



Individual Advanced Research Opportunities Program

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Libraries in the Information Economy of Croatia

1. Introduction

Topic of research

In the proposal submitted for this research project (presented in Appendix 1), the specified topic and objective was to identify and, to the extent possible, measure the role of "Libraries in the Information Economy of Croatia". The methodology for the research was based, as proposed, first upon allocation of industries to identified sectors of the economy and to segments within them, second, on the use of an input-output matrix to represent the structure of the economy and the use of information segments within it by the various sectors of the economy, third, upon measurement of the labor and capital involved in libraries in each component of that structure, and, fourth, on the resulting relationship between libraries and the use of information by the various sectors. In measuring the role of libraries, specific attention was to be given to the relative use of publications and Internet resources, each as accessed through libraries.

Relevance and contribution to field.

This clearly is very relevant to library and information science (the field in which the project was proposed), since it represents a primary concern of the field, namely the need for librarians to

staff the operations of libraries in the several sectors of a national economy. Beyond that direct and immediate contribution, the results could add some of the tools of economics to the study of library and information science.

Summary of Approach

The methods used were (1) interviews to acquire qualitative data, (2) acquisition of quantitative data, (3) application of four models for analysis of quantitative data, (4) presentation of progress reports to interested groups. They were carried out as follows:

Interviews

Key persons (a total of 74) in Croatia were interviewed (a total of 125 meetings) for the purpose of obtaining and assessing qualitative data about the situation in Croatia with respect to its information economy, obtaining their views about the roles of libraries in Croatia and in their institutions, identifying sources of relevant quantitative data, and, as possible, obtaining those data. Appendix 2 provides a chronological listing of these interviews as well as other related activities.

Quantitative Data Acquisition

Relevant data were obtained concerning libraries in Croatia. Specifically, data were obtained about each type of library (national, university, faculty, research, special, public, and school) for each of the variables needed for assessment of their economic role: staffing, collections, acquisitions, users and their number of uses, expenditures. There were two primary sources for these data: (1) the National and University Library and (2) the Bureau of Statistics, of which the latter was more complete. In addition, data were obtained from many, though not all, of the individual libraries visited. (specifically, from the University of Zadar library, the public library and the Research Library of the City of Zadar, the library of INA, the library of the Croatian National Bank, the library of the Faculty of Medicine of the University of Zagreb, the library of the Boscović Institute, the Croatian National and University Library).

Relevant data were obtained concerning the relative expenditures for each type of library materials. These included data on expenditures for electronic materials, obtained from CARNet and confirmed with the Ministry of Science, Education, and Sports.

Relevant data were obtained about the economy of Croatia and the expenditures by industries for information, as represented by purchases of publications. The data include both a surrogate and an experimental Input-Output Matrix for the Croatian national economy, covering the period of about 1997. They include data about the distribution of the Croatian workforce by industry group and by category of occupation. These data were obtained primarily from the Bureau of Statistics, supplemented by data (for the surrogate Input-Output Matrix) from the Croatian National Bank.

Models for Data Analysis

Those data are being analyzed by applying four models to them:

- (1) a cost accounting model, called the Library Planning Model, provides means for assessing the distribution of library staffing among capital investment functions (in acquiring, cataloging, storing, and preserving materials) and product and service delivery functions (in producing products from the library's collections and in providing user or reader services from them),

- (2) the Input-Output Matrix model, a classical macro-economy model for describing the structure of national economies,
- (3) an Industry-Function structure model, a speculative model for distributing the national workforce by function within each industry,
- (4) the Cobb-Douglas production model, a classical model that provides means for assessing the relative role of capital and labor in the production of goods and services.

The results from the analysis of data from Croatia are then being compared to those from applying the same models to data from the United States.

Application of these models was made during the time in Croatia primarily as a means for assessing the value, accuracy, and reliability of the data obtained in Croatia and for testing the validity of their use for analysis. As a result, there are some preliminary results, which will be presented next. But it must be said that the analytical work in applications of these models will take many months and is therefore by no means complete. Nor are the preliminary "results" to be regarded as anything more than experimental tests and illustrations of the process of analysis to be used with these models.

Presentations

The use of presentations as part of the methodology was not originally planned but was a natural outgrowth of the meetings and interviews, which led to invitations to speak to various groups of Croatians and others. There were several values derived from the resulting presentations. First, and most important, they provided contexts for feedback from persons attending the presentations and many of the comments were of immediate value in identifying further sources of information. Second, the preparation of materials for each presentation served as a means for organizing the results obtained from the other methodologies; in this respect each presentation was effectively a progress report on the project to that date.

The following lists the presentations made, in chronological order, and identifies specific values derived from some of them.

