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Application of Outsourcing in the Regions of Eastern Siberia and the Far Eastern Federal District



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Abstract. Outsourcing is currently common in Russian business practice. The use of outsourcing changes the system of management in a company and affects its performance indicators. The aim of this study is to identify patterns in the development of outsourcing in regions of the Far Eastern Federal District and Eastern Siberia on the basis of empirical data. Despite the widespread introduction of outsourcing in the activities of enterprises, the patterns of development of this phenomenon at the regional level, its relationship with economic indicators and investment attractiveness of the regions are not studied sufficiently. The relevance of the study is determined by the strategy of improving the business environment in the regions with the aim of attracting investment and implementation of innovative technology. Our research is built on the information methods of data structuring and correlation and

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regression analysis. We selected activities that are transferred to outsourcing and developed a structure of a multidimensional data array that helps apply various methods of analytical data processing. We revealed patterns in the development of outsourcing in the regions. The patterns are formulated on the basis of the analysis of the structural composition of enterprises, the results of correlation analysis and estimates of logistic regression models. The obtained results have both theoretical and practical significance; they are interesting for the business environment and for researchers in economics and entrepreneurship. Of theoretical importance are the regularities of development of outsourcing in the Far Eastern Federal District and East Siberia. We point out that the development of outsourcing in these regions has common patterns that do not depend on the level of economic development and investment rating. Our research reveals that the use of outsourcing in production activities has no effect on the level of gross regional product. At the same time, it is shown that the number of companies operating in the outsourcing indicates the investment attractiveness of the region. As for real business, the results that we present can be useful in studying the structure of the outsourcing market and in assessing the possibility of transferring the functions and processes to external execution. The data structure that we have developed is the basis for organizing the monitoring of the outsourcing market in the regions. The organization of such a system for storing the data of statistical observations makes it possible to record dynamic changes in the outsourcing market, to study its influence on the formation of a comfortable business environment, and to predict the level of self-employment.

Key words: outsourcing, statistical analysis, investment attractiveness of the region.

Introduction

The term “outsourcing” usually denotes a situation where some internal processes, functions or services in a particular company are handed over to an external company to be executed.

In English-language literature this interpretation is unambiguous [21; 27]. It is understood that some manufacturing processes can be transferred to external execution [22].

The works of domestic authors contain definitions that are substantially different from the one presented above. For example, they distinguish the outsourcing of municipal

management functions [4]. Classifications based on an economic point of view allocate the outsourcing of capital [6]. In this case the customer enterprise is only an owner of the brand, but has no production processes for products or services.

In our research, we understand outsourcing as the transfer of support business processes, some non-core business processes, functions and external operations by the customer company to the external company.

The use of outsourcing leads to a change in business rules and management system in the company. Currently, researchers in regional economics note that economic

actors more often transfer some of their tasks to third parties to be solved. So, companies can fully transfer to other firms the functions like accounting and reporting, advertising campaigns, information provision, etc. [3; 7]. The principle of economic efficiency according to which we do only those tasks that others do less effectively [18] and which at present promotes the development of entrepreneurship is the main principle of outsourcing. Having analyzed economic literature [1; 2; 18] we can talk about the allocation of both managerial and economic aspects of outsourcing. However, these issues are beyond the scope of the present study.

Despite the widespread introduction of outsourcing in the economic activities of enterprises the patterns of development of this phenomenon and its connection with economic indicators and investment attractiveness of the regions still require further research.

The purpose of our paper is to reveal patterns in the development of outsourcing in the regions of the Far Eastern Federal District and Eastern Siberia on the basis of empirical data.

The relevance of the study is determined by the strategic task of forming a comfortable business environment in the Far Eastern and Siberian federal districts with the aim of raising investment and implementing innovation technology in production.

