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INFORMATION TECHNOLOGY OUTSOURCING TRENDS AT HIGHER EDUCATION OF THE RUSSIAN FAR EASTERN IN THE CONTEXT OF GLOBAL TENDENCIES IN INFORMATION TECHNOLOGY OUTSOURCING

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Abstract

Analysis of IT service spending shows the growth of percent IT outsourcing spending over the time. But IT outsource spending in higher education is less than in other industries. Our research analyzes the impact of IT outsourcing on the level of change in the IT services in universities, and evaluates of the economic efficiency of transfer of IT processes to external companies. Our research creates data parameters that measure efficiency of IT outsourcing and uses these measures to analysis two regional Russian universities as examples. Results of our comparative analysis do not allow an unambiguous conclusion about the benefits of using IT outsourcing in higher education.

Keywords: Information Technology (IT) Outsourcing, IT Metrics, IT Outsource Spending, Higher Education, IT Service Delivery, IT Service Support

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INTRODUCTION

The term “Outsourcing” means a situation where any internal operations or services at one company are performed by an external company. So the term “IT outsourcing” is associated with IT services. The document, “The Gartner IT Key Metrics Data Report”, defines IT outsourcing as any situation when the full operational responsibility for a particular set of IT services is completely handed over to an external service provider [1].

The analysis of IT service spending shows the growth of IT outsource spending over few the last years. The report, “IT Key Metrics Data”, published every year since 1996 are based on research from Gartner Company [2]. These documents include primary data collected directly from IT employees of companies (chief information Officers (CIO), managers, and IT leaders), and special marketing research. IT Outsource Spending as a percent of IT spending averages 18%. Some companies use it more than 90%. The percentage of IT outsourcing of entire IT spending varies by industry. For example: government from 17% to 25%, communications 25%, banking 18%, commerce 18%, materials and resource industries 16%, education 8%.

Outsourcing spending in education is smaller than any other industry and the same in Russia [3]. The IT outsourcing market in Russia is substantially different from that

shown in Gartner's estimates.

We hypothesize that conservatism in higher education limits IT services outsourcing. What is the cause of this conservatism? Perhaps this conservatism is based on special operating practices of higher education.

In universities, all academic and research activities, one way or another, employ search and information processing as well as computation (information flow).

Thus, the corporate information system (CIS) provides all functions of educational institution. CIS is an indicator of learning environment potential. So the goal of IT outsourcing might be improving its efficiency.

We are interested in how IT outsourcing is developing in Russian universities. The purpose of our research is the analysis of the impact of IT outsourcing as it effects to the level of change in IT services in universities and evaluation of economic efficiency of transfer of IT processes to external companies.

We expected our research to answer to three questions:

1. "Are there significant advantages from the transfer of IT services outsourcing?"
2. "Does increased IT outsourcing improve the efficiency of University CIS?"
3. "Are university IT services improved by IT outsourcing?"

CHOOSING THE OBJECTS OF RESEARCH DATA PROBLEMS

In Russia, analysis of higher education IT outsourcing is naturally difficult over regions for several reasons.

1. The long process of reform of higher education in Russia. This process has lasted more than 10 years, but reform has unevenly affected universities and institutes.
2. There are differences between cultural, social and economic environments in the regions of Russia. Regional universities and colleges have different goals and educational targets.
3. Rating systems of Russian universities within different national organizations are very different [4-6].

First, our research needed to select specific and comparable data in order to compare the results of the application of IT outsourcing. We chose two of the largest universities in Eastern Siberia and the Russian Far East: Far Eastern Federal University (FEFU) and Vladivostok State University of Economics and Service (VSUES). Over the last 15 years these universities have traditionally occupied high places in the ranking of universities in Russia and the top places in the ranking of regional universities.

Both universities, located in the same city, have similar conditions of development and

infrastructural features and are comparable in the number of the number of students of different levels of training. These universities have high-grade corporate information systems that provide all functional tasks of a higher education institution.