- 1) Thursday, 13 October 2006. CroInfo 2006 Conference. The first presentation was to this conference of "information managers" (or, as they were called during the conference "knowledge managers") from Croatian companies and agencies. They indeed represent one of the primary groups with which this project is concerned. The values from this presentation were immediate, since it led directly to a number of subsequent interviews.
- 2) Monday, 6 November. Lecture to class at the Faculty of Philosophy, University of Zagreb. This presentation was to a group of students. I hope it had value for them, but it and other lectures to classes (as will be listed later) had great value for me in gaining a picture of the nature of the educational process in Croatia.
- 3) Tuesday, 7 November. Lecture to class at the Faculty of Philosophy, University of Zagreb.
- 4) Thursday, 9 November. Lecture to students and faculty at the Faculty of Organization and Informatics in Varaždin, University of Zagreb. This lecture led directly to discussions about collaboration on this project between me, faculty at Varaždin, and potentially faculty at the University of Graz in Austria.
- 5) Wednesday, 15 November. Lectures to two classes of students in the Department of Information Science, University of Zadar.
- 6) Monday, 20 November. Lecture to class at the Faculty of Philosophy, University of Zagreb.

- 7) Monday, 20 November. Presentation and extensive discussion of the project with Croatian librarians and information professionals.
- 8) Tuesday, 21 November. Presentation to faculty at the University of Graz, Institute for Information Science and Department of Economics. This lecture led directly to discussions about collaboration on this project between me, faculty at Varaždin, and faculty at the University of Graz in Austria. The decision was made to proceed ahead with preparation of proposals by the faculty of the University of Graz for such collaboration.
- 9) Friday, 24 November. Presentation and extensive discussion of the project with another group of Croatian librarians and information professionals.
- 10) Friday, 1 December. The Lazerow Lecture at Simmons College in Boston provided a means for summarizing the entire three month effort in Croatia. As such, preparation of it formed much of the basis for this Final Report.

2. Project Results

Research Sites Visited

In carrying out this methodology, the following sites were visited and individuals at them were interviewed. Appendix 2 contains a listing of the appointments, the individual(s) involved, and the objective(s) for each, in chronological order.

Universities and Faculties

University of Zagreb
 Faculty of Philosophy
 Faculty of Economics and Management
 Faculty of Organization and Informatics (in Varaždin)
 Faculty of Medicine
 University of Zadar
 Faculty of Philosophy
 University of Osijek
 Faculty of Philosophy (in May 2006)
 University of Graz (in Austria)

Libraries

Bosković Institute Library
 City of Zadar Public Library (in May 2006)
 City of Zadar Research Library (in May 2006)
 Croatian Central State Administrative Office Library
 Croatian National and University Library
 Croatian National Archives
 Croatian National Bank Library
 Croatian RadioTelevision (HRT) Archives and Library
 Economics Institute Library
 Faculty of Medicine Library, University of Zagreb
 Faculty of Organization and Informatics Library, University of Zagreb
 Faculty of Philosophy Library, University of Zagreb
 INA Library
 Medveschak Public Library, City of Zagreb (in May 2006)
 Pliva Information Resources Center
 Public and University Library of Osijek (in May 2006)
 University of Zadar Library

Ministries and Agencies

Bureau of Statistics
Croatian Academic and Research Network (CARNet)
Croatian State Intellectual Property Office
Ministry of Culture
Ministry of Finance
Ministry of Science, Education, and Sports

Companies and Industries

Croatian National Bank (still a nationally owned banking institution)
Croatian Radio and Television (the dominant company in these media)
HINE (Croatian National New Agency)
INA (the dominant energy, oil and gas, supplier)
MegaTrend (a distributor of computer related hardware, software, and applications)
Pliva (the historically dominant pharmaceutical company)
Vjesnik (Newspaper Archive Database Services)

Results from Interviews

The results from the interviews were of exceptional value in clarifying the role of libraries in Croatia and the economic basis for their operations. I will summarize the results in terms of the relevant major categories: (1) academic and research, (2) public, (3) special (including internal information management systems), (4) school. Before doing so, though, it is important to discuss the societal context for libraries in Croatia.

The Societal Context for Libraries

It is important to recognize that Croatia is a society in transition, in several respects. First, from late 1991 through 1995 it experienced a severe and devastating war,. In fact, Vukovar and Eastern Slavonia were not peacefully returned to Croatia until 1998, under auspices of the United Nations. The recovery from that war, both economically and socially, is still a continuing process. For example, a law was passed granting children of the veterans of that war automatic admission, starting in 2005, to institutions of higher education, and that has significant effects, both socially and economically.

