

## REGIONAL ANALYSIS OF PERFORMANCE INDICATORS OF LATVIAN BUSINESS INCUBATORS



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### Abstract

A regional analysis of performance indicators for Latvian business incubators provides a valuable insight into the performance of the business incubator ecosystem in various regions and helps to make future policy decisions on providing funding for the incubators that aim to support the growth and success of startups.

The present research performed a regional analysis of operational programmes for two periods from 2007 to 2021.

The strengths and weaknesses of Latvian business incubators across various regions of Latvia could be identified based on the analysis. This can help to make policy decisions and guide resource allocation to contribute to the development of the business incubator ecosystem in the future.

**Key words:** business incubators, regional economy.

### Introduction

The needs for business development stated in national policy documents and the reasons for the emergence of business incubators since 2005 have been analysed as part of the research.

In July 2005, the European Council approved the Integrated Guidelines for Growth and Employment, which combined general economic policies and employment (Commission of the European Communities, 2005).

In accordance with the guidelines, the Ministry of Economics launched the implementation of the Innovation Centre and Business Incubator Development Programme in 2007. Its purpose was to promote the development of innovation infrastructure as well as support the creation and operation of innovation centres and business incubators and the provision of services by innovation centres and business incubators for startups in the regions of Latvia.

Business incubators as entities contributing to the development of the business environment were only at the initial stage in Latvia in 2007; however, already in the first years of the implementation of the programme, it was established that the business incubators also helped new businesspersons to start successful businesses in Latvia.

In 2007 in Latvia, 11 projects implemented by innovation centres and business incubators received support from the Ministry of Economics (Ministry of Economics of the Republic of Latvia, 2008).

Later, the business incubator programmes were transferred to the Investment and Development Agency of Latvia (hereinafter LIAA) for administration.

In Latvia, the support provided by the LIAA business incubators could be divided into two stages:

1. Public procurement 'Procurement of business incubation services in the regions of Latvia' under the operational programme Business and Innovation, activity 2.3.2.1 Business incubators. Activity 2.3.2.1 Business incubators, measure 2.3.2 Improving business infrastructure and equipment, priority 2.3 Increasing business activity and competitiveness under the 2007–2013 operational programme Business and Innovation. Activity 2.3.2.1 was implemented in two periods: period 1 that lasted from 2009 to the summer of 2014, while in 2014 a new call for tenders for the transitional period (period 2) was announced to procure business incubation services until 31 October 2015.
2. The program was continued with the implementation of the project Regional business incubators and the Creative Industries Incubator under the operational programme Growth and Employment administered by LIAA. Measure 3.1.1.6 was implemented in the 2014–2020 programming period as measure 3.1.1.6 Regional business incubators and the Creative Industries Incubator under specific support objective 3.1.1 Promoting the establishment and development of SMEs, especially in the manufacturing industry and RIS3 priority industries.

The research analysed performance indicators for Latvian regional business incubators administered by LIAA by employing multivariate statistical analysis.

### Materials and Methods

The research used the results of business incubator programmes administered by LIAA, which were implemented in two periods: from 2009–2014 for main procurement for activity 2.3.2.1 Business incubators and from 2017–2021 for activity 3.1.1.6

Regional business incubators and the Creative Industries Incubator, and the targets achieved by the project participants were summarized as on 31/12/2021.

The research analysed the performance of regional business incubators during both LIAA-administered programmes. The research identified key factors in the performance of business incubators, the influence of the factors, as well as regional incubator clusters. IBM SPSS software was employed to analyse data on business incubators, which revealed the factors in their performance to be further used to assess their development.

The research employed cluster analysis to divide regional business incubators into groups, considering complex factors. Such an analysis of factors and clusters made it possible to analyse the performance of business incubators in the regions, identifying the most innovative, active and effective regional business incubators.

The data collected by LIAA were used for factor analysis.

### Results and Discussion

The research data were divided into two parts representing each period of administration of business incubators because their origin and amount were different.

Under the first programme for business incubators, LIAA announced a call for tenders to procure services with the aim of transferring the operation of business incubators to private companies, associations or universities. In fact, under this programme, the business incubators represented mostly legal entities that provided business incubator services under the supervision of LIAA in all regions of Latvia. The research analysed the collected data on main procurement carried out by LIAA in the period 2009–2014.

In the second period, LIAA itself took over the administration of business incubators by hiring regional incubator managers and providing services as a state-owned institution. The targets achieved by the participants of the second period activity Regional business incubators and the Creative Industries Incubator have been summarized for the period 2017–2021.

The collected data on both programmes were different and could not be analysed as a whole; therefore, each period was analysed separately, and the results were summarized in the form of common conclusions.

