MECHANISM OF INITIATING ENDOGENOUS GROWTH IN PERIPHERAL REGIONS: IN CASE OF AUTONOMOUS TERRITORIAL UNIT GAGAUZIA

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This study shows the possible mechanism of initiation endogenous growth in peripheral regions with poorly developed industry and innovation infrastructure (in case of Autonomous Territorial Unit Gagauzia, Republic of Moldova). Understanding of scientific problem has required an attempt to create the concept of Innovation Development Systems in peripheral rural areas of countries with emerging market economies identifing the goal of this study. The empirical research base consists of two units: statistical data and the results of special studies conducted by the author. The analysis used the theoretical and empirical methods, including synthesis, scientific generalization, analogy forecasting, observation, interviews, document analysis, comparative analysis of scientific sources and documentation of legal framework forregion, a secondary analysis of data definition obtained from other research groups. Proposed mechanism will demonstrate the impact of Innovation and Education Cluster activity on increasing the innovative entrepreneurship activity, building relationships between cluster members and other elements of the Regional Innovation System. Subsequent investigations can be dedicated to search relationships in the development of innovative activity between regions of the RM and other countries in which universities play an important role in building the regional innovation development.

Keywords: *Innovation and Educational cluster, regional development, Moldova, UTA Gagauzia.*

Acest studiu demonstrează mecanismul posibil de iniţiere a creşterii endogene în regiunile periferice cu industria slab dezvoltată şi infrastructura de inovare (în cazul Unităţii Teritoriale Autonome Găgăuzia, Republica Moldova). Înţelegerea problemei ştiinţifice a necesitat o încercare de a crea conceptul de inovare şi dezvoltare a sistemelor în zonele rurale periferice ale ţărilor cu economii de piaţă emergente identificate. Scopul acestui studiu. Baza de cercetare empirică este formată din două unităţi: date statistice, inclusiv informaţii de statistici, dar şi rezultatele studiilor speciale realizate de autor. În timpul analizei au fost folosite metodele teoretice şi empirice, inclusiv sinteza, generalizarea ştiinţifică, prognoza, analogia, observaţia, interviul, analiza documentelor, analiza comparativă a surselor ştiinţifice şi documentarea cadrului legal pentru regiune, analiza secundară de definire a datelor obţinute de alte grupuri de cercetare. Mecanismul propus va demonstra impactul activităţii Clusterului de Inovare şi Educaţional pe creşterea activităţii de antreprenoriat inovativ, formarea relaţiilor între membrii clusterului şi alte elemente ale Sistemului de Inovare Regională. Investigaţiile ulterioare pot fi dedicate pentru a căuta relaţii în dezvoltarea activităţii de inovare între regiunile RM şi alte ţări în care universităţile joacă un rol important în construirea dezvoltătii regionale de inovare.

Cuvinte-cheie: *Clusterul de Inovare şi Educaţional, dezvoltare regională, Republica Moldova, UTA Gagauzia.*

Это исследование иллюстрирует возможный механизм инициирования эндогенного роста в периферийных регионах с неразвитой промышленностью и инновационной инфраструктурой (в случае автономного территориального образования Гагаузия, Республика Молдова). Осознание данной научной проблемы потребовало попытку создать концепцию системы инновационного развития в периферийных сельских районах стран с формирующейся рыночной экономикой, что и определило цель данного исследования. Эмпирическая база исследования состоит из двух блоков: статистические данные, в том числе статистическая информация и результаты специальных исследований, проведенных автором. При анализе использованы теоретические и эмпирические методы, в том числе синтеза, научного обобщения, прогнозирования аналогии, наблюдения,

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интервью, анализа документов, сравнительного анализа научных источников и документально правовой базы в регионе, вторичный анализ определения данных, полученных другими исследовательскими группами. Предлагаемый механизм демонстрирует влияние деятельности инновационно-образовательных кластеров на повышение инновационной активности предпринимательства, формирования отношений между членами кластера и другими элементами региональной инновационной системы. Последующие исследования могут быть посвящены поиску взаимоотношения в развитии инновационной деятельности между регионами РМ и другими странами, в которых университеты играют ведущую роль в построении регионального инновационного развития.