Second, since declaring its independence in 1990, Croatia has been steadily changing its economy from being predominately nationally owned and operated to being predominately privately owned and operated. That process continues today, with about 25% to 33% of activity continuing to be nationally owned and operated but still steadily being privatized. In some cases, the transition involves continuing national ownership, but without national funding; in other cases, it involves transfer to private ownership but with continuing national funding. So the process of privatization is, to say the least, very complicated. This can be illustrated with the distribution of expenditures for research and development (for which libraries, at least potentially, have a significant economic role), of which 52% of the total is by private industry, 27% by government, and 21% by higher education.

Third, Croatia has applied for admission to the European Union and is in the midst of a long-term process involved in fitting its legal, social and economic structure into the requirements for admission. This involves changes in laws as well as in economic structures. A specific example, of special significance to this study, are the steps taken to bring the Croatian higher education system into conformance with the requirements of the European Union. This is specifically

represented by the Bologna Accord¹, a sweeping educational reform planned for full implementation by 2010, and it is having direct and immediate impact on Croatian higher education. A similar effort is underway to bring the intellectual property right laws of Croatia into closer agreement with those of the European Union.

The Ministry of Science, Education, and Sports and The Ministry of Culture

The separation of what, on the surface, should be mutually supportive activities (i.e., science and education, on the one hand, and culture, on the other) into two separate ministries has special importance for the assessment of libraries. In a very real sense, libraries and especially academic libraries are not adequately recognized by either of the two ministries. Public libraries are the ostensible responsibility of the Ministry of Culture and school and academic libraries, the responsibility of the Ministry of Science, Education, and Sports. The National and University Library, which is a major research library heavily used by students of the University of Zagreb, is the responsibility of the Ministry of Science, Education, and Sports but it plays a crucial role in cultural areas. Unfortunately, the key administrative staff at the National and University Library face severe problems in the workloads for their responsibilities and the complications of working with the two ministries.

Academic and Research Institutions in Croatia

There is a range of academic and research institutions in Croatia, each of which to varying degrees includes a library. The organization of universities in Croatia and of libraries within them is dramatically different from that in the United States. In Croatia, individual Faculties have substantial autonomy and really function as virtually independent institutions.. Each Faculty and usually each Department within a Faculty maintains its own library. In fact, it was only within the past year that the Faculty of Philosophy of the University of Zagreb (to become the Faculty of Humanities and Social Sciences) finally managed to agree to merge its some 22 departmental libraries into a Faculty library (for which a new building is now under construction). Even in the two Croatian universities (Osijek and Zadar) with central libraries, they are relatively small, and that of the University of Osijek really is the public library of the City of Osijek, not a university library.

In fact, the University and Public Library of Osijek is significant as an example of one of the complicating factors. There are six “depository libraries” in Croatia, that is libraries at which Croatian publishers are required to deposit copies of their publications as part of copyright. Those six include the National and University Library (two copies), the University of Zagreb, the Research Library of the City of Zadar, the Public and University Library of Osijek, the University of Split.

It is possible that the Bologna Accord will lead to increased authority for the central universities. Especially important is the fact that the Bologna Accord emphasizes new approaches to teaching and learning, with more self-learning by students, in which access to good libraries will be an essential component. However, it must be recognized that there is great inertia in academe, and the pace of change is likely to be slow.

¹ In May 1999, European ministers of education issued a declaration on the ‘European Higher Education Area’, which has come to be known as the ‘Bologna process’. This seeks to harmonize higher education systems among EU countries, provide greater compatibility and comparability of the national systems, and promote mobility and employability of EU citizens. In 2003, the Conference of Ministers responsible for Higher Education called for efforts to secure closer links between higher education and research institutes.

The Societal Role of Libraries

Academic and Research Libraries and National Archives

Academic and research libraries in Croatia are essentially fragmented, without clear central administration. In principle, the National and University Library could and perhaps should provide that central leadership, but except in the area of implementation (currently underway) of a national automated system for Croatian academic and research libraries, it does not.

There are currently seven universities in Croatia (Zagreb, Split, Osijek, Rijeka, Zadar, Pula, and Dubrovnik). Two of them have designated "university" libraries, Osijek and Zadar, but that at Osijek is really the public library of the city of Osijek which has been assigned to the university because of its role as one of the depository libraries but continues to function as the city library. The other five, though, do not have a designated research library but instead have varying numbers of faculty and departmental libraries that function under the management of the respective faculty or department.

The National and University Library and the university, faculty, and departmental libraries in the seven universities are funded by the Ministry of Science Education, and Sports and by the academic programs (i.e., the faculties and departments).

In addition to the academic and research libraries, as such, there are also the archives of Croatia, which are regarded as of special cultural importance. They are funded by the Ministry of Culture. They include the Croatian National Archives and a number of regional archives. There are also archives maintained of newspapers, radio, and television in Croatia. The latter, though, could also be regarded as special libraries, and they provide more than merely archival services.

