ANALYSIS OF THE DEVELOPMENT OF THE UNIVERSITY OF JOSIP JURAJ STROSSMAYER IN OSIJEK AND ITS ROLE IN BUILDING THE INFORMATION SOCIETY [1]

Dražen Barković, Full Professor
J.J. Strossmayer University in Osijek
Faculty of Economics in Osijek

Gordana Dukić, Ph.D.
Darko Dukić, Ph.D.

ABSTRACT

Universities play a significant role in the development of the society they act in. Their role is mainly felt at regional level. Nevertheless, through their scientific research, artistic and educational work, universities have a significant impact on a wider environment as well. The University of Josip Juraj Strossmayer in Osijek, continuing a three-century-long tradition of higher education in Eastern Croatia, is one of the most important factors of development of the region. The new millennium has posed new challenges. The ongoing transformation process is extremely complex and requires the engagement of not only the entire academic community, but also of any entity interacting with the university. In order to give an overview of the main development trends of the University over the past ten years, the study presented in this paper applies adequate statistical methods and models. Deriving from the commitment taken by Croatia to found its social and economic progress on building an information society, the study puts special emphasis on analysing the possibility for the University of Josip Juraj Strossmayer in Osijek to actively contribute to the above process by providing conditions for the implementation of research programmes and projects as well as for the education and training of computer science human resources.

Key words: regional university, economic development, statistical methods and models, information society, education and training of computer science human resources

[1] The paper was written in the scope of the project: Regiona University (No.010-0101427-0837).

1. INTRODUCTION

Research and education are the basic postulates of development. Therefore, even the slightest backwardness in these fields has a direct impact on global social processes. Especially given the current turbulent economic conditions, insufficient investment into scientific research and education inevitably leads to accelerated stagnation and decrease in competitiveness. Croatia's commitment to develop a knowledge-based society is the only logical option under the given circumstances, and it is reasonably expected to result in overall positive changes in time. The building of such a society is based on the quality and continuous improvement of the research and education system. The most developed countries of the world have identified the need for its creation on time. Building a knowledge-based society is the strategic goal of the European Union set out by the Lisbon Strategy adopted in 2000. According to this document, by 2010 the European Union should become the most competitive and the most dynamic knowledge-based society in the world, capable of sustainable economic growth, with more jobs and social cohesion. It is estimated that the accomplishment of Lisbon goals would increase the Member State GDP between 12% and 23%, and employment by approximately 11%. Although such estimates seem fairly optimistic, the implementation of the set goals will definitely lead to significant steps forward in the field of scientific research and education.

Croatia's strategic goal is to create the most competitive research and education society in this part of Europe by 2010. To achieve this goal, and thus bring the Croatian research and education system closer to the systems existing in the developed countries of the world and the European Union, a set of reforms has been introduced throughout the system. The reforms are based on the long-term tradition of the Croatian research and education system, as well as on the best practices of European and other countries. The implementation of the Bologna process plays a special part in the field of higher education, while the main goals of research and technology policies are: higher investment into research and development, improving their effectiveness, boosting cooperation between the scientific research system, state institutions and economy, and more active participation of Croatian scientists/researchers in European Union programmes.

Universities, as the centres of research, application-oriented, artistic and educational work, achieve the most powerful interaction at regional level. They play an enormous role in the development of the communities they act in. Among other things, they take care of the cultural and sports infrastructure, provide conditions for research activities, and transfer knowledge and competences for general benefit. Universities thus contribute not only to the prosperity of a region, but also act as a powerful leverage of economic and social development both at national and global level.

The University of Josip Juraj Strossmayer in Osijek is certainly one of the most important factors of development of Eastern Croatia. Continuing a three-century-long tradition of higher education in this region, it faces new challenges in the new millennium. This paper attempts to analyse the main trends of its development over the past ten years. In order to research the above topic, the study applies statistical methods and models intended for the time sequence analysis. Deriving from the requirements of the contemporary society that have emerged as a result of rapid progress in information and communication technologies, the analysis puts special emphasis on the state of affairs in university and application-oriented study programmes in this domain. The intention was to draw attention to the importance of the University in building an information society.

2. BRIEF HISTORICAL OVERVIEW OF THE DEVELOPMENT OF HIGHER EDUCATION IN EASTERN CROATIA

The roots of higher education in Eastern Croatia date back to 1707, to the founding of the Higher Theological School in Osijek. With the aim of training and educating theologians and teachers to work in grammar schools, another Higher Theological School was founded in Osijek in 1724, whereas a college with philosophy and moral theology studies existed in Požega from 1761 to 1776. The Diocesan Theological College of the Episcopal seminary in Đakovo was founded in 1806.

