65**	**34**
Agriculture, forestry and fishing	A	x	x	x			
Agriculture, hunting and related services	A01	x	x	x			
Growing plants from non-permanent crops	A011	x	x	x			
Growing plants in permanent crops	A012	x					
Growing plants for propagation	A013				x		
Animal husbandry	A014	x	x	x			
Agricultural support activities and post-harvest activities	A016	x	x	x	x	x	x
Extractive industry	B					x	
Extraction of stone, sand and clay	B081					x	
Manufacturing industry	C	x	x	x			
Processing and preserving fruits and vegetables	C103	x	x	x			
Manufacture of vegetable and animal oils and fats	C104					x	
Dairy product manufacturing	C105				x	x	x
Manufacture of milling products, starch and starch products	C106	x	x	x			
Manufacture of other food products	C108				x	x	x
Beverage manufacturing	C110	x	x	x			
Manufacturing of tobacco products	C120	x				x	
Textile manufacturing	C13					x	
Manufacture of other textile articles	C139				x	x	x
Garment manufacturing	C14	x	x	x			
Manufacture of wearing apparel, except fur apparel	C141	x	x	x			
Manufacture of wearing apparel by knitting or crocheting	C143	x			x		
Woodworking, manufacture of products of wood and cork, except furniture; manufacture of articles of straw and other plaited vegetable materials	C16					x	

Industries	NACE rev 2	Current analysis			Dynamic analysis		
		Employment	Turnover	both	Changes/ variations in Employment	Changes/ variations in turnover	both
Manufacture of products of wood, cork, straw and other plaited vegetable materials	C162					x	
Manufacture of coke oven products and products obtained from crude oil processing	C19	x	x	x			
Manufacture of products obtained from the processing of crude oil	C192	x	x	x			
Manufacture of soaps, detergents and cleaning, cosmetic and perfumery products	C204				x	x	x
Manufacture of basic pharmaceutical products and pharmaceutical preparations	C21	x	x	x		x	
Manufacturing of basic pharmaceutical products	C211	x	x	x			
Manufacture of rubber and plastic products	C22					x	
Manufacture of plastic articles	C222					x	
Manufacture of other non-metallic mineral products	C23	x					
Manufacture of glass and glassware	C231	x	x	x			
Manufacture of concrete, cement and plaster articles	C236					x	
Production of tools and ironmongery	C257				x	x	x
Other industrial activities n.e.c.	C32				x		
Manufacturing of medical and dental devices, apparatus and instruments	C325				x		
Gas production; distribution of gaseous fuels through pipelines	D352	x					
Water distribution; sanitation, waste management, decontamination activities	It is	x					
Water collection, treatment and distribution	E360	x	x	x			
Waste collection	E381					x	
construction	F				x	x	x
Civil construction works	F42	x	x	x	x	x	x
Road and railway construction work	F421	x	x	x	x	x	x
Demolition and site preparation works	F431				x	x	x
Other special construction works	F439				x		
Wholesale and retail trade; maintenance and repair of motor vehicles and motorcycles	G				x		
Wholesale and retail trade; maintenance and repair of motor vehicles and motorcycles	G45				x		
Vehicle maintenance and repair	G452				x	x	x
Wholesale trade, except of motor vehicles and motorcycles	G46				x		
Wholesale of raw agricultural products and live animals	G462	x					