*Analysis of data on main procurement for activity*  
2.3.2.1 *Business incubators for the period 2009–*

*2014:*

The research processed the data, calculated correlations between the variables and performed factor and cluster analyses.

Initially, the correlations between the variables were calculated, and it was concluded that there was a statistically significant correlation between the following variables for business incubators:

1. Office spaces rented to SMEs and the number of virtually incubated SMEs (0.968);
2. The number of incubated SMEs and growth of exports by the incubated SMEs, % (0.760);
3. The number of jobs created/maintained by the incubated SMEs and the average increase in their turnover, % (0.801);
4. The number of new products developed by SMEs and the number of SMEs that left the incubator (0.925);
5. The amount paid out and increase in the average SME turnover, % (0.953);
6. The total amount of the contract, EUR, and the number of SMEs that left the incubator (0.958);
7. Support used, % of the total, and increase in the average SME turnover, % (0.891);
8. Increase in the average SME turnover, %, and taxes paid correlate almost with all other variables, as they are some of the main results of incubator performance;
9. However, the growth of exports by the incubated SMEs, %, strongly correlated with the above-mentioned variables: increase in the average SME turnover, %, and taxes paid;
10. The number of SMEs that left the incubator strongly correlated with the number of new products developed by SMEs, increase in the average SME turnover, %, and the total amount of the contract, EUR.

For further data analysis, the data were tested for suitability for factor analysis. Based on the Kaiser-Meyer-Olkin (KMO) and Bartlett tests, the authors found that a KMO value for the sample was 0.5, and the sample was adequate for factor analysis. The Bartlett test significance value (Sig.=0.000) was less than 0.05, also indicating that the sample was suited for factor analysis.

To identify complex factors, the research employed the principal component method and the Kaiser criterion for determining the number of factors. As a result, three complex factors were identified, which explained 71.7% of the total variance. To equalize the load on the complex factors, factor rotation was performed by applying the Varrimax method, and the results are shown in Table 1.

Table 1  
**Rotated Component Matrix<sup>a</sup>**

	Component		
	1	2	3
Office spaces rented to SMEs, m <sup>2</sup>	-0.127	<b>0.789</b>	-0.519
Number of incubated SMEs	<b>0.728</b>	0.487	-0.359
Number of virtually incubated SMEs	<b>0.821</b>	-0.052	-0.229
Number of jobs created/maintained by incubated SMEs	<b>0.624</b>	0.578	0.235
Number of new products developed by SMEs	-0.058	<b>-0.783</b>	-0.142
Increase in the average SME turnover, %	-0.027	-0.113	<b>0.519</b>
Growth of exports by incubated SMEs, %	-0.2	0.318	<b>0.701</b>
Number of SMEs that left the incubator	<b>-0.771</b>	0.338	-0.312
Amount paid out	<b>-0.863</b>	-0.125	0.161

The factor analysis allowed the authors to identify the following factors:

1. The first factor was explicitly **economic** and had the following main components: the number of incubated SMEs, the number of virtually incubated SMEs, the number of jobs created/maintained by incubated SMEs, the number of SMEs that left the incubator and amount paid out.
2. The second factor was **innovation** – the number of new products developed by SMEs that was associated with a practical component – office spaces rented to SMEs, m<sup>2</sup>.
3. The third factor was **financial**, which showed financial performance: increase in the average SME turnover, %, and growth of exports by incubated SMEs, %.

In view of quite strong correlations between the variables for business incubators, it could be concluded that all the three factors were also very steady and logical. The economic factor represented the key variables that showed the growth of enterprises in relation to the innovation factor – the number of new products – and the financial factor – increase in turnover and exports.

A cluster analysis was performed based on the results of the factor analysis. The research identified the desired number of clusters by using the Elbow

rule, and it was 4. After that, the k-means method was used to group business incubators into four clusters. An analysis of variance (ANOVA) showed the statistical significance of all the complex factors for cluster analysis (Sign. = 0.000 < 0.05). An overview of the cluster analysis is given in Table 2.