Ключевые слова: *инновации и образование кластеров, региональное развитие, Молдова, Гагаузия.*

JEL Classification: R58, E2, O18, P48.

Introduction. Economic growth in the modern states according to most researchers is provided by the National Innovation System (NIS). The problem of transformation of the existing NIS in developing countries related to the question: what factors can develop countries catch up to develop? Answering this question Gershenkron (1962) noted that a developing country has only one advantage - "advantage of backwardness": the possibility of existing institutions to borrow technologies and management methods. The problem of borrowing easier and less costly than the development of something fundamentally new". How true is this statement ? Is it possible to quickly transfer existing practices and methods of innovation development without adaptive mechanism, without preparing the ground for an effective assimilation?

Modern studies have mainly focused on highly urbanized technologically advanced regions, characterized by the institutional infrastructure development, with plenty of high-tech firms and a high level of associating enterprises, high-intensity knowledge sharing and absorptive capacity. Only a small number of empirical researches emphasize the unfavourable for innovative development conditions, characterized by the lack of innovation environment, supporting organizations, and undeveloped networking of regional development (Trippl, 2005 and Isaksen, 2001). This questions are typical for the "emerging market economies" countries for which Vercueil (2012) proposed the following characteristics: intermediate income (between 10-75% per capita income of the average EU level), catching- up growth (narrowing the income gap in the last 10 years in comparison with developed economies), economic opening and institutional transformations.

Innovation development in such regions is very difficult for a number of reasons: lack of high- tech sectors, which would have the technological complementarities and perform the role of "prime mover" of the regional economy, poorly developed network of interaction between the actors of innovation environment, lack of their critical mass, lack of institutional framework and environment that encourages innovation and technological growth (Isaksen, 2001, Todtling and Trippl, 2005).

The aim of this article is to answer the question about possibility of developing an innovative system in the peripheral regions with poorly developed industry and innovation infrastructure. The answer to this question can be found in modern studies on territories innovative development through the clustering processes. Creating an innovation network, accelerating the interactive learning process between local knowledge based actors and their external partners based on the concept of cognitive economics (Cappellin, 2003). For these reasons, in our study we focus on the one type of knowledge cluster – Innovation and Educational Cluster (IEC), which is actual for the regions with poor developed industry but universities present.

Organizations cluster benefits due to synergetic effect are obvious. The symbiosis of entrepreneurs, government agencies, educational institutions and business service providers in the region with the core – regional based University allows to establish exchange flows of innovative information, inventions and technologies between all members of the cluster and further distribute them to the entire region and beyond. This kind of innovation network allows all key actors to exchange existing information, knowledge and expertise (Cantner, Graf, 2011). The purpose of the study is to show the impact of IEC promotion innovation activities on increasing regional entrepreneur's innovation potential focusing on the determinants of relational interaction.

Shortcomings of Innovation Systems in emerging market economies. Emerging market economies require a special mechanism for the development of innovative systems with concentration on collaboration between entrepreneurship and R&D organisations. Schumpeter scholar (1939) highlighted the importance of innovation for economic growth and business development. Most innovation firms in such regions are focusing on incremental and process innovations (Tödtling, 1992; Feldman, 1994; Fritsch, 2000). This is due to the differences in regional specialization and innovation activity (Howells; 1999) with geographical limitation of knowledge spillover effects (Audretsch and Feldman; 1996, Bottazzi and Peri; 2003). Moreover, development of regional policies and institutions competences are partly bound to existing sub-national territories (Cooke et al., 2000) which characterize directly the case we describe. As a rule, the first stage of Regional Innovation System (RIS) development is fragmented and consists of non-connected actors being characterized by general problems:

- *Intra-regional level:*

1. Lack of demand for innovations due to firms' inability to identify their needs for innovation along with low quality and quantity of scientific and technological infrastructure;
2. Lack of an entrepreneurial culture in relation to inter-firm cooperation and consequently absence of economies of scale which may make profitable local innovation efforts;
3. Sectorial specialization in traditional industries with little inclination for innovation and links to the international market;
4. Weak cooperation links between the public, private sectors and regional R&D actors in policy planning (lack of coordination between public and private research organizations, collaboration between Universities and enterprises, support of innovation active entrepreneurs in priority regional sectors).