Public Libraries

Public libraries in Croatia are primarily funded by the local communities, cities and counties, within which they fall. There is some financial support from the Ministry of Culture. The automated systems for public libraries are not coordinated with that being implemented for the academic and research libraries, but instead are a number of separate automated systems, with essentially no communication among them and certainly no national union catalog.

Industrial Libraries, Archives, and Information Centers

Special libraries (i.e., libraries in industry) have almost disappeared from Croatia. This is of special significance to this project, since the functions performed by special libraries (within companies and agencies) are its focus of concern. Therefore, the magnitude of staff time involved in those functions, whether performed by trained library staff, by other staff, or by the knowledge workers that depend on those functions, is of great importance.

Even internal management information systems in industry appear to have been eliminated as the result of efforts to achieve short term profitability. The result, though, is the loss of long term management, product development, and exploitation of markets.

There are the information industry archives, to which I referred above, and they have a significant role to play in the operations of those industries.

School Libraries

I interviewed staff of the Ministry of Science, Education, and Sports concerned with school libraries, which is the source for funding of all educational programs. However, there is little that I can say about school libraries beyond that.

Results from Quantitative Data Acquisitions

Data were acquired about the libraries of Croatia and about the economy of Croatia. The most important thing to note is that, of necessity, the data acquired related to different time periods and, unfortunately, are difficult to bring into proper correlation.

Library and Archive Data

In particular, the data for libraries have only recently been acquired on a national basis. Those obtained from the National and University Library (the first library data obtained) are very limited and relate only to 2005. Those obtained from the Bureau of Statistics are complete but relate only to 2004, the most recent year they are reporting. Those acquired from CARNet (concerning subscriptions for electronic journals, acquired on a national basis, and for print journals, acquired by individual libraries) are for 2006, but electronic journals have been acquired in this way only over the past two to three years, so the data from 2004, 2005, and 2006 are probably not on the same basis of reporting in this respect. Perhaps the differences for library data during a two to three year period can be resolved, and every effort will be made to make them consistent.

The data from the Bureau of Statistics cover all types of libraries, including special libraries, and the data elements are virtually equivalent to the ARL data in the U.S.

E-Journal Data

CARNet is the agency within the Ministry of Science, Education, and Sports responsible for negotiating subscriptions to electronic journals and for management of the use of them by the academic and research community. From CARNet I obtained data about the distribution of use of e-journals. It is of exceptional value in itself in showing the effect of this means of distribution. The problem is that there are very few comparable data as readily available for the United States.

Economic Data

The economic data are far more difficult to bring into consistency. Of course, the data reported in the Croatian Statistical Yearbook for any given year must be assumed to be correct, as the officially reported data. The problems arise in relating those data to the Input-Output Matrix.

The last official Croatian Input-Output Matrix apparently was produced in 1987. It is essentially valueless given the changes that have occurred in every aspect of Croatian society and economy. The surrogate Input-Output Matrix developed for the Croatian National Bank and experimental one developed at the Bureau of Statistics each relate to 1997. The two are quite similar and consistent with each other. Either of them will serve very well as the means for applying the Input-Output Matrix model.

The problem, of course, is that 1997 is not 2006! So the two sets of economic data relate to two quite different points in time. The task therefore is to provide means for relating the two sets of economic data sufficiently to serve the needs of the project. And that will require an extensive testing of the models and of the data. However, the official U.S. Input-Output Matrix is for 1996, so the comparison between Croatia in 1997 and the U.S. in 1996 may be acceptable.

Results from Data Analysis

At this time, the research findings are quite limited because the primary focus of the three months spent in Croatia was on acquisition of the relevant data and on the discussions with the several persons interviewed. Of course, as the data were acquired, they were tested with the four models used in the methodology in order to evaluate their reliability and utility. I can therefore present some preliminary results reflecting those applications to the quantitative data. Please recognize, though, that these do not really represent “results” but instead are illustration of process.

Librarians as Percentages of Populations Served

First, let’s look at the employment of library staff in relationship to populations served.