The authors [23] believe that the main reason for the emergence of outsourcing lies in the increasing complexity of technological processes and, as a consequence, sharp differentiation of knowledge and competences. It is obvious that in such a situation, top managers are unable not only to control, but also to understand how competent the actions of their employees are [1; 24; 25; 26; 28]. The transfer of certain processes and functions for execution to external companies helps an enterprise focus on its core activities. Hence there is an assumption that the development of outsourcing means improving the business environment in the regions.

We believe that our studies will help answer the following questions:

1. Are there general patterns in the development of outsourcing in the regions of Eastern Siberia and the Far Eastern Federal District?
2. Is there a connection between the development of outsourcing in the region and the volume of GRP?
3. Does the number of outsourcing companies depend on the level (rating) of investment attractiveness of the region?
4. Is it possible to highlight the types of economic activity connected with the rating of investment attractiveness of the region?

The answers to these questions help establish a link between the development of outsourcing and the business environment

and elaborate measures on the development of small and medium business in the regions.

In practical terms, the results of our research give entrepreneurs an opportunity to determine the following aspects:

- possibility of outsourcing non-core functions and supporting business processes;
- popular types of services and industries in the B2B (*business-to-business*) outsourcing market.

Choosing the objects of the research

The objects of our study are regions of the Far Eastern Federal District (FEFD) and regions of Eastern Siberia (Irkutsk Oblast, Zabaykalsky Krai, Republic of Buryatia). Traditionally, these constituent entities have close economic and socio-cultural relations. The regions are situated far from the federal center, their socio-economic development is highly unequal, and they have small population.

Macroeconomic indicators of the level of development are contradictory. Among the twelve regions under consideration four are included in the top ten in terms of GRP per capita in the Russian Federation [11; 19]. However, in the rankings of investment attractiveness almost all the analyzed regions belong to the group of those with low potential [12].

To date, the FEFD is implementing large-scale investment projects, the success of which largely depends on the level of development of entrepreneurship in the region.

Thus, the study of the development of outsourcing is very topical and is of particular interest to public authorities and the business community, as it shows the development of entrepreneurship in general.

Data sources

The study is based on open public data. The data sources include the Unified Register of Subjects of Small and Medium Business available at the website of the Federal Tax Service of Russia [5], the website of the Federal State Statistics Service of Russia, and websites of analytical companies.

In order to analyze the patterns based on empirical data we used the following sources:

1. The results of queries to the database “Unified Register of Subjects of Small and Medium Business” [2]. The result of each query is a table with the list of enterprises in the selected region and type of economic activity. For each region we made 17 queries (in accordance with the number of allocated types of activities). The data is structured in accordance with the relational data model¹.
2. The data on the main characteristics of Russian regions including population, GRP, average accrued wages, etc. [11].
3. The rating of Russian regions according to main characteristics such as population size, average income per capita, GRP per capita, and others [11].

¹ See, for example: http://www.internet-technologies.ru/books/category_9.html

Table 1. Ratings of the regions of the Far Eastern Federal District and Eastern Siberia

Region	Position in Russia			Investment attractiveness rank
	Area	Population	GRP per capita (2013)	
Republic of Buryatia	14	54	65	3C1
Zabaykalsky Krai	10	48	60	3C1
Irkutsk Oblast	4	20	24	2B
Republic of Sakha (Yakutia)	1	57	8	3B1
Kamchatka Krai	8	78	13	3C2
Primorsky Krai	22	25	29	3B1
Khabarovsk Krai	3	36	21	3B1
Amur Oblast	13	61	44	3B2
Magadan Oblast	9	83	9	3C2
Sakhalin Oblast	37	73	4	3B1
Jewish Autonomous Oblast	60	82	52	3C2
Chukotka Autonomous Okrug	6	84	6	3C2

Source: statistics reports of the Federal State Statistics Service.

4. The rating of investment attractiveness of Russian regions [12].

5. Statistical report “Population of the Russian Federation in municipalities as of January 1, 2016” (source: Federal State Statistics Service – Rosstat [19]).

The rating (macroeconomic and investment) of regions of the Far Eastern Federal District and Eastern Siberia is presented in *Table 1*.