- *Inter-regional (national) level:*

1. Inadequate coordination between national and regional actions (lack of coordination of the science and technology policy between Departments (Ministries);
2. Traditional financial systems lockable for risk of seed innovation capital, defined as 'long-term intangible industrial investments with an associated high financial risk' (Muldur, 1992);
3. Poor adaptation of public assistance schemes to local SMEs innovation needs (Landabaso, Oughton&Morgan, 1997);
4. Scarcity of technological intermediaries capable of identifying local business demand for innovation and channel it to national and international sources.

- *International level*:

1. Low level participation in international R&D networks, difficulties in attracting skilled labour and accessing external know-how;
2. Poor links of large transnational companies with the local economy, low level of outsourcing development.

Barriers to increasing innovation potential of Gagauz SMEs

Due to the Schumpeter definition of an entrepreneurship (1934) SMEs play a driver forces role in the economy. Proceeding from their relatively high labor intensity and less capital investment, SMEs are able to respond flexibly and adapt to changing market conditions quicker than their larger counterparts. Entrepreneurial sector in the RM consists up to 98% from SMEs, of which 76% (until 9 employees) are micro enterprises which contribute in new job creation, support innovation and stimulate competition. More flexibility, reaction on the market demands and challenges of business environment create conditions for realizing innovation culture changing, development networking relationships and collaboration. These conditions are crucial for companies choosing innovative way of development, because the technology transfer brings the latent conflict, which leads to discrepancy innovations against the organizational culture of the company receiving innovation. In connection with these attributes is very important to keep in mind some determine features of innovative SMEs capacity identified by Hill and Nelly (2000):

- Resources: financial, intellectual, human and physical capital;
- Culture supporting innovation;
- Competence affecting on the level of absorptive capacity;
- Networking ties for innovation.

The researchers acknowledged the limitations of studies in the field of cooperation relations among SMEs (Classen et al., 2012). In turn, Rothwell (1989, 1991) gave a more in-depth assessment of the capacity of SMEs in preparing the R&D personal in- house, a high level of inter-industry knowledge exchange, complementarities with outside experience gathering. These characteristics are very important in the context of developing countries and peripheral regions, which are characterized by limited financial resources for supporting of innovative development and poor access to high-quality education opportunities.

Model of increasing SMEs innovative potential

Since 2012, a series of consultancy and educational studies with local entrepreneurial in Gagauzia have been conducted in framework of IEC activity, where different types of communication in knowledge transferring process for regional SMEs have been used. At the terms of these meetings created new partnership, increased a number of social relationships based on direct personal contacts (Fontes, 2005), fostering development of "collective learning processes" (Boschma and Lambooy, 1999).

Innovation process in SMEs is rather unstructured and seems as a chaotic action therefore to provide an adequate description of the innovation process pay attention to Saren (1984) who identified five types of innovation development models: departmental-stage models, activity-stage models, decision-stage models, conversion process models, response models. Focusing on Conversion process models, we consider two accelerate variables that are expected to influence the input – throughput – output – performance relationships.

Based on the above, disclosing of our model of increasing innovative potential of regional SMEs expressed through the process of transformation inputs to outputs. In the "black box" model we included accelerating innovation processes components: inside of organization – "collaboration and innovation culture" and outside – "collaboration and innovation network". As a condition of innovation culture will be taken the activity marked in the questionnaire as a "participation in study in the field of innovation" and availability of innovative policies in the firm management. As an accelerator of "network creation" examined data related to the firm cooperation with universities and R&D structures. Using the main stages of conversion model were examined the relationships between innovation "Input and Output" in regional SMEs. In addition, we included accelerators internal and external variables: innovation organizational culture and collaboration culture which support of network creation and appeared due to the activity of main agent of region innovation activity – IEC.