Industries	NACE rev 2	Current analysis			Dynamic analysis		
		Employment	Turnover	both	Changes/ variations in Employment	Changes/ variations in turnover	both
Wholesale of food, beverages and tobacco	G463				x		
Wholesale of consumer goods	G464				x	x	x
Wholesale of computer and telecommunications equipment	G465					x	
Wholesale of other machinery, equipment and supplies	G466		x		x		
Specialized wholesale of other products	G467				x		
Non-specialized wholesale trade	G469				x		
Retail sale of food, beverages and tobacco in specialized stores	G472				x	x	x
Retail sale of computer and telecommunications equipment in specialized stores	G474					x	
Retail sale of other household goods in specialized stores	G475	x	x	x			
Retail trade carried out through stands, kiosks and markets	G478				x	x	x
Transport and storage	H				x	x	x
Land transport and pipeline transport	H49				x	x	x
Other land passenger transport	H493					x	
Road freight transport and moving services	H494		x		x	x	x
Warehousing and auxiliary activities for transport	H52				x		
Deposits	H521	x	x	x	x		
Ancillary activities for transport	H522				x		
Accommodation and public catering activities	and				x	x	x
Restaurants and other food service activities	I56				x	x	x
restaurants	I561				x	x	x
Catering activities for events and other food services	I562					x	
Information and communications	J					x	
Editing activities	J58					x	
Book, newspaper, magazine and other publishing activities	J581				x		
Software product editing activities	J582				x	x	x
Program production and broadcasting activities	J60	x					
Television program production and broadcasting activities	J602	x					
Other electronic communications activities	J619				x	x	x
Information technology service activities	J620				x	x	x
IT service activities	J63				x	x	x
Financial intermediation, except insurance and pension funding activities	K64				x		
Other financial intermediation activities, excluding insurance and pension funding activities	K649				x		
Real estate transactions	IT					x	

Industries	NACE rev 2	Current analysis			Dynamic analysis		
		Employment	Turnover	both	Changes/ variations in Employment	Changes/ variations in turnover	both
Rental and operation of own or leased real estate	L682					x	
Professional, scientific and technical activities	M					x	
Legal and accounting activities	M69				x	x	x
Legal activities	M691					x	
Accounting and financial auditing activities; tax consultancy	M692				x	x	x
Activities of centralized administrative departments; management and management consultancy activities	M70				x	x	x
Management consulting activities	M702				x	x	x
Architectural and engineering activities; testing and technical analysis activities	M71				x		
Testing activities and technical analysis	M712				x		
Other professional, scientific and technical activities	M74					x	
Rental and leasing activities	N77					x	
Motor vehicle rental and leasing activities	N771				x		
Activities of travel agencies and tour operators; other tourist reservation and assistance services	N79					x	
Activities of travel agencies and tour operators	N791					x	
Security systems service activities	N802					x	
Landscaping activities and building services	N81				x	x	x
Cleaning activities	N812					x	
Landscape maintenance activities	N813				x	x	x
Administrative services, support services and other service activities provided primarily to businesses	N82					x	
Education	P		x		x	x	x
Secondary education	P853	x	x	x	x	x	x
Higher education	P854				x	x	x
Other forms of education	P855				x		
Other activities related to human health	Q869					x	
Sports activities	R931					x	
Other personal service activities	S960				x	x	x

Source: Statistical research on innovation, National Bureau of Statistics of the Republic of Moldova (n.d.)

Annex 5. Industries with innovation potential of the Gagauzia ATU Development Region

Industries with innovation potential (LQ or %-share or Patents) NACE rev.2		Selected industries			Innovation activities		Patents
		Innovation activities		Patents	LQ (1)	Share (10%) LQ	Innovation activities %- Share
		LQ	%-Share	%-Share			
10	Food industry	X	X	X	1.64	21.4%	30.6%
C103	Processing and preserving fruits and vegetables	X	X	--	5.00	33.3%	--
C104	Manufacture of vegetable and animal oils and fats	X	X	--	15.00	100.0%	--
C105	Dairy product manufacturing	X	X	--	6.00	100.0%	--
C110	Beverage manufacturing	X	X	X	3.60	20.0%	2.8%
C13	Textile manufacturing	X	X	--	7.50	100.0%	--
C139	Manufacture of other textile articles	X	X	--	10.00	100.0%	--
C20	Manufacturing of chemical substances and products	X	X	--	3.33	100.0%	--
C202	Manufacture of pesticides and other agrochemical products	X	X	--	30.00	100.0%	--
C204	Manufacture of soaps, detergents and cleaning, cosmetic and perfumery products	--	--	X	--	--	5.6%
C21	Manufacturing of pharmaceutical products and preparations	X	X	X	10.00	100.0%	30.6%
C211	Manufacturing of basic pharmaceutical products	X	X	--	10.00	100.0%	--
C282	Manufacture of other general-purpose machinery and equipment	--	--	X	--	--	2.8%
C283	Manufacture of machinery and equipment for agriculture and forestry	--	--	X	--	--	2.8%
C289	Manufacture of other special purpose machinery and equipment	--	--	X	--	--	8.3%
C310	Furniture manufacturing	X	X	--	4.62	50.0%	--
C325	Manufacturing of medical and dental devices, apparatus and instruments	--	--	X	--	--	13.9%
G463	Wholesale of food, beverages and tobacco	X	X	--	1.30	33.3%	--
H49	Land transport and pipeline transport	X	X	--	1.03	5.6%	--
H493	Other land passenger transport	X	X	--	2.31	16.7%	--
M71	Architectural and engineering activities; testing and technical analysis activities	X	X	--	3.75	100.0%	--
M712	Testing activities and technical analysis	X	X	--	6.00	100.0%	--