The recent history of higher education in Eastern Croatia starts in 1959 with the founding of the Centre for Part-time Studies in Osijek set up as a satellite study centre under the Faculty of Economics in Zagreb. The two-year College of Economics and the two-year College of Agriculture in Osijek are the first institutions of higher education in this region founded in 1960. A year after the Teacher Training Colleges were opened in Osijek and Slavonski Brod, the Faculty of Law in Zagreb launched the Centre for Part-time Studies of Law in Osijek, the Polytechnic was founded in Slavonski Brod, the two-year College of Economics was founded in Vukovar, the two-year School of Dentistry was founded in Osijek and the Polytechnic was founded in Nova Gradiška. The two-year College of Economics became in 1961 the Faculty of Economics in Osijek, and the Centre for Engineering Studies in Slavonski Brod was founded in 1967. In the first half of 1970s the two-year College of Civil Engineering from Zagreb, the two-year College of Economics in Slavonski Brod and the Law School in Osijek were opened. Such an impetus to higher education resulted in the initiative to found the University of Osijek. The agreement on the establishment of the University was signed on 31 May 1975. The Faculty of Law was founded the same year, and the Faculty of Food Technology in Osijek was opened a year later. The Faculty of Education in Osijek was founded in 1977, the School of Engineering in Slavonski Brod in 1979, as well as the Medical Studies in Osijek,

becoming the Faculty of Medicine in 1998. In 1982 the Faculty of Civil Engineering was founded in Osijek, and in 1990 the Electrical Engineering Studies evolved into the Faculty of Electrical Engineering. The same year the decision was reached to name the University of Osijek after the famous bishop and theologian, great patron and people's tribune Josip Juraj Strossmayer.

The University of Josip Juraj Strossmayer in Osijek suffered heavily during the Homeland War. 24 of its students and 5 lecturers were killed in the war. Nevertheless, even under such circumstances, the University remained operational. By adjusting to the requirements of the region, the University continues with the transformation process in the period following the Homeland War. As a result of the changes, the number of its research and education constituents has increased. The University of Josip Juraj Strossmayer in Osijek currently comprises the following: the Faculty of Economics, the Faculty of Electrical Engineering, the Faculty of Philosophy, the Faculty of Civil Engineering, the Catholic Faculty of Theology, the Faculty of Medicine, the Faculty of Agriculture, the Faculty of Law, the Faculty of Food Technology, the Faculty of Mechanical Engineering, the Faculty of Teacher Education, the Academy of Arts, the Department of Mathematics, the Department of Biology, the Department of Physics, and the Department of Chemistry. There are three additional facilities as part of the University established for the purpose of meeting the needs of students, researchers and lecturers: the University Library in Osijek, and the Student Centres in Osijek and Slavonski Brod.

3. MOST SIGNIFICANT FEATURES OF THE DEVELOPMENT OF THE UNIVERSITY OF JOSIP JURAJ STROSSMAYER IN OSIJEK FROM ACADEMIC YEAR 1999/2000 TO ACADEMIC YEAR 2007/2008

Table 1 contains the overview of the number of lecturers and assistants at the research and education constituents of the University of Josip Juraj Strossmayer in Osijek from the academic year 1999/2000 to the academic year 2007/2008.

FACULTY/ DEPARTMENT	ACADEMIC YEAR								
	1999/2000	2000/2001	2001/2002	2002/2003	2003/2004	2004/2005	2005/2006	2006/2007	2007/2008
Faculty of Economics	42	41	41	41	41	40	40	64	63
Faculty of Electrical Engineering	43	40	44	42	42	40	40	43	59
Faculty of Philosophy	82	82	85	79	92	72	81	103	107
Faculty of Civil Engineering	43	44	44	40	52	51	53	55	49
Catholic Faculty of Theology	-	-	-	-	-	-	15	21	24
Faculty of Medicine	56	53	56	61	57	74	80	124	133
Faculty of Agriculture	90	91	95	90	91	93	99	111	113
Faculty of Law	31	32	30	31	29	29	30	34	38
Faculty of Food Technology	29	34	35	36	34	35	42	43	49
Faculty of Mechanical Engineering	41	41	40	39	40	40	40	39	39
Faculty of Teacher Education	17	19	20	21	20	20	22	31	38
Academy of Arts	-	-	-	-	-	10	14	19	35
Department of Mathematics	3	3	3	8	10	10	15	17	20
Department of Biology	-	-	-	-	-	15	25	24	27
Department of Physics	-	-	-	-	-	7	8	10	11
Department of Chemistry	-	-	-	-	-	-	7	12	15
TOTAL	477	480	493	499	508	536	611	750	821