United States: Librarians as Percent of Populations Served

	Population Served	Libraries	Library Expend	Library Staff	Staff/ Population
Total	300 million people			170,000 staff	0.06%
Public	50 million people	9,000	\$8,026 million	136,246 staff	0.27%
School	52 million students	78,000		97,000 staff	0.20%
Higher Ed		4,216			
University	165,000 teachers	113		34,691 staff	21.02%
Special	20 million Knowledge workers	11,000		20,000 staff	0.10%

Croatia: Librarians as Percent of Populations Served

	Population Served	Libraries	Library Expend	Library Staff	Staff/ Population
Total	4,500,000 people	1,671	244 million Kuna	1,671 staff	0.03%
Public	550,000 people	256	115 million Kuna	1,377 staff	0.25%
School	536,000 students	1,091	100 million Kuna	1,274 staff	0.24%
Higher Ed	150,000 students	138	105 million Kuna	760 staff	0.51%
University	13,000 teachers	133	94 million Kuna	659 staff	5.06%
Special	294,000 Knowledge workers	186	23 million Kuna	289 staff	0.10%

Notes:

- (1) These figures are all, except for “Knowledge workers”, taken from “Knjižnic e u 2004”
- (2) Knowledge workers is derived from the Industry-Function Structure Model

Libraries Expenditures within the Economy

Now, let’s look at the expenditures for libraries in relationship to contextual expenditures.

United States: Library Expenditures as Percentages of Contextual Expenditures

	Contextual Expend	Libraries	Library Expend	Library Staff	LbyExp/ Context Expend
Total				170,000 staff	
Public	\$2,000 billion	8,983	\$8,026 Million	136,246 staff	0.40%
School					

Higher Ed	\$174 billion	4,216	\$4 billion		2.30%
University	\$75 billion	113	\$2.5 billion	34,691 staff	3.33%
Special		11,000		20,000 staff	

Croatia: Library Expenditures as Percentages of Contextual Expenditures

CONTEXT	Contextual Expend	Libraries	Library Expend	Library Staff	LbyExp/Context Expend
Total	245 billion Kuna (GDP)	1,671	244 Million Kuna	1,671 staff	0.10%
Public	14 billion Kuna (Local Government Expend)	256	115 Million Kuna	1,377 staff	0.80%
School					
Higher Ed	1 billion Kuna	138	105 Million Kuna	760 staff	1.01%
University		133	94 Million Kuna	659 staff	
Special		186	23 Million Kuna	289 staff	

Notes: The GDP is taken from Statistical Yearbook, 2005.

Local government expenditures is taken at 17% of total government expenditures.

Application of LPM to Academic and Research Libraries

I now turn to the application of the several models to the available data. In each case, I will first present the application to data from the United States and then, second, to data from Croatia. I will start with LPM (the Library Planning Model). At this stage in applying LPM, all values, except for the workload values (i.e., Total Populations served and materials acquired), are the default values. Changes from the default values will be considered in subsequent analyses.

United States: Academic and Research Libraries

The following are the data for ARL libraries in 2004.

VOLSADG	9,848,884	GRPPRES	107,798	PRFSTF	10,503
CURRSER	3,808,845	PRESPTCP	1,661,958	NPRFSTF	17,103
ILLTOT	4,423,582	REFTRANS	13,395,749	STUDAST	7,427
ILBTOT	2,988,730	INITCIRC	41,873,133	TOTSTF	27,606
		TOTCIRC	77,529,359	TOTSTFX	35,033
TOTSTU	2,528,613				
GRADSTU	547,886	SALPRF	562,726,581	EXPLM	984,519,056
PHDAWD	30,135	SALNPRF	496,470,435	EXPBND	24,041,238
PHDFLD	6,512	SALSTUD	99,779,796	OPEXP	314,136,595
FAC	166,378	TOTSAL	1,158,976,814	TOTEXP	2,481,460,950

Notes: These data are all taken as the totals over all 113 university members of the ARL for the year 2002-2003. They therefore include the Canadian institution. As a result, these values should be recalculated for just the U.S. universities. The following two tables show the entry of data into LPM for the populations served and the materials acquired.

USAGE BY POPULATION TYPES	TOTAL POPULATION	USER %	USES/ USER	TOTAL USES
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Funded by the US Department of State's Title VIII Program and the IREX Scholar Support Fund

Staff	100000	25%	50	1250000
Faculty	166378	100%	90	14974020
Graduate Students	547886	100%	60	32873160
Under-Graduate Students	1980728	100%	45	89132760
Institutions (ILL Lending)	4423582	100%	1	4423582
Researchers		100%	25	
Informed Public		100%	25	
General Public		1%	9	
Total Uses				142653522

ADDITION TO MATERIALS	UNITS OF MEASURE	ANNUAL ADDITIONS
Monographs	Volumes	9848885
Monographic Series	Volumes	
Periodicals	Vols/Titles	3808845

The following show the results from the LPM for the distribution of staff and the estimated workloads for services.