Table 2  
**Final Cluster Centres**

	Cluster			
	1	2	3	4
Economic	1.40	-1.23	-0.34	0.23
Innovation	0.81	0.52	0.44	-1.33
Financial	-0.52	-0.94	1.14	-0.17

1. Cluster 1: VBII Ltd incubator (Valmiera, Gulbene), (Vidzeme region 1), foundation Ventspils High-tech Park (Ventspils, Talsi), (Kurzeme region 1).
  2. Cluster 2: Kurzeme Business Incubator Ltd (Liepaja, Saldus, Kuldiga), (Kurzeme Region 2), general partnership JIC Business Incubator (Jelgava, Dobele), (Zemgale Region 1), general partnership JIC Business Incubator (Jekabpils, Aizkraukle), (Zemgale region 2).
  3. Cluster 3: general partnership Riga Region Business Development Incubator (Ogre, Tukums, Limbazi), (Riga region), HUB Riga Ltd (Riga), (Creative Industries Incubator), society Business Incubator Cesis (Cesis, Aluksne, Madona), (Vidzeme region 2).
  4. Cluster 4: association Latgale Apparatus Construction Technological Centre (Daugavpils, Livani, Preili), (Latgale region 1), association Latgale Apparatus Construction Technological Centre (Rezekne, Balvi), (Latgale region 2).
- The cluster analysis performed revealed how all the ten incubators were distributed by region:
1. Cluster 1: Vidzeme region (Valmiera, Gulbene) and Kurzeme region (Ventspils, Talsi).
  2. Cluster 2: Kurzeme region (Liepaja, Saldus, Kuldiga) and Zemgale region (Jelgava, Dobele, Jekabpils, Aizkraukle).
  3. Cluster 3: Riga city and Riga region (Riga, Ogre, Tukums, Limbazi) and Vidzeme region (Cesis, Aluksne, Madona).
  4. Cluster 4: Latgale region (Daugavpils, Livani, Preili, Rezekne, Balvi).

Cluster 1 was characterized by the positive coordinates of centres of two factors, i.e. the economic and innovation factors, which were strongly positive, which meant that the business incubators of Vidzeme (Valmiera, Gulbene) and Kurzeme regions

(Ventspils, Talsi) were strong in achieving their main or economic performance targets and also the most innovative in creating new products. For Clusters 2 and 3, Kurzeme region (Liepaja, Saldus, Kuldiga) and Zemgale region (Jelgava, Dobeles, Jekabpils, Aizkraukle), as well as Riga city and Riga region (Riga, Ogre, Tukums, Limbazi) and Vidzeme region (Cesis, Aluksne, Madona) were positively characterised by the innovation factor, which also indicated the positive trend of creating new products. Cluster 3, i.e. the cluster including Riga city and Riga region, was characterised by a pronounced financial factor, which could be explained by the capital's greater opportunities in fostering turnover and the related export growth. In contrast, Cluster 4 including Latgale region (Daugavpils, Livani, Preiļi, Rezekne, Balvi) performed well in the provision of basic services, i.e. performed the necessary functions of a business incubator, yet the creation and exports of new products were not so pronounced.

*Analysis of data on activity 3.1.1.6 Regional business incubators and Creative Industries Incubator for the period 2017–2021:*

The results of the data processing, correlation analysis and factor and cluster analysis for the second period of operation of business incubators are summarized below. In the period 2017–2021, the analysis involved two fewer indicators, while the incubators were analysed by region and there were 13 regional incubators, compared with 10 in the previous period.

After performing the correlation analysis, it was concluded that a statistically significant correlation existed between:

1. Turnover and the balance sheet total (0.908).
2. Turnover and exports (0.930).
3. Turnover and profit (0.768).
4. Turnover and taxes paid (0.982).

For further data analysis, the data were tested for suitability for factor analysis. Based on the Kaiser-Meyer-Olkin (KMO) and Bartlett tests, the authors found that a KMO value for the sample was 0.73, and the sample was adequate for factor analysis. The Bartlett test significance value (Sig.=0.000) was less than 0.05, also indicating that the sample was suited for factor analysis.

To identify complex factors, the research employed the principal component method and the Kaiser criterion for determining the number of factors. As a result, two complex factors were identified, which explained 83.7% of the total variance. To equalize the load on the complex factors, factor rotation was performed by applying the Varimax method, and the results are shown in Table 3.

Table 3

**Rotated Component Matrix<sup>a</sup>**

	Component	
	1	2
Turnover, EUR	<b>0.983</b>	-0.003
Balance sheet total, EUR	<b>0.916</b>	0.334
Number of employees/ average number of employees	0.350	<b>0.711</b>
Exports as a share of turnover, EUR	<b>0.954</b>	0.138
Profit, EUR	<b>0.850</b>	0.135
Taxes paid, EUR	<b>0.964</b>	-0.085
Number of enterprises	0.129	<b>-0.832</b>

The factor analysis allowed the authors to identify the following factors:

1. The first factor was explicitly **economic and financial** and had the following main components: turnover, a balance sheet total, exports as a share of turnover, profit and taxes paid.
2. The second factor was **structural** and included the average number of employees and the number of enterprises.