Source: Data provided by the University of Josip Juraj Strossmayer in Osijek

Table 1. *Number of lecturers and assistants at the research and education constituents of the University of Josip Juraj Strossmayer in Osijek from the academic year 1999/2000 to the academic year 2007/2008*

In the analysed period, the number of lecturers and assistants at the University increased annually by an average of 43 (indicator calculated as the average first difference). In order to present a more objective overview of the general trend in the number of lecturers and assistants at the University, in addition to the data referring to the total number of the above human resources, Table 2 includes the rates of change based on the data for the academic year 1999/2000, as well as the respective year-on-year rates of change.

ACADEMIC YEAR	NUMBER OF LECTURERS AND ASSISTANTS	RATE OF CHANGE [Base academic year = 1999/2000] (%)	YEAR-ON-YEAR RATE OF CHANGE (%)
1999/2000	477	0.00	-
2000/2001	480	0.63	0.63
2001/2002	493	3.35	2.71
2002/2003	499	4.61	1.22
2003/2004	508	6.50	1.80
2004/2005	536	12.37	5.51
2005/2006	611	28.09	13.99
2006/2007	750	57.23	22.75
2007/2008	821	72.12	9.47

Table 2. *Number of lecturers and assistants at the University of Josip Juraj Strossmayer in Osijek from the academic year 1999/2000 to the academic year 2007/2008, rates of change with respect to the academic year 1999/2000 and year-on-year rates of change*

In the academic year 2007/2008 the number of lecturers and assistants at the University was 1.72 times higher than in the academic year 1999/2000. Over the period analysed, the number increased annually by an average of 7.02% (average rates of change calculated as the geometric mean). The highest increase rate was recorded in the academic year 2006/2007, and the lowest in the academic year 2000/2001. In general, the number of lecturers and assistants varied only slightly until the academic year 2004/2005. Intensive employment growth was slowed down in the last academic year analysed, although it reached almost 10% even then.

In order to establish the main features of the trend in the number of lecturers, the cubic trend model was applied in the study. In addition to the data referring to the number of lecturers and assistants, the following graph presents the cubic equation calculated in the above analysis. It should be mentioned that due to the low count of data included in the analysis the obtained results should be interpreted with caution.

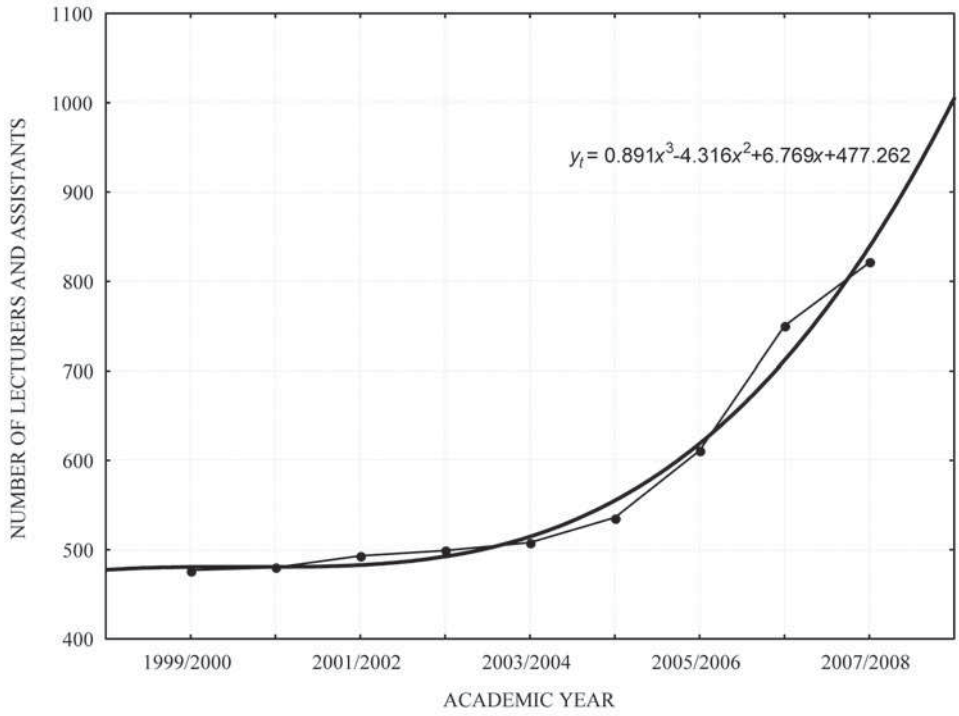

Figure 1. *Number of lecturers and assistants at the University of Josip Juraj Strossmayer in Osijek from the academic year 1999/2000 to the academic year 2007/2008, with respective cubic trend equation*

The analysis of variance (ANOVA) table for the analysed phenomenon reads as follows:

SOURCE	df	SUM OF SQUARES	MEAN SQUARE	F-value
REGRESSION	3	127165.764	42388.588	87.935
RESIDUAL	5	2410.236	482.047	
TOTAL	8	129576.000		

According to the coefficient of determination (R^2), the cubic trend model explained 98.14% of total variations, which implies that the calculated equation is highly representative.