ESTIMATED FTE, DIRECT & INDIRECT, BY FUNCTION

FUNCTION	DIRECT			Total	Allocated	
	Intellectual	Procedural	Physical	Direct	Indirect	Total
Circulation		972.47	2291.47	3263.95	620.15	3884.10
Reference	2896.47	1448.53	162.01	4507.00	856.33	5363.33
Acquisition	3582.60	3113.66	648.85	7345.11	1395.57	8740.68
Cataloging	1042.42	2427.02		3469.45	659.19	4128.64
Conservation	0.16	378.02	226.72	604.90	114.93	719.83
TOTAL DIRECT	7521.65	8339.71	3329.04	19190.40	3646.18	22836.57
	INDIRECT			Indirect		
Supervision	1169.15	749.89		1919.04		
Clerical Support		959.52		959.52		
Training, Unallocated, etc.	300.87	333.59	133.16	767.62		
TOTAL INDIRECT	1470.02	2043.00	133.16	3646.18		
General & Administrative	2283.66	1141.83		3425.49		3425.49
TOTAL	11275.32	11524.53	3462.21	26262.06		26262.06

The value of 26,262 is to be compared to 35,033 in the ARL data table. For later purposes, I calculate the Reader Services staff (with allocated G&A) per 1000 faculty and the Technical Services staff (with allocated G&A) per \$1 million expenditures for materials:

- (1) Reader Services staff/1000 faculty = 10,634/166.378 = 64/1000 faculty
- (2) Technical Services staff/\$1 million = 15,628/984.5 = 16/\$1 million

SERVICES ESTIMATED ACTUAL

Funded by the US Department of State's Title VIII Program and the IREX Scholar Support Fund

	WORKLOAD	WORKLOAD
Circulation Use	32,675,102	41,873,133
In-House Use	62,308,921	
Reserve Use	6,239,293	
Photocopy Use	2,228,015	
Multi-Media Use	1,517,581	
Reference, General	11,335,079	13,395,749
Reference Extended	1,382,299	
Database Access	154,454	
Access Elsewhere (ILL-B)	1,633,030	2,988,731
Analyze, Consult, Instruct	276,460	107,799

Croatian: Academic and Research Libraries

The following are data for Croatian academic and research libraries:

	Total	National	University	Faculty	Institute
LIBRARIES	138	1	2	131	4
ACQUISITIONS					
Books	154,480	22,114	26,717	77,909	27,740
Journals	73,620	15,786	11,880	33,558	12,396
HOLDINGS (in 1000)					
Books	6,728	2,069	879	2,539	1,241
Journals	1,568	289	18	969	292
BORROWERS					
Registered Borrowers	207,395	15,616	10,786	172,415	8,578
Circulation	1,202,618	320,000	320,292	499,215	63,111
Uses of Materials	2,181,967	282,170	285,876	1,291,624	322,297
ILL					
National Requests	13,281	1,276	297	11,196	512
Int'l Lend Requests	671	272	11	375	13
Int'l Borrow Requests	7,010	2,838	489	3,487	196
FINANCIAL (1000 kuna)					
Total	106,207	55,363	10,486	28,703	11,655
Employee	60,229	25,774	9,290	16,004	9,161
Materials	29,511	5,192	10,388	11,692	2,239
Other	25,817	24,397	158	1,007	255
EMPLOYEES					
Total	760	306	76	277	101
Professional	552	193	53	239	67
Other	208	113	23	38	34
ACQUISITION MEANS					
Total (Books)	154,480	22,114	26,717	77,909	27,740
Purchase (Books)	65,543	4,171	13,114	46,416	1,842
Deposit (Books)	45,944	13,465	9,667	1,017	21,795
Exchange (Books)	3,428	601	1,431	1,355	41

Donate (Books)	33,742	3,877	2,505	23,299	4,061
Other (Books)	5,822			5,822	

Notes: This is the portion of the source data (from “Knjižnice u 2004”) that relate to academic and research libraries. The situation here is quite complex, but the Total Column is the total for all types of academic and research libraries, and those are the data entered into LPM.

USAGE BY POPULATION TYPES	TOTAL POPULATION	USER %	USES/ USER	TOTAL USES
Staff	10000	25%	50	125000
Faculty	13251	100%	90	1192590
Graduate Students	30000	100%	60	1800000
Under-Graduate Students	120304	100%	45	5413680
Institutions (ILL Lending)	14000	100%	1	14000
Researchers	44000	100%	25	1100000
Informed Public		100%	25	
General Public		1%	9	
Total Uses				9645270

Notes: The values for Faculty, and Students are taken from the data from the National and University Library which were purported to represent the university data. The value for Graduate Students is an arbitrary estimate at about 20%, and the value for Undergraduate Students is simply the remainder. The value for Staff is an arbitrary estimate.