These two universities provide a unique basis comparison: delivery and support of IT services in FEFU is completely (100%) outsourced while in VSUES its IT department provides all IT delivery and support (0% outsourced).

METHODOLOGY

Our research was based on a special method of system analysis. We used structural analysis for design process models and defining functions and operations of IT services which were transferred to outsourcing. Estimates of IT outsourcing spending were calculated based on methodology of "Total cost of ownership of IT". However this methodology was adapted for Russian feature. Comparative analysis of tendencies Russian and all-world IT outsourcing markets was based on correlation analysis.

Global tendencies in IT outsourcing

Independent research of the IT service market in Russia was completed in the last years from of information technological companies or public organizations including leading IT companies, IT staff and IT practitioners [2,3]. We used these reports as the basis of our analysis of the Russia IT service market.

Research of the Russian IT service market showed the growth of IT services and IT outsourcing volume for the last 10 years [3]; in 2014 its value in Russian rubles (RUR) remained unchanged although its value in USD declined by 15%.

These factors clearly define the decline in the IT services market volume: reduction in the number of long-term and expensive contracts, involvement of large-project Russian integrators (operating at the same level of funding), and the optimization of existing IT infrastructures [3].

We hypothesize that the basic factors of IT outsourcing development were staff shortage, high cost for internal IT services and company goals to concentrate on business only.

Researches reports [3] and [1] are the basis of our comparative analysis of industry sector IT outsourcing in Russia and in global markets (Table 1).

The Industry	IT outsource spending as percent of total IT spending by industry [1]	The percent of industry in Russian IT outsourcing market [3]
Retail and Wholesale	18%	19%
Banking and Financial Services	18%	16%
Industrial Manufacturing	20%	12%
Energy	20%	9%
Government - National/International	25%	8%
Construction, Materials and Natural Resources	16%	7%
Telecommunications	25%	7%
Transportation	19%	3%
Media and Entertainment	21%	2%
Healthcare Providers	12%	1%

Table 1: Global IT and IT outsourcing costs.

Indicators (Table 1) are calculated by different algorithms. Values from Gartner’s reports [1] are IT Outsource spending as a percent of the total IT spending by industry ($\alpha_{out, t}$). Values from report [3] are the percent of industry in Russian IT outsourcing market (β_j). However, it isn’t possible to compare these indicators. But it is possible to estimate statistical association between indicators.

Indicator β_j might be calculated from the indicator $\alpha_{out, t}$ by formula

$$\beta_j = \frac{\alpha_{out, j} * S_j^{IT}}{\sum_j \alpha_{out, j} * S_j^{IT}}$$

Where β_j – the share of j industry of total volume IT Outsourcing market; S_j^{IT} the IT budget of j industry; $\alpha_{out, t}$ is IT Outsource spending as a percent of the total IT spending for j industry. Therefore $\sum_j \alpha_{out, j} * S_j^{IT}$ is the total volume of IT outsourcing market for a national economy.

There is functional association between these indicators. But correlation analysis can be used to estimate statistical association between indicators for different (national or regional) economies.

Correlation analysis demonstrates low statistical association for Russian and all-world IT outsourcing markets by industry (Pearson Correlation Test is 8, 9%, not significant).

Research from [1] and [3] show global trends of IT outsourcing that differ between industry sectors in Russia and global market.

Tendencies and opportunities of IT outsourcing in higher education are different than in other industries. IT outsourcing carries smaller risks for higher education institutions than for business but higher education is usually more conservative, i.e., less likely to use IT outsourcing [7].

The Huron Consulting Group found only 6 of the 20 best known information technologies being utilized in least 30 percent of USA colleges and universities. Huron Consulting reported three top areas where USA higher education use outsourcing [8]:

- Information systems and applications (32%),
- Communications infrastructure services (27%);
- Enterprise infrastructure and services (27%).

RESULTS

The tendency of IT outsourcing at higher educations in Russia match with all-world trends. Below we show that IT outsourcing don't improve economy efficiency of IT services in universities.