Table 1

Variables and descriptive statistic

	Variables	***Description***
INPUTS	Num_HR	Total number of firm physical resources
	Num_ RDHR	Total number of firm R&D intellectual personnel
	Prosp_Dev	Prospects of firms development
	Firm_Pos	Currently economic position firms in the market
	RD_Expen	Volume of expenditure on R&D
DRIVERS	Collab_Uni	Firm collaboration with university innovation incubator
	Collab_RDStruc	Collaboration with R&D structures: Research institute, NGOs, Business service providers etc.
	Inno_cult_SMEs	Most active SMEs, participating in training and seminars SMEs with more developed innovation culture
OUTPUTS	Num_Innov	Numbers of SMEs innovation
	N_patents	Number of patents
	Inno_Prod	Share of innovative products in total production
	Inno_Share	Share of profits from realization of innovative products

Inputs: Resources (financial capital (volume of expenditure on R&D), human and physics capital (total number of firm physical resources and R&D intellectual personnel), currently economic position firms in the market and prospects of firm's development, currently economic position firms in the market.

Outputs: Innovation results (numbers of innovations and patents share of innovative products, share of profits from realization of innovative products).

Drivers (accelerator of innovation potential SMEs increasing):

- Internal driver – Collaboration and Innovation organizational culture (Innovation culture support and promotion of innovation activity, most active SMEs, participating in studies and grant programs);
- External driver – Collaboration and Innovation Network creation (firm's collaboration with R&D institutions: National (International) Research institute, NGOs, Business service providers, Knowledge intensive business services etc.).

For the proof of importance of driver forces influence on SMEs innovation activity in the region in the study tested the relationship between the following variables represented in Table 1. Standard model with instrumental variables is obtained by adding to the usual regression equation that relates the endogenous regressions and instrumental variables:

$$y_i = \beta_0 + x_1\beta_1 + x_2\beta_2 + \cdots x_n\beta_n + \varepsilon_i \qquad (1)$$

The study of linkages between the studied factors and the results showed that all of the dependencies in this example are rectilinear character. We assume that the unknown function is a linear combination of the above factors and for estimating coefficients applied a linear model method ordinary Least Squares. Each dependent variable allowed us to create four models:

1. $\text{Num\_In} = \beta_0 + \text{Num}_{HR} \times \beta_{Num\_HR} + \text{Num\_R\&D}_{HR} \times \beta_{Num\_RD\_HR} + \text{Prosp}_{Dev} \times \beta_{Prospects\_dev} \times \text{Firm}_{Pos} \times \beta_{Firm\_Pos} + \text{R\&D}_{Expen} \times \beta_{RD\_Expend} + \text{Collab\_Uni} \times \beta_{Collab\_Uni} + \text{Collab\_RDStr} \times \beta_{Collab\_RDStr} + \text{Inno\_cult} \times \beta_{Inno\_cult} + \varepsilon_i \qquad (2)$

2. $\text{N\_Patent} = \beta_0 + \text{Num}_{HR} \times \beta_{Num\_HR} + \text{Num\_R\&D}_{HR} \times \beta_{Num\_RD\_HR} + \text{Prosp}_{Dev} \times \beta_{Prospects\_dev} \times \text{Firm}_{Pos} \times \beta_{Firm\_Pos} + \text{R\&D}_{Expen} \times \beta_{RD\_Expend} + \text{Collab\_Uni} \times \beta_{Collab\_Uni} + \text{Collab\_RDStr} \times \beta_{Collab\_RDStr} + \text{Inno\_cult} \times \beta_{Inno\_cult} + \varepsilon_i \qquad (3)$

3. $\text{Inno\_Prod} = \beta_0 + \text{Num}_{HR} \times \beta_{Num\_HR} + \text{Num\_R\&D}_{HR} \times \beta_{Num\_RD\_HR} + \text{Prosp}_{Dev} \times \beta_{Prospects\_dev} \times \text{Firm}_{Pos} \times \beta_{Firm\_Pos} + \text{R\&D}_{Expen} \times \beta_{RD\_Expend} + \text{Collab\_Uni} \times \beta_{Collab\_Uni} + \text{Collab\_RDStr} \times \beta_{Collab\_RDStr} + \text{Inno\_cult} \times \beta_{Inno\_cult} + \varepsilon_i \qquad (4)$