Source: Statistical research on innovation, National Bureau of Statistics of the Republic of Moldova (2023)/ State Agency for Intellectual Property (data provided upon request).

Annex 6. Industries and potential priority areas for smart specialisation of the ATU Gagauzia Development Region

NACE Rev2 Industries	Industries	Economic potential (E) & Innovation potential (I)		Scientific potential	
		Current economic potential	Emerging economic potential	National patents RDN (P)	Publications
Sustainable and innovative food value chain		E&I	E&I		Agricultural and Biological Sciences, Biochemistry, Genetics and Molecular Biology Veterinary Medicine, Chemical Engineering
A	Agriculture, forestry and fishing	E			
A01	Agriculture, hunting and related services	E			
A011	Growing plants from non-permanent crops	E			
A014	Animal husbandry	E			
A016	Agricultural support activities and post-harvest activities	E	E		
C 10	Manufacturing industry	E		P	
C103	Processing and preserving fruits and vegetables	E&I		P	
C105	Dairy product manufacturing		E&I		
C106	Manufacture of milling products, starch and starch products	E			
C108	Manufacture of other food products		E		
C110	Beverage manufacturing	E&I		P	
Advanced textile technologies and sustainable materials		It is	E&I		Chemistry, Immunology and Microbiology, Pharmacology, toxicology and pharmacy
C139	Manufacture of other textile articles		E&I		
C14	Garment manufacturing	E			
C141	Manufacture of wearing apparel, except fur apparel	E			
Advanced Chemistry and Biopharmaceuticals for Health and Care		E&I	E&I		
C204	Manufacture of soaps, detergents and maintenance products, cosmetics and perfumery		E&I	P	Textiles Textile and paper machinery
C21	Manufacturing of basic pharmaceutical products and pharmaceutical preparations	E&I		P	
C211	Manufacturing of basic pharmaceutical products	E&I			
Other					
C19	Manufacture of coke oven products and products obtained from crude oil processing	E			
C192	Manufacture of products obtained from the processing of crude oil	E			
C231	Manufacture of glass and glassware	E			
C257	Production of tools and ironmongery		E		
E360	Water collection, treatment and distribution	E			
F42	Civil construction works	E	E		

NACE Rev2 Industries	Industries	Economic potential (E) & Innovation potential (I)		Scientific potential	
		Current economic potential	Emerging economic potential	National patents RDN (P)	Publications
F421	Road and railway construction works	E	E		
F431	Demolition and site preparation works		E	P	
G452	Vehicle maintenance and repair		E		
H49	Land transport and pipeline transport		E&I		
H494	Road freight transport and moving services		E		
I56	Restaurants and other food service activities		E		
I561	restaurants		E		
J582	Software product editing activities		E		
J619	Other electronic communications activities		E		
J620	Information technology service activities		E		
J63	IT service activities		E		
M702	Management consulting activities		E		
N81	Landscaping activities and building services		E		

Source: authors' own calculations.