Table 3 contains the overview of the number of lecturers and assistants over the analysed period, the predicted values and the residuals.

ACADEMIC YEAR	NUMBER OF LECTURERS AND ASSISTANTS	PREDICTED VALUE	RESIDUAL
1999/2000	477	480.606	-3.606
2000/2001	480	480.667	-0.667
2001/2002	493	482.792	10.208
2002/2003	499	492.331	6.669
2003/2004	508	514.632	-6.632
2004/2005	536	555.043	-19.043
2005/2006	611	618.913	-7.913
2006/2007	750	711.591	38.409
2007/2008	821	838.424	-17.424

Table 3. *Number of lecturers and assistants at the University of Josip Juraj Strossmayer in Osijek from the academic year 1999/2000 to the academic year 2007/2008, predicted values and residuals*

The number of lecturers and assistants was above the general trend established by the cubic trend model in the academic years 2001/2002, 2002/2003 and 2006/2007.

Table 4 lists the data on the number of students at the research and education constituents of the University of Josip Juraj Strossmayer in Osijek from the academic year 1999/2000 to the academic year 2007/2008.

FACULTY/ DEPARTMENT	ACADEMIC YEAR								
	1999/2000	2000/2001	2001/2002	2002/2003	2003/2004	2004/2005	2005/2006	2006/2007	2007/2008
Faculty of Economics	2869	1971	2142	2759	4287	5537	5297	4639	4709
Faculty of Electrical Engineering	408	406	693	813	1114	1287	1380	1651	1828
Faculty of Philosophy	1118	1066	1089	1056	1262	1393	1305	1489	1503
Faculty of Civil Engineering	408	397	686	748	704	917	1027	1050	1167
Catholic Faculty of Theology	-	-	-	-	-	-	228	251	252
Faculty of Medicine	303	338	350	356	379	498	632	731	737
Faculty of Agriculture	801	770	946	1083	1210	1394	1664	1595	1437
Faculty of Law	1859	1932	2101	2150	2224	2539	2405	3629	3830
Faculty of Food Technology	576	583	597	596	618	440	620	619	753
Faculty of Mechanical Engineering	236	307	414	471	476	567	627	589	625
Faculty of Teacher Education	251	339	493	489	636	635	828	859	882
Academy of Arts	-	-	-	-	-	49	149	184	220
Department of Mathematics	207	265	272	259	304	394	393	446	433
Department of Biology	-	-	-	-	-	-	153	209	215
Department of Physics	-	-	-	-	-	-	110	152	117
Department of Chemistry	-	-	-	-	-	-	104	*	20
TOTAL	9036	8374	9783	10780	13214	15650	16922	18093	18728

Source: Data provided by the University of Josip Juraj Strossmayer in Osijek

Table 4. *Number of students at the research and education constituents of the University of Josip Juraj Strossmayer in Osijek from the academic year 1999/2000 to the academic year 2007/2008*

In the analysed period, the number of students at the University increased annually by 1211.5. Table 5 contains data on the total number of students and on the rates of change based on the data for the academic year 1999/2000, as well as the year-on-year rates of change.

ACADEMIC YEAR	NUMBER OF STUDENTS	RATE OF CHANGE [Base academic year = 1999/2000] (%)	YEAR-ON-YEAR RATE OF CHANGE (%)
1999/2000	9036	0.00	-
2000/2001	8374	-7.33	-7.33
2001/2002	9783	8.27	16.83
2002/2003	10780	19.30	10.19
2003/2004	13214	46.24	22.58
2004/2005	15650	73.20	18.43
2005/2006	16922	87.27	8.13

2006/2007	18093	100.23	6.92
2007/2008	18728	107.26	3.51

Table 5. *Number of students at the University of Josip Juraj Strossmayer in Osijek from the academic year 1999/2000 to the academic year 2007/2008, rates of change with respect to the academic year 1999/2000 and year-on-year rates of change*

In the academic year 2007/2008 the number of students at the University was 2.07 times higher than in the academic year 1999/2000. Over the analysed period the number increased annually by 9.54%. Thus, the increase in the number of students was more intensive than the increase in the number of lecturers and assistants. The highest increase rate was recorded in the academic year 2003/2004, whereas only in the academic year 2000/2001 the number of students was lower than in the previous academic year. A gradual decrease in the rate of increase in the number of students can be observed following the academic year 2003/2004.