4. $\text{Inno\_Share} = \beta_0 + \text{Num}_{HR} \times \beta_{Num\_HR} + \text{Num\_R\&D}_{HR} \times \beta_{Num\_RD\_HR} + \text{Prosp}_{Dev} \times \beta_{Prospects\_dev} \times \text{Firm}_{Pos} \times \beta_{Firm\_Pos} + \text{R\&D}_{Expen} \times \beta_{RD\_Expend} + \text{Collab\_Uni} \times \beta_{Collab\_Uni} + \text{Collab\_RDStr} \times \beta_{Collab\_RDStr} + \text{Inno\_cult} \times \beta_{Inno\_cult} + \varepsilon_i \qquad (5)$

Standardized coefficient determines the strength of the effect of variations in the variation of Xj having a productive factor Y if for abstracted from the concomitant effect of variations in other factors included in the regression equation. Formula of elasticity for the linear model:

$$E_j = \hat{}_j \frac{\overline{X}_j}{\overline{Y}} \qquad (6),$$

where: $\hat{}_j$ is estimated coefficient (or estimator), E – average coefficient of elasticity, $\overline{X}_j$ arithmetic mean for X_j.

Since standardized regression coefficients are comparable, the largest of these coefficients can be ranked according to the strength of the factors affecting the result. Obtaining the following results of increasing innovation entrepreneurships potential models with four independent variables: NUM_INNOV, N_PATENT, INNO_PROD, INNO_SHARE. The greatest influence on the variation NUM_INNOV, provides factor RD_EXPEN, because standardized coefficient 0.6560 is greatest. Next on the strength of the effect – INNO_CULT (0.1336), then number of R&D personnel – 0.11573 (Table 3). The greatest influence on the variation N_PATENT, provides factor INNO_SHARE, because standardized coefficient 0.4568 is the greatest. Next on the strength of the effect are– RD_EXPEN and COLLAB_UNIV.

Table 3

Coefficient elasticity

	Model 1		**Model 1**		**Model 1**		**Model 1**	
	NUM_ INNOV	**NUM_ INNOV**	**N_ PATENT**	**N_ PATENT**	**INNO_ PRODUCT**	**INNO_ PRODUCT**	**INNO_ INTENS**	**INNO_ INTENS**
Factors	Coefficient elasticity average	Standard. Coefficient	Coefficient elasticity average	Standard. Coefficient	Coefficient elasticity Average	Standard. coefficient	Coefficient elasticity average	Standard. coefficient
NUM_RD_ HR	0.27153	0.11573	-	-	0.07311	0.12691	0.16463	0.26695
RD_ EXPEN	1.3563	0.6560	0.50156	0.26721	0.15445	0.12913		
COLLAB_ UNI	-	-	0.2375	0.1481	-0.13894	-0.13598	0.06445	0.05892
INNO_ CULT	0.2444	0.1336	-	-	-	-	-	-

Source: Made by author.

The greatest influence on the variation INNO_PRODUCT, provides to factor INNO_SHARE, because standardized coefficient 0.6350 is the greatest. Next on the strength of the effect – PROSP_DEV then RD_EXPEN and NUM_RDHR. The greatest influence on the variation INNO_SHARE provides factors: INNO_ PRODUCT, NUM_RDHR, N_PATENT and COLLAB_UNIV. The impact of the university in "Share of profits" from realization of innovative products explained by consulting in marketing research for businesses. University has no impact on "Share of innovative products" because there is no technical component on the university, and therefore possibilities of aid in this direction of development.

Conclusions. During the development of the Innovation driven model of increasing SMEs innovative potential have been considered a number of models adaptable to regional countries with emerging market relations. It has been analyzed and proved a high degree of influence of geographical proximity and relationship to the growth of innovation activity and exchange of innovations. Summing up the analysis of the proposed model the case of Gagauzia region, we identified determinants of innovation SMEs development and the General Inputs and founded Drivers: Internal driver – Collaboration and Innovation organizational culture and External driver – Collaboration and Innovation Network creation.

One of the main objectives of the autonomous region initiatives are to promote innovative start- ups firm, to supporting the existing perspective business and creating the strong network between main actors of development. Proposed mechanism demonstrates the impact of knowledge network creation based on the Innovation and Education Cluster activity with the core of this innovation network – Comrat State University. Observable increasing of innovative entrepreneurship activity, due to the development of collaboration and innovation culture, launches the formation processes of relationships between potential cluster members and other actors.

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