The Vladivostok State University of Economics and Service (VSUES) has education programs in services and economics only. FEFU is a classical university having more than 100 educational programs (see general information of FEFU and VSUES in Table 2).

	Number of students	Number of postgraduate students	Total number of teachers	Area of lecture halls and laboratories (m²)	Total quantity of personal computers
FEFU	22,176	593	1,753	514,497	8,519
VSUES	10,191	219	407	91,110	3,924

Table 2: General information FEFU and VSUES.

Table 3 presents data on the structure and composition of the IT services that allow users CIS universities.

Sources of data are corporate websites of universities and open data reports [9,10]. For both universities, the composition of IT services and the number of services for end-users are comparable. But there are the fundamental differences in the organizational

structures of IT departments.

Indicator	FEFU		VSUES	
	Number of services	Type of services/notation	Number of services	Type of services/notation
Information services	4	Timetable, interviews, phonebook, mail	9	Timetable, interviews, phonebook, mail, navigation, staff portfolio, student portfolio, media data and other.
Banking	1	On-line banking	1	On-line banking
Library	30	11 Russian languages data bases, 17 foreign languages data bases	22	9 Russian languages data bases, 13 foreign languages data bases
Management services	4		2	
Certificate service	10		None data	
on-line education	3	LMS, other	5	LMS, other
Service support	12	idm; e-mail, phone; Wi-Fi; personal work station; printing, copying, scanning; computer's classrooms; media lecture halls; information systems, other	15	idm; e-mail, phone; Wi-Fi; personal work station; printing, copying, scanning; computer's classrooms; media lecture halls; information systems, other
Software for management	13	1C, Document management system "Directum", Tandem, Consultant +,	2	Document management system (own project), official site vvsu.ru, portal VSUES

		official site www.dvfu.ru, portal FEFU ip.dvfu.ru		
Learning Management System	1	Blackboard	1	Moodle
Multimedia equipment		All classrooms		All classrooms

Table 3: IT services available to users of the CIS FEFU and VSUES.

IT Services Outsourcing: Business Process Changes in the Management of IT Infrastructure

At VSUES, IT processes are fully provided by internal division of the university including the information center and data center. The only two IT services outsourced are external communication (WAN) and warranty service.