In order to identify the basic rules of the trend in the number of students at the University of Josip Juraj Strossmayer in Osijek more accurately, the analysed data were approximated by using the cubic trend model. Figure 2 presents the trend in the number of students over the analysed period including the calculated cubic trend equation.

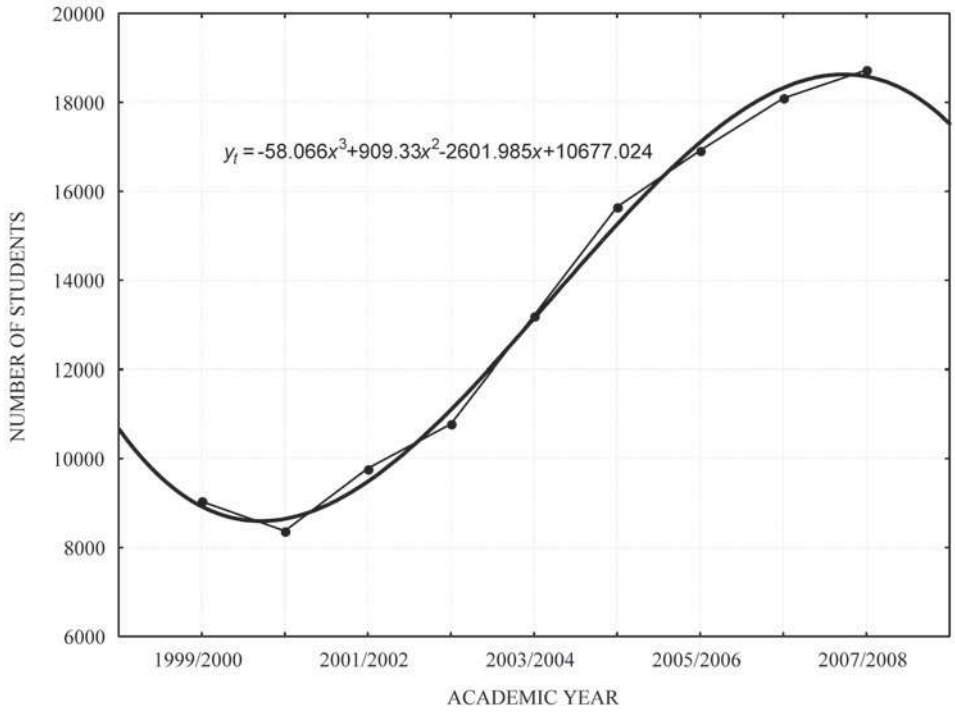

Figure 2. *Number of students at the University of Josip Juraj Strossmayer in Osijek from the academic year 1999/2000 to the academic year 2007/2008, with respective cubic trend equation*

The analysis of variance (ANOVA) table for the variable defined as the number of students at the University of Josip Juraj Strossmayer in Osijek for the academic years 1999/2000 to 2007/2008:

SOURCE	df	SUM OF SQUARES	MEAN SQUARE	F-value
REGRESSION	3	131621241.006	43873747.002	402.964
RESIDUAL	5	544388.550	108877.710	
TOTAL	8	132165629.556		

The coefficient of determination (R^2) indicates that the applied model explained 99.588% of total variations. Therefore, the calculated cubic trend equation can be considered highly representative. However, it should be reiterated that due to the low count of data included in the analysis the results obtained should be interpreted with caution.

Table 6 lists the data on the number of students over the analysed period, the predicted values and the residuals.

ACADEMIC YEAR	NUMBER OF STUDENTS	PREDICTED VALUE	RESIDUAL
1999/2000	9036	8926.303	109.697
2000/2001	8374	8645.848	-271.848
2001/2002	9783	9487.266	295.734
2002/2003	10780	11102.162	-322.162
2003/2004	13214	13142.143	71.857
2004/2005	15650	15258.814	391.186
2005/2006	16922	17103.781	-181.781
2006/2007	18093	18328.652	-235.652
2007/2008	18728	18585.030	142.970

Table 6. *Number of students at the University of Josip Juraj Strossmayer from the academic year 1999/2000 to the academic year 2007/2008, predicted values and residuals*

The number of students was above the general trend established by the cubic trend model in the academic years 1999/2000, 2001/2002, 2003/2004, 2004/2005 and 2007/2008.