Research methods

Our research is based on the information methods of data structuring and methods of applied statistics.

Regularities of the development of outsourcing and relationships with the level of regional economic development are studied with the help of applied statistics methods.

Analysis of statistical relationships of indicators is based on correlation analysis – we calculated the Pearson correlation coefficient and partial correlation coefficients [8].

We use logistic regressions [8] to evaluate the impact of outsourcing on the level of investment attractiveness of the region.

Data. Selection and preliminary processing

In accordance with traditional views we believe that outsourcing can take on the functions and operations related to the implementation of auxiliary work and administrative processes, tasks and economic activities. Thus, we allocate the activities that are potentially transferred to the external contractor (hereafter we use the classification from the Register of Small and Medium Business [5]):

1. Subsidiary activities in the production of agricultural crops and post-harvest processing of agricultural products (Code 01.6).

2. Warehousing and storage (Code 52.1).

3. Managing computer equipment (Code 62.03).

4. Data processing, provision of information hosting services and related activities (Code 63.11).

5. Activities of holding companies (Code 64.2).

6. Administration of financial markets (Code 66.11).

7. Advisory services on financial intermediation (Code 66.19.4).

8. Acceptance of payments from individuals by payment agents (Code 66.19.6). The choice of this type of activity requires special comment. The companies of this type play the role of “front office” at the sales of goods and services.

9. Legal activities (Code 69.1).

10. Providing services in the field of accounting (Code 69.20.1).

11. Activities of head offices (Code 70.1). In this case administrative management functions are transferred to the external contractor;

12. Technical testing, analysis and certification (Code 71.2).

13. Promotion and advertising (Code 73.1).

14. Market research (Code 73.20.1, market research).

15. Employment and recruitment (Code 78).

16. Private security (Code 80.1, economic activity).

17. Cleaning (Code 81.1, economic activity).

These types of activities are the most obvious ones, because they are not associated with core activities of industrial enterprises or of entities that provide services to the end user.

We assume that at the regional level these activities are carried out by medium or small enterprises. While studying the issue we found that big players in the outsourcing market (e.g., IT companies, advertising agencies, holding companies, accounting firms, etc.) are not residents of the Eastern-Siberian regions or the FEFD [13; 14; 15; 16; 17].

The original data (the results of queries to the database “Register of Small and Medium Business [5]) were not fit for analysis and were pre-processed. Methods of processing included sorting, structuring, and consolidation. As a result of processing we have formed a multi-dimensional data array. The structure of the data is presented in the diagram (*Fig. 1*).

Thus, in order to analyze the patterns of outsourcing in the regions of Eastern Siberia and in the Far Eastern Federal District we use the following indicators:

Figure 1. Structure of the multi-dimensional data array

federation subjects	scale of the enterprise	type of activity1	type of activity n	outsourcers Total	Population size	Investment rating
		number of enterprises	number of enterprises			
Region (excluding the administrative center)	micro	number of enterprises						
	small	number of enterprises							
	medium				number of enterprises				
	micro			enterprises	number of enterprises				
	small								
	medium								
Administrative center	micro								
	small								
	medium								
.....	number of enterprises				number of enterprises			
.....								
.....								
Region (excluding the administrative center)	micro								
	small							
Administrative center	micro								
	small							

Source: developed by authors.

- gross regional product (GRP), including GRP per thousand population, GRP per thousand economically active population;
- the number of enterprises operating in the outsourcing (total), including the number of enterprises operating in the outsourcing per thousand population and per thousand of economically active population;
- total number of outsourcer enterprises broken down by types of economic activities;
- regions' ratings on investment attractiveness [12].

An obvious disadvantage of the multidimensional dataset lies in the lack of indicators of output and labor productivity at enterprises operating in the outsourcing. However, such data is not available. Regional statistics have only aggregated information on small and medium enterprises broken down by large groups of economic activities [9; 10].