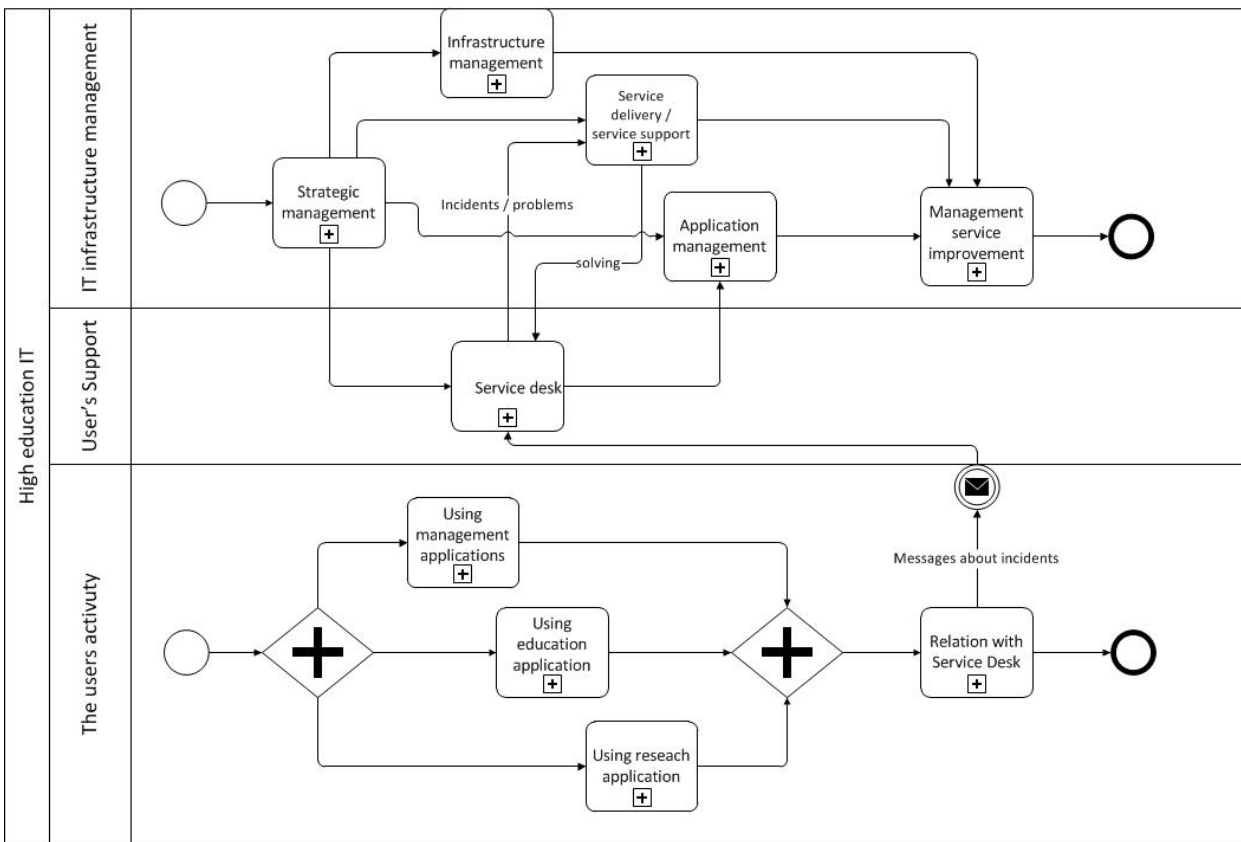


Figure 1: Business process diagram. IT service support and IT service delivery with internal IT department – VSUES.

At FEFU, all functions related to the provision and support of IT services is totally outsourced which is unusual for higher education and for the IT services market unique. The totally different methods of IT services at VSUES and FEFU result in very different business process management models (Figures 1 and 2). These models were created by authors with Business Process Management Notation [11].