ESTIMATED FTE, DIRECT & INDIRECT, BY FUNCTION

FUNCTION	DIRECT			Total	Allocated	
	Intellectual	Procedural	Physical	Direct	Indirect	Total
Circulation		56.61	159.87	216.48	41.13	257.61
Reference	67.89	67.89	11.00	146.78	27.89	174.67
Acquisition	10.22	50.21	11.83	72.26	13.73	85.99
Cataloging		42.14		42.14	8.01	50.15
Conservation	0.41	7.71	4.38	12.51	2.38	14.88
TOTAL DIRECT	78.52	224.57	187.09	490.17	93.13	583.31
	INDIRECT			Indirect		
Supervision	19.08	29.94		49.02		
Clerical Support		24.51		24.51		
Training,						
Unallocated, etc.	3.14	8.98	7.48	19.61		
TOTAL INDIRECT	22.22	63.43	7.48	93.13		
General & Administrative	58.33	29.17		87.50		87.50
TOTAL	159.07	317.16	194.57	670.80		670.80

The total of 671 FTE is to be compared with the value of 760 in the table above. (It should be noted here that the National and University Library has responsibilities beyond those of library operations. It should also be noted that the fragmentation of the faculty and departmental libraries is inherently inefficient.)

For later purposes, I calculate the Reader Services staff (with allocated G&A) per 1000 faculty and the Technical Services staff (with allocated G&A) per \$1 million expenditures for materials:

- (1) Reader Services staff/1000 faculty = 496.71/13.251 = 37/1000 faculty
- (2) Technical Services staff/\$1 million = 174.09/\$5 million = 35/\$1 million

(The exchange rate is taken at 6 Kuna per dollar.)

SERVICES	ESTIMATED WORKLOAD	ACTUAL WORKLOAD
Circulation Use	1,901,994	1,202,618
In-House Use	4,975,300	2,181,967
Reserve Use	378,958	
Photocopy Use	8,318	
Multi-Media Use	91,523	
Reference, General Reference	462,564	
Extended Database Access		
AccessElsewhere (ILL)	110,880	13,952
Analyze, Consult, Instruct		

Application of LPM to Public Libraries

United States: Public Libraries

The following are the data for all public libraries (a total of 8963 central libraries plus branches and bookmobiles). The data are from IPEDS for 2003.

Total unduplicated population of service area	277,362,714
Total paid FTE employees	136,246
Salaries and wages for all library staff	\$4,187,965,626
Total staff expenditures	\$5,190,496,612
Total expenditures on library collection	\$1,158,752,241
Total operating expenditures	\$8,026,123,394
Current print serial subscriptions	1,946,151
Total annual library visits	1,244,373,005
Total annual reference transactions	301,758,384
Total annual circulation transactions	1,897,893,491
Total annual loans provided to other libraries	23,251,176

For entry of these data into LPM, I will make the following assumptions:

- (1) The using population is 40% of the total population.
- (2) The average cost of a serial is \$200, so the cost of serials is \$400 million.
- (3) The average cost of a book is \$50, so the number of books is 15 million.
- (4) The workload factors for circulation and in-house use of materials will be taken as 1 minute per transaction for clerical and manual (the rationale is that the charge-out process in public libraries is simpler than in academic and the size of the collection and therefore the reshelving times are much less than in academic libraries).
- (5) The workload factors for regular reference will be taken as 5 minutes for both intellectual and clerical, since the questions tend to be simpler.

USAGE BY POPULATION TYPES	TOTAL POPULATION	USER %	USES/USER	TOTAL USES
General Public	277,362,714	40%	11	1220395942

Total Uses 1220395942

ADDITION TO MATERIALS	UNITS OF MEASURE	ANNUAL ADDITIONS
Monographs	Volumes	15000000
Periodicals	Vols/Titles	2000000

ESTIMATED FTE, DIRECT & INDIRECT, BY FUNCTION

FUNCTION	DIRECT			Total Direct	Allocated	
	Intellectual	Procedural	Physical		Indirect	Total
Circulation		18160.65	36321.31	54481.96	10351.57	64833.53
Reference	15133.88	15133.88		30267.76	5750.87	36018.63
Acquisition	992.06	4365.08	535.71	5892.86	1119.64	7012.50
Cataloging		4092.94		4092.94	777.66	4870.60
Conservation	0.16	198.57	119.05	317.78	60.38	378.16
TOTAL DIRECT	16126.10	41951.13	36976.07	95053.30	18060.13	113113.43
	INDIRECT			Indirect		
Supervision	3710.17	5795.16		9505.33		
Clerical Support		4752.66		4752.66		
Training, Unallocated, etc.	645.04	1678.05	1479.04	3802.13		
TOTAL INDIRECT	4355.21	12225.87	1479.04	18060.13		
General & Administrative	11311.34	5655.67		16967.01		16967.01
TOTAL	31792.65	59832.67	38455.11	130080.44		130080.44

For later purposes, I calculate the Reader Services staff (with allocated G&A) per 1000 population and the Technical Services staff (with allocated G&A) per \$1 million expenditures for materials:

- (1) Reader Services staff/1000 population = 115,000/277,000 = 0.42 per 1000 population
- (2) Technical Services staff/\$1 million = 15000/\$1159 = 13 per \$1 million

SERVICES	ESTIMATED WORKLOAD	ACTUAL WORKLOAD
Circulation Use	1,830,593,912	1,897,893,491
In-House Use	1,830,593,912	
Reserve Use		
Photocopy Use		
Multi-Media Use		
Reference, General Reference	305,098,985	301,758,384
Extended Database Access		

**AccessElsewhere
(ILL)
Analyze, Consult,
Instruct**

Croatian: Public Libraries

The following are data for all public libraries in Croatia:

1 LIBRARIES	256	4 REGISTERED BORROWERS	
2 ACQUISITIONS		Total	553,291
Books	482,483	Circulation	4,328,622
Newspapers	2,819	5 USE	
Journals	15,657	Total	12,223,841
3 HOLDINGS (in 1000)		Books	9,880,428
Books	6,824	Newspapers	1,898,923
Newspapers	23	Journals	444,228
Journals	124	6 ILL	
Manuscripts	1	National Requests	2,939
Microforms	23,661	Int'l Lend Requests	75
Audio	59,574	7 FINANCIAL (1000 kuna)	
Visual	8,055	Total	114,685
8 EMPLOYEES		Employee	76,934
Total	1,377	Materials	32,883

For entry of these data into LPM, I will make the following assumptions:

- (1) The workload factors in Croatia will be the same assumed for public libraries in the U.S.
- (2) Most else will be taken the same as was assumed for public libraries in the U.S.
- (3) However, assuming closed stack operation, I will take the workload factors for Procedural as 1 min for both circ and in-house and the physical time as 3 minutes.

USAGE BY POPULATION TYPES	TOTAL POPULATION	USER %	USES/ USER	TOTAL USES
Institutions (ILL Lending)	3,014	100%	1	3014
General Public	553,291	40%	11	2434480
Total Uses				2437494

ADDITION TO MATERIALS	UNITS OF MEASURE	ANNUAL ADDITIONS
Monographs	Volumes	482483
Periodicals	Vols/Titles	18476

ESTIMATED FTE, DIRECT & INDIRECT, BY FUNCTION

FUNCTION	DIRECT			Total	Allocated	
	Intellectual	Procedural	Physical	Direct	Indirect	Total
Circulation		144.92	434.79	579.71	110.15	689.86
Reference	31.06	31.06	0.36	62.49	11.87	74.36

*Funded by the US Department of State's Title VIII Program and
the IREX Scholar Support Fund*

Acquisition	31.91	135.86	11.77	179.54	34.11	213.65
Cataloging		132.31		132.31	25.14	157.45
Conservation	0.16	1.99	1.10	3.25	0.62	3.87
TOTAL DIRECT	63.13	446.15	448.02	957.30	181.89	1139.19
	INDIRECT			Indirect		
Supervision	28.62	67.11		95.73		
Clerical Support		47.87		47.87		
Training,						
Unallocated, etc.	2.53	17.85	17.92	38.29		
TOTAL INDIRECT	31.15	132.82	17.92	181.89		
General & Administrative	113.92	56.96		170.88		170.88
TOTAL	208.20	635.93	465.94	1310.07		1310.07

The 1310 is to be compared to 1,377.

For later purposes, I calculate the Reader Services staff (with allocated G&A) per 1000 population and the Technical Services staff (with allocated G&A) per \$1 million expenditures for materials:

(1) Reader Services staff/1000 population = 878.85/553 = 1.6 per 1000 population

(2) Technical Services staff/\$1 million = 431.22/\$5.5 = 78.4 per \$1 million

(The exchange rate is taken at 6 Kuna per dollar.)

SERVICES	ESTIMATED WORKLOAD	ACTUAL WORKLOAD
Circulation Use	3,653,228	4,328,622
In-House Use	3,651,721	
Reserve Use		
Photocopy Use	1,507	
Multi-Media Use		
Reference, General Reference	611,634	
Extended Database Access		
AccessElsewhere (ILL)	3,652	3,014
Analyze, Consult, Instruct		

Application of Industry-Function Structure by Sectors

The Industry-Function Structure shows the distribution of the work force by function within each industry. It is derived by assembling data about the distribution of the workforce by type of industry (the rows of the matrix), on the one hand, and by type of function (the columns of the matrix), on the other. The interior values are then calculated by applying a limited set of parameters to the row totals.

United States: Industry-Function Structure by Sectors

I will not here repeat the tables taken from *Statistical Abstract of the United States* from which the rows and columns of the following table were taken, and which represent the source data for application of the Industry-Function Structure Model.