Results

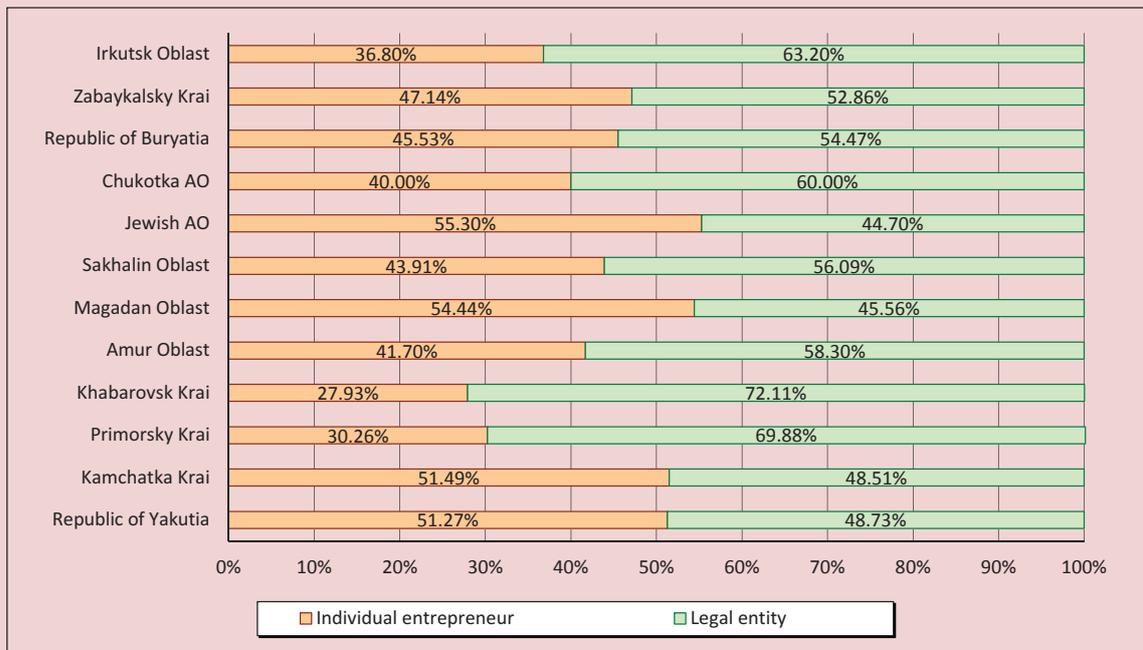
The resulting data arrays are used for analysis by various statistical methods. An obvious advantage of these methods consists in the possibility to identify patterns in the development of outsourcing and the relationship with the level of economic development of the territory even in the absence of detailed information. Of interest is the structural composition of enterprises in the regions by the scale (number of employees) and legal form of organization. All regions have the same structural composition of the enterprises operating in the outsourcing services. According to their scale, they are mostly micro-enterprises. Their legal form is presented by legal entities. The structural composition of outsourcer enterprises in the regions is represented as a diagram in *Figures 2 and 3*.

Figure 2. Structural composition of outsourcer enterprises broken down by scale



Source: calculated by authors based on the generated data array.

Figure 3. Structural composition of outsourcer enterprises broken down by legal form



Source: calculated by authors based on the generated data array.

When we group enterprises by types of activity, the pattern in the structural composition of the enterprises is different. In their scale the outsourcers in the vast majority of cases are also micro-enterprises. However, the structural composition arranged by legal form has no pattern. For businesses with types of activities “private security services” and “holding companies” legal entities constitute more than 90%, which may be due to the requirements to licensing and to information security. For other types of activities the number of legal entities is 20 to 80% of the total number of enterprises.

In order to carry out statistical analysis of the patterns we use three types of samples:

- data on the regions as a whole (we considered 12 regions, thus the sample size $N = 12$);
- data on the administrative centers of regions (hereinafter – “capitals”, the sample size $N = 12$);
- the sample that includes data on the number of outsourcer enterprises in the region excluding capital cities and the data on capitals separately (the sample size $N = 24$).