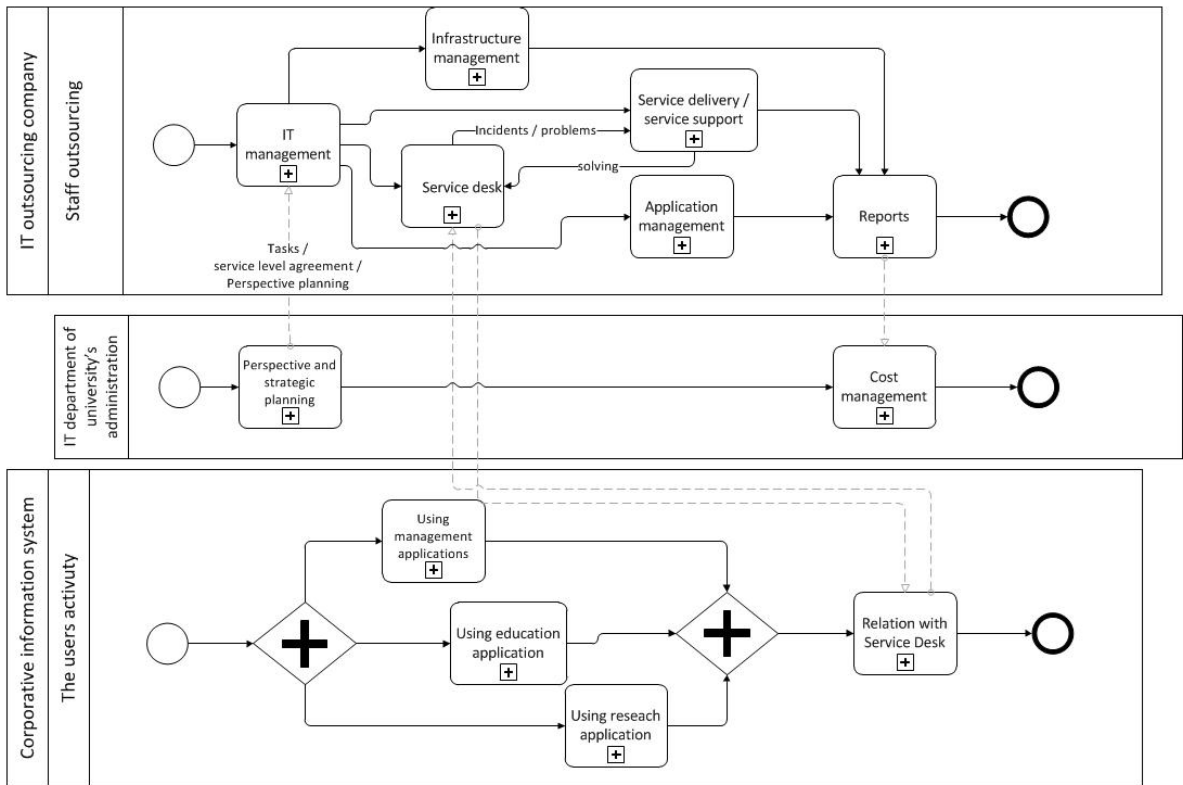


Figure 2: Business process diagram. IT service support and IT service delivery are handed over to external provider – FEFU.

INDICATOR OF IT OUTSOURCING EFFICIENCY

A variety of outsourcing efficiency indicators are published in scientific and business literature.

The choice of indicator for estimating business process efficiency is determined by project tasks and goals of compares. But indicators must be measurable values associating sample data with service or productions times or with expert opinion [12,13].

Authors of scientific articles use traditional economic and financial indicators such as investment efficiency, state economics effects and/or return on investment [14].

For this paper we created IT outsourcing efficiency estimates based on well-known indicators of university activities and indicators of economic efficiency traditionally used in the IT community. Specific choices of indicators depended on data available from official open information sources.

We chose indicators that measure of information infrastructure influence on university business that is used for calculating university’s ratings in Russia. The criteria for choosing indicators were:

- Indicators must reflect corporation information system functions;
- Indicators must enumerate information services and information parameters.

These are total volume of scientific and design projects, number of information services, percent of revenue and number computer work stations (Table 4).

	Total volume of scientific and design projects by 1 scientific staff (thousand rub.)	Number of information services	Percent of revenue	Quantity of personal computers by one student
FEFU	156.6	More than 50	4.4%	0.5
VSUES	143.9	More than 50	3.2%	0.7

Table 4: Indicators of university activities (Average for 3 years).

Indicators of economic efficiency are based on estimates of the well-known methodology “Total cost of ownership of IT” [15]. Indicators of economic efficiency were created on basis of well-known methodology “Total cost of ownership for IT”. This methodology calculates the direct and indirect costs of IT over its lifecycle and analyzes factors which influence to these costs.

We considered that IT outsource operations connect with IT service delivery and IT service support. Consequently IT-outsource spending should relate to direct operation spending for information infrastructure. Direct spending consists of capital costs (hardware and software), costs of upgrading technology infrastructure, costs for service support and service delivery and costs of internet provider services. Spending defined by user activity is included to support service’s spending.

Comparison of direct capital costs is impossible because the universities have different enterprise architecture and different technological infrastructures. Indirect spending was excluded from consideration. It should relate with idle time of computer work stations and staffs, but activities of university’s departments in Russia are organized so that all

functions and tasks are accomplished in any situation.

Normalized direct operation spending is presented in Table 5 and is comparable between universities. Data sources are official reports which according to Russian laws are published openly [16,17]; but these data sources have obvious weaknesses: they do not contain specific information. Additionally we've used data from Official information system of government purchase [18]. Information from this source might choose direct operating spending exactly. However, employing system analysis (Figures 1 and 2) we could choose realistic indicators. Direct operating costs are for of 2015. The number of students was calculated as median student population for 2012-2015.