Table 7 indicates the relation between the number of students and the number of lecturers, including assistants, at the University of Josip Juraj Strossmayer in Osijek from the academic year 1999/2000 to the academic year 2007/2008.

FACULTY/ DEPARTMENT	ACADEMIC YEAR								
	1999/2000	2000/2001	2001/2002	2002/2003	2003/2004	2004/2005	2005/2006	2006/2007	2007/2008
Faculty of Economics	68.31	48.07	52.24	67.29	104.56	138.43	132.43	72.48	74.75
Faculty of Electrical Engineering	9.49	10.15	15.75	19.36	26.52	32.18	34.50	38.40	30.98
Faculty of Philosophy	13.63	13.00	12.81	13.37	13.72	19.35	16.11	14.46	14.05
Faculty of Civil Engineering	9.49	9.02	15.59	18.70	13.54	17.98	19.38	19.09	23.82
Catholic Faculty of Theology	-	-	-	-	-	-	15.20	11.95	10.50
Faculty of Medicine	5.41	6.38	6.25	5.84	6.65	6.73	7.90	5.90	5.54
Faculty of Agriculture	8.90	8.46	9.96	12.03	13.30	14.99	16.81	14.37	12.72
Faculty of Law	59.97	60.38	70.03	69.35	76.69	87.55	80.17	106.74	100.79
Faculty of Food Technology	19.86	17.15	17.06	16.56	18.18	12.57	14.76	14.40	15.37
Faculty of Mechanical Engineering	5.76	7.49	10.35	12.08	11.90	14.18	15.68	15.10	16.03
Faculty of Teacher Education	14.76	17.84	24.65	23.29	31.80	31.75	37.64	27.71	23.21
Academy of Arts	-	-	-	-	-	4.90	10.64	9.68	6.29
Department of Mathematics	69.00	88.33	90.67	32.38	30.40	39.40	26.20	26.24	21.65
Department of Biology	-	-	-	-	-	-	6.12	8.71	7.96
Department of Physics	-	-	-	-	-	-	13.75	15.20	10.64
Department of Chemistry	-	-	-	-	-	-	14.86	*	1.33
TOTAL	18.94	17.45	19.84	21.60	26.01	29.20	27.70	24.12	22.81

Table 7. *Relation between the number of students and lecturers, including assistants, at the University of Josip Juraj Strossmayer in Osijek from the academic year 1999/2000 to the academic year 2007/2008*

The most favourable ratio between the number of students and lecturers, including assistants, at the University of Josip Juraj Strossmayer in Osijek was in the academic year 2000/2001. The ratio was 1 lecturer and assistant to 17.45 students. The ratio continuously deteriorated until the academic year 2004/2005. Following this academic year the situation gradually improved. According to the data available for the current academic year, there is an overall ratio of 1 lecturer and assistant to 22.81 students at the University of Josip Juraj Strossmayer in Osijek. However, if analysed at the level of individual research and education constituents, the ratio varies significantly. Currently the least favourable ratio of the number of students and lecturers, including assistants, is at the Faculty of Law, with 1 lecturer and assistant to 100.79 students. There is a fairly unfavourable ratio at the Faculty of Economics as well, while the most favourable ratio is at the Department of Chemistry where, according to available information, there is 1 lecturer and assistant to 1.33 students. There are fewer than 10 students to 1 lecturer and assistant for the current academic year at the Faculty of Medicine, the Academy of Arts and the Department of Biology. Based on the data listed in Table 7, the conclusion to be drawn is that positive steps forward towards full implementation of the Bologna process have been taken over the past years; nevertheless, at individual research and education constituents the situation is still far from satisfactory.

A number of projects significant for the development of the University of Josip Juraj Strossmayer in Osijek have been implemented over the past years. Most of the capital investment programs have been realised by means of loans granted by Slavonska banka Osijek. The long-term loan contract between Slavonska banka Osijek, the University and the Ministry of Science and Technology was singed on 12 July 2002. The drafting of the university campus project, the implementation of which started at the former "Drava" military barracks, the construction of the new Students' Dormitory in Osijek, the drafting of the main and detailed project of the new building for the Faculty of Agriculture, finalising the construction of the Faculty of Electrical Engineering and the Faculty of Economics, adapting the former "Gaj" military barracks for university purposes, redecoration of the Faculty of Food Technology, the Faculty of Civil Engineering and the Faculty of Philosophy in Osijek as well as the redecoration and equipment of the Faculty of Mechanical Engineering in Slavonski Brod are only some of the projects implemented in the past few years. The most important development projects of the University of Josip Juraj Strossmayer in Osijek are related to the construction and reconstruction of various buildings at the "Drava" barracks.