The latter type of samples was formed to build logistic regression models, because small samples do not provide statistically significant estimates.

The values of the elements of the matrix of paired correlation coefficients of the number of enterprises by types of economic activity are statistically significant at the level of 0.05.

This clearly indicates a general pattern of development of outsourcing in the region. Chukotka Autonomous Okrug is an exception here. However, it is quite understandable, given the special climatic conditions of the region and its extremely low population density.

The level of correlation between GRP and the total number of outsourcer enterprises, and between GRP and the number of such enterprises per thousand active population is quite high (*Tab. 2*). The calculated values of the coefficients are statistically significant at the level of not more than 0.05.

However, the samples that we possess do not allow us to make unambiguous conclusions about the nature of causal relationships between the indicators. Moreover, the high level of correlation (78%) between GRP and the total number of enterprises operating in terms of outsourcing arouse our concern. Most enterprises in our sample are micro-enterprises (see diagrams in Figures 2 and 3) and cannot significantly influence the level of gross output of enterprises in the regions. We hypothesized that the high level of correlation between the indicators might result from population size. Our hypothesis has been confirmed. When we calculated the coefficients of partial correlation with the eliminated variable “population size” it became apparent that correlation with GRP of the regions was not statistically significant (*Tab. 3*). Consequently,

Table 2. Matrix of pair correlation coefficients

Indicator	GRP	Total number of outsourcer enterprises	Total number of outsourcer enterprises per thousand active population
GRP	1.000		
Total number of outsourcer enterprises	0.783	1.000	
Total number of outsourcer enterprises per thousand active population	0.573	0.596	1.000

Source: calculated by authors with the use of the generated data array.

Table 3. Matrix of partial pairwise correlation coefficients that excluded the variable "population of the region"

Excluded variable – population size in the region	GRP	Total number of outsourcer enterprises	Total number of outsourcer enterprises per thousand active population
BPI	1.000		
Total number of outsourcer enterprises	0.326	1.000	
Total number of outsourcer enterprises per thousand active population	0.438	0.697	1.000

Source: calculated by authors with the use of the generated data array.

the number of outsourcers is not statistically associated with the level of GRP in the region.

The calculated values of coefficients of correlation with GRP index were not statistically significant.

In order to test the hypothesis about the existence of pattern connecting the number of outsourcer enterprises with the rating of investment attractiveness of the region we used the regression model of a special type – a *logit* model.

A specific feature of this model consists in the fact that the dependent variable is binary (it takes either the value 1 or the value 0). In our case, the ratings of investment attractiveness of regions of Eastern Siberia and the Far East are represented as binary. Given the fact that overall levels of regions

in the rating of investment attractiveness are quite low, in the binary option the values of the rating below 3B1 are taken as zero; consequently, the values equal to or above this level are taken as a unit (see Tab. 1).

The pairwise logistic regression analysis produced the following results.

The indicator "Total number of outsourcer companies" is statistically significantly associated with the rating of the region according to its investment attractiveness. The forecast of the rating is not perfect, there are errors in three cases out of 24 (over 12%). The value of the pseudo-coefficient of determination is $R^2 = 0.63$.

The indicator "Number of enterprises with the main type of activity "market research" as a factor produces a slightly worse

result of the forecast of the rating. Errors occur in four out of 24 cases (17%). However, the value of the pseudo-coefficient of determination is slightly higher: $R^2 = 0.69$.

Other indicators that classify the level of investment attractiveness of the region include enterprises with the following types of activity: 52.1 (warehousing and storage), 78 (employment and recruitment).

It should be noted that almost all indicators of the number of outsourcer enterprises prove statistically significant when *logit* regressions are constructed with a single variable. However, these pair models give a forecasting result that is much worse, though the factors are statistically significant.

The exceptions are the indicators for companies with the following types of activities: 66.19.6 (reception of payments from individuals by payment agents), 66.11 (administration of financial markets). The number of companies with these types of activities is not connected statistically with the level of investment attractiveness of the region. The results for all models are presented in detail in *Table 4*.