A cluster analysis was performed based on the results of the factor analysis. The research identified the number of clusters in the similar way by using the Elbow rule, and it was 4. An analysis of variance (ANOVA) showed the statistical significance of all the factors for cluster analysis (Sign. = 0.000 < 0.05). An overview of the cluster analysis is given in Table 4.

Table 4

**Final Cluster Centres**

	Cluster			
	1	2	3	4
Economic and financial	1.68	-0.33	-1.53	1.11
Structural	-0.31	-0.38	1.62	2.41

Based on the results of the cluster analysis, the incubators were divided into four clusters:

1. Cluster 1: the incubators of Daugavpils and Ogre.
2. Cluster 2: the incubators of Jelgava, Jurmala, Kuldiga, Liepaja, Madona, Rezekne, Valmiera and Ventspils as well as the Creative Industries

Incubator.

3. Cluster 3: the incubator of Jekabpils.

4. Cluster 4: the incubator of Sigulda.

Although the economic and financial factor was common in this case, the analysis found that it was strongly positive for Clusters 1 and 4, i.e. the Daugavpils, Ogre and Sigulda Business Incubators. In contrast, the structural factor was very strong for the Jekabpils and Sigulda Business Incubators, which had a significant number of enterprises to be incubated, which resulted in a significant number of employees working for the enterprises.

The overall interpretation of the data and the conclusions are given in the conclusions.

### Conclusions

1. After summarizing the data on both programmes, it could be concluded that the first business incubator programme, which was characterized by services provided mostly by enterprises to three cluster incubators, had a positive innovation factor, i.e. the creation of new products, which related to office spaces rented. The positive value of this factor could be viewed as the success of the incubator programme, as it involved the creation of new products, which was the initial business goal, followed by the development or failure of the product.

In the period from 2009 to 2013, almost 500 enterprises received support, and the highest activity (in granting support) was reported in 2010. Five years after the public support had been granted, only 17% of the initial number of enterprises continued their economic activity. Overall, it could be concluded that almost a fifth (17%) of all the supported enterprises were financially steady after five years of development and did their active economic activity, thereby ensuring an increasing turnover and an increase in the number of employees, yet the rest had not been able to compete and stopped operating (Initial Assessment by the Ministry of Economics).

In the opinion of the authors, such a number of enterprises that had been able to grow in a business incubator and continued developing was sufficient to consider the business incubator programme as successful.

2. The second business incubator programme was characterized by an interesting distribution of incubators into clusters, as Cluster 1 with Daugavpils and Ogre had a distinctly positive economic and financial factor. The successful performance of Daugavpils was surprising because in the previous business incubator programme, the Latgale (4) cluster had rather low factor values. Such a situation could be

explained by the fact that in the second business incubator programme, the incubators were under the supervision of LIAA and were administered jointly; therefore, the second cluster also included the incubators from nine cities that performed similarly, while successful performance was achieved by the incubators with more active managers who were able to demonstrate a more positive factor performance. The analysis allows us to conclude that the most successful business incubators have been in Daugavpils, Ogre and Sigulda.

3. Research by other authors has identified a correlation between incubator services and programme outcomes. The reasons for the success of enterprises related to the practices of business incubator programmes. In addition, decision makers who make public investments in business incubators need to be aware of the regional economic environment and design policies that best support the incubation capacity of the region (Harper-Anderson & Lewis, 2018).

4. It is the physical presence of a would-be businessperson in a business incubator that helps the incubator with marketing and sales through using the experience and existing contacts, as well as disciplines the businessperson and creates his/her professional image, which is not so pronounced in other settings (Flavel *et al.*, 2008).

5. Overall, business incubators should be promoted as opportunities for supporting new businesspersons. Business incubators tend to motivate individuals to start a business. The motivation affects the performance of new businesspersons as proved by motivation theory because the businesspersons can access both financial and non-financial services (Matotola, 2016).

6. Just like other research studies, the present research also has found that both incubator programmes have been generally successful in Latvia, and they provided the necessary support for regional economic activity, which consequently helped to develop the country's export capacity and increased the amount of taxes paid and reduced unemployment. In the opinion of the authors, the funding programme for business incubators should be continued, involving businesspersons and universities in it.

Research studies by other authors have found that university incubators also contribute to economic development in a similar way. University-incubated enterprises achieve higher employment and sales than non-incubated ones (Lasrado *et al.*, 2015).

7. Overall, with the support of regional business incubators, the performance of would-be

businesspersons helps to reduce unemployment, raise the standard of living of the businesspersons and society, as well as contributes to the whole regional economy.

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