4. THE ROLE OF THE UNIVERSITY IN BUILDING THE INFORMATION SOCIETY

The intensive progress in information and communication technologies has affected the global social and economic trends over the past decades. In highly

developed countries of the world such development has marked the end of the industrial era and the advent of an information society. The information society is based on the creation, exchange and use of information as the main resource. In such a society information and communication technologies are the main tools to initiate any kind of processes. This is one of the main reasons for the highest growth rate that has been recorded by the information and communication sector for years already.

The currently most developed economies of the world have in time recognised the importance and benefits of using new technologies. Their experience has shown that the application of contemporary information and communication achievements directly affects the economic development. Thus, if they wish to increase the competitiveness of their economy, competent state institutions must actively foster the building of an information society. In acceptance of such principles, by the end of 2003 the Croatian government adopted a special document entitled "Program *e*-Croatia 2007", with the basic goal to provide citizens and entrepreneurs with the possibility to obtain timely information and to actively participate in the society via an information system network. The construction and implementation of such a system is aimed at strengthening and networking of Croatian economy, comprehensive exchange of information and the creation of a transparent, swift and efficient state service. Numerous activities that certainly contribute to the increase in competitiveness have already been implemented in the meantime. Nevertheless, there are still fields in which the results have not been satisfactory so far. Therefore, more effort should be made to accelerate Croatia's path towards an information society. This is the only way to bridge the gap that keeps us away from the highly developed community we aspire to become.

As centres of research, application-oriented and education work, universities play an important role in the process of building an information society. Their core task in this domain is to provide the conditions for the implementation of research programmes and projects aimed at fostering the building of such a society as well as for the education and training of the required profiles of human resources. Notwithstanding that the University of Josip Juraj Strossmayer in Osijek has already taken certain steps to this end in order to contribute to the development of the community, these are still not coordinated with the requirements of the regional economy. This applies first and foremost to the number of university and application-oriented studies aimed at acquiring competence in the field of computer science, telecommunications, computer engineering and information science, as well as to the number of students enrolled in such study programmes. For the purpose of providing an overview of the current state of affairs in this field, Table 8 lists the university and application-oriented study programmes at the University of Josip Juraj Strossmayer in Osijek and the number of students enrolled in the above study programmes for the academic year 2007/2008.

INSTITUTION/ STUDY PROGRAMME	NUMBER OF STUDENTS ENROLLED						
	I	II	III	IV	V	Under-graduate ABD	TOTAL
Faculty of Economics							
- Business Computer Sciences	-	94	27	-	-	-	121
Faculty of Electrical Engineering							
- University study programme	286	211	153	217	153	138	1158
- Application-oriented study programme	237	137	68	-	-	228	670
Faculty of Philosophy							
- Information Sciences	48	48	40	-	-	-	136
- Library and information sciences as part of double major study programmes	-	-	-	85	-	68	153
Faculty of Teacher Education							
- Computer Sciences	-	-	-	3	-	32	35
Department of Physics							
- Physics and Technical Education with Computer Sciences	-	-	-	22	-	27	49
Department of Mathematics							
- Mathematics - Computer Sciences	-	-	-	24	-	48	72
- Mathematics - Computer Sciences	27	23	22	29		-	101
TOTAL	598	513	310	380	153	541	2495

Source: Data provided by the University of Josip Juraj Strossmayer in Osijek

Table 8. *University and application-oriented studies aimed at acquiring competence in the field of computer sciences, telecommunications, computer engineering and information sciences at the University of Josip Juraj Strossmayer and the number of students enrolled in such study programmes for the academic year 2007/2008*

It was not possible to make a distinction between the students by individual study programmes at the Faculty of Electrical Engineering (the data presented refer to the students enrolled in all university and application-oriented study programmes at the Faculty). In addition, the Table includes the data that refer to old study programmes that no longer accept new students. Therefore, they should be taken only as general indicators of the state of affairs in the domain of acquisition of competence in the field of computer sciences, telecommunications, computing and information sciences at the University of Josip Juraj Strossmayer in Osijek. Nevertheless, even in accordance with an optimistic assessment, based on such inadequate data, only 13.32% of University students have enrolled in one of the study programmes providing the above competence. Taking into account the ever-growing requirements for human resources with computer science education background, this share can certainly not be considered satisfactory. The data would be even less favourable if

we took into account only the students who have actually graduated and obtained a degree in those study programmes.

The following table contains the overview of undergraduate and graduate study programmes at the University of Josip Juraj Strossmayer in Osijek in the field of computer sciences, telecommunications, computing and information sciences for the academic year 2007/2008 by institution.

INSTITUTION	UNDERGRADUATE UNIVERSITY STUDY PROGRAMME	GRADUATE UNIVERSITY STUDY PROGRAMME
Faculty of Economics	Business - Computer Science	Business - Computer Science
Faculty of Electrical Engineering	Electrical Engineering	Communications and Computer Science
	Computer Engineering	Computer Engineering
Faculty of Philosophy	Information Science	Information Science
Department of Physics	Physics	Physics and Computer Science
Department of Mathematics	Mathematics and Computer Science	Mathematics and Computer Engineering

Source: Data provided by the University of Josip Juraj Strossmayer in Osijek

Table 9. *Overview of university study programmes for acquisition of competence in the field of computer science, telecommunications, computer engineering and information science at the University of Josip Juraj Strossmayer for the academic year 2007/2008*

It should be mentioned that, in addition to the above mentioned university study programmes, the Faculty of Electrical Engineering offers the branch of study in automatics and computer science as part of the application-oriented study programme in electrical engineering. However, all of the above mentioned study programmes meet the requirements of the regional community and economy only partially. The founding of a Faculty of Computer Science at the University of Josip Juraj Strossmayer would certainly decrease the insufficiency of personnel with computer science education background and thus boost the economic development of Eastern Croatia.

5. CONCLUSIONS

The University of Josip Juraj Strossmayer in Osijek has been one of the most powerful promoters of the development of Eastern Croatia ever since it was founded. Through its scientific research, application-oriented, artistic and educational work the University has an impact on a wider environment as well, in particular at the national level. Although the University suffered heavy destruction in the Homeland War, it has remained operational in fulfilling its main tasks. Over the past few years, major steps have been taken towards reconstruction of its capital and human resources. In

this period, the number of students enrolled in the research and education constituents of the University increased significantly. For the purpose of further modernisation of the University, it is extremely important to continue the implementation of the commenced programmes and projects at the same pace. As the development of the University envisages its recognition in certain fields of research, new study programmes should be systematically developed and the existing ones adjusted to world trends and the requirements of regional economy. In this context, the founding of a Faculty of Computer Science could be considered one of the imperatives. Namely, unless appropriate steps forward are made in this field, in the coming years, the economy of Eastern Croatia will be faced with shortage in personnel with computer and information science education background, which could have a fairly detrimental effect on its development. To a region burdened with numerous problems, such backwardness would have long-term consequences in all segments of the society.

REFERENCES

Blanke, J.: The Lisbon Review 2006: Measuring Europe's Progress in Reform, World Economic Forum, Geneva, 2006.

Drucker, P.: Nova zbilja, prijevod, Novi Liber, Zagreb, 1992.

Dukić, D., Dukić, G., Sesar, M.: "Development of Information Society in the Republic of Croatia Aimed at Increased Competitiveness", The 3rd International Conference on Social and Organizational Informatics and Cybernetics (SOIC 2007) in the context of The International Multi-Conference on Society, Cybernetics and Informatics (IMSCI 2007), Orlando (USA), July 12-15, 2007., in Tremante, A., Malpica, F., Oropeza, A., Welsch, F., Carrasquero, J.V., Su, H.F. (eds.): Proceedings, Volume II, International Institute of Informatics and Systemics, Orlando, 2007., pp. 264-269.

Haralambos, M., Heald, R.: Uvod u sociologiju, prijevod, Globus, Zagreb, 1989.

Kralik, G. (red.): Tri stoljeća visokog školstva u Osijeku, Drugo dopunjeno izdanje, Sveučilište Josipa Jurja Strossmayera u Osijeku, Osijek, 2003.

Mansell, R., Steinmueller, W.E.: Mobilizing the Information Society Strategies for Growth and Opportunity, Oxford University Press, New York, 2000.

Primorac, D., Milanović Litre, I., Puljiz, I., Jurela-Jarak, I. (red.): Pregled postignuća 2004.-2007., Drugo, dopunjeno izdanje, Ministarstvo znanosti, obrazovanja i športa Republike Hrvatske, Zagreb, 2007.

"Studija razvoja informacijskog društva u Hrvatskoj u 2005. godini", Središnji državni ured za *e*-Hrvatsku, IDC Adriatics, 10/2006.

Šošić, I.: Primijenjena statistika, Školska knjiga, Zagreb, 2004.

Wilhelm, A.G.: Digital Nation - Toward an Inclusive Information Society, The MIT Press, Cambridge, 2004.