All the factors listed in the table are statistically significant when “predicting” the position of a region in the rating of investment attractiveness. This means that companies in more developed regions improve their administration system and transfer administrative processes and functions to external companies for execution.

Insights

Thus, the simulation results allow us to formulate answers to the questions set out in the introduction.

The analysis of statistical data indicates the presence of a general pattern of development of outsourcing in the regions of the Far Eastern Federal District and Eastern Siberia. This conclusion is supported by the results of correlation analysis and analysis of the structural composition of enterprises.

Despite the significant number of companies operating on conditions of outsourcing, their number is not related to the level of GRP, and is only a consequence of population size in general and of the size of economically active population in particular. Hence it is obvious that the introduction of outsourcing in economic practice in the regions of the Far Eastern Federal District and Eastern Siberia does not have a significant effect on macroeconomic performance. The absence of big players among regional outsourcing companies does not allow them to compete with the branches of Moscow-based companies.

At the same time the results obtained allow us to assert that the use of outsourcing is an indicator of investment attractiveness of regions. The fact that a region has specialized analytical firms (“market research”) and companies specializing in “technical testing, research and certification” is no doubt related to a higher position of the region in the rating

Table 4. Logistic models assessment results

Factor	Share of errors	R ²	p-value
Number of outsourcer enterprises, total	12% (3 out of 24)	63%	0.012
Number of enterprises 73.20.1 "market research"	17% (4 out of 24)	69%	0.022
Number of enterprises 73.1 "advertising"	30%	50%	0.025
Number of enterprises 52.1 "warehousing"	13%	66%	0.098
Number of enterprises 70.1 "headquarters"	21%	51%	0.052
Number of enterprises 81.2 "cleaning"	25%	33%	0.051
Number of enterprises 63.11 "data processing"	30% (7 out of 24)	32%	0.018
Number of enterprises 66.19.4 "financial advisory support"	30% (7 out of 24)	40%	0.021
Number of enterprises 69.10 "legal services"	25%	54%	0.019
Number of enterprises 78 "staff recruitment"	13%	66%	0.012
Number of enterprises 71.20 "technical testing and certification"	21%	60%	0.014
Number of enterprises 80.1 "private security services"	17% (4 out of 24)	57%	0.008

Source: calculated by authors with the use of the generated data array.

of investment attractiveness. Logistic models with the number of companies of this type as a factor produce the smallest number of errors in the "forecast" of the rating of investment attractiveness of the region, the factors have statistical significance at the level of 2% (see Tab. 4). This result indirectly confirms our hypothesis that the main reason for the development of outsourcing

lies in the differentiation of knowledge and competences.

The research produced the results that have both theoretical and practical significance and that can be interesting for business environment and for researchers in the field of economics and entrepreneurship.

Of theoretical importance are the patterns of development of outsourcing in the Far

Eastern Federal District and Eastern Siberia. The development of outsourcing in these regions has common patterns that do not depend on the level of economic development and investment rating. It is established that the use of outsourcing in production activities has no effect on the level of GRP. At the same time, our research shows that the number of companies operating on the terms of outsourcing is an indicator of investment attractiveness of the region.

The findings presented in the research allow real business to study the structure of the outsourcing market and to assess the possibility of transferring functions and processes to external execution.

The structure of the data that we developed provides the basis for organizing the monitoring of the outsourcing market in the regions, because organizing such a system for

the storage of statistical surveys data helps do the following:

- register dynamic changes in the outsourcing market.
- study the impact of outsourcing on the creation of a comfortable business environment and investment attractiveness of regions;
- forecast the level of self-employment.

In general, our studies confirm that the introduction of outsourcing is an indicator of the level of development of the business environment and self-employment. However, the use of outsourcing in production activities of enterprises has no significant impact on the economic performance of regions of the Far Eastern Federal District and Eastern Siberia. We see development prospects within the consolidation of outsourcer companies and advancement of their technology.

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