	Direct operating costs of IT service support and service delivery by 1 computer (rub.)	Direct operating costs of IT service support and service delivery by one student (rub.)	Direct operating costs of communication services by one student (rub.)
FEFU	21,091.8	8,102.5	3,703
VSUES	5,228.8	2,013.3	774

Table 5: Direct operating costs of IT service support and service delivery.

CONCLUSIONS

Comparative analysis of IT services efficiency indicators did not demonstrate an advantage of IT outsourcing for higher education.

The indicators of information infrastructure influencing university business-processes are better for Federal university; but advantages are not significant. The total volume of scientific and design projects by FEFU scientific staff is about 9% more for than for VSUES. Other indicators (Table 4) are approximately equal.

However, direct operating costs of IT services for FEFU are higher, significantly higher than in VSUES. Normalized direct operating costs of IT service support and service delivery for FEFU are almost four times more than for VSUES.

Based on these results we conclude that outsourcing did not improve economic efficiency of IT services for FEFU. This is confirmed by statistical data and our indicators.

We believe that the cause of ineffectiveness is special practice goals of higher

education. Perhaps we'll see decreasing of IT operating costs in FEFU in a few years. But current results explain why IT outsourcing within higher education has remained low.

REFERENCES

1. Gartner IT Key Metrics Data 2015 IT outsourcing summary report (2015)
<http://www.gartner.com/technology/consulting/surveys/>
2. Gartner consulting. Free IT Key Metrics Data Summary (2014)
<http://www.gartner.com/technology/consulting/surveys/>
3. The analysis of IT-outsourcing market in the world and in Russia (2015)
<http://www.globalcio.ru/analytics/>
4. Rating of high schools in Russia. Rating's agency "Expert" (2015)
http://raexpert.ru/rankings/vuz/vuz_2015/#vuz_raiting
5. Academic Ranking of World Universities-European Standard ARES (2016)
<http://eurochambres.org/ares-2016/russian-federation/>
6. Rating of high schools in Russia Far East (2014) <https://dip-land.ru/articles/2014/10/vuzyi-dalnego-vostoka-rossii-reytingi-i-populyarnost/>
7. Official site of the Huron consulting group (2015)
http://www.huronconsultinggroupusa.com/Expertise/Education/University_Performance_Improvement_Solutions
8. Trends and Opportunities for Higher Education IT With Scott Hess (2015)
https://www.huronconsultinggroup.com/Company/Media_Center/News_and_Events/Events/Huron_Webinar_Trends_and_Opportunities_for_Higher_Education_IT
9. E-campus. Official site of VSUES. E-campus (2016) <http://e-campus.vvsu.ru/>
10. The reports, plans and documents FEFU. Official sit FEFU (2016)
<http://wwwold.dvfu.ru/about/documents>
11. Business Process Model and Notation. Documents BPMN v2.0 (2016)
<http://www.bpmn.org/>
12. Antipov EF, Pahomov VI (2010) Military and economic efficiency estimation of results outsourcing in foodstuff department – Moscow: The central military scientific institute of Russia.

13. Pichkalev AV (2012) Generalized Harrington desirability function for comparative analysis of technical facilities (2012). Researches of naukograd 1: 25-28. <http://cyberleninka.ru/article/n/obobschennaya-funktsiya-zhelatelnosti-harringtona-dlya-sravnitel'nogo-analiza-tehnicheskikh-sredstv>
14. Hugaeva LT (2011) Effectiveness of outsourcing at the enterprise. Terra economicus 22. <http://cyberleninka.ru/article/n/effektivnost-outsorsinga-na-predpriyatii>
15. Total Cost of Ownership (TCO) of IT. Making every IT dollar count Part 1, January 2009. <http://www.nashnetworks.ca/total-cost-of-ownership-tco-of-it.htm>
16. Financial reports of VSUES. Official site of VSUES. <http://e-campus.vvsu.ru/>
17. Financial reports FEFU/Official site FEFU. <http://wwwold.dvfu.ru/buhgalterskaa-i-finansovaa-otcetnost>
18. Official site of government purchase. <http://zakupki.gov.ru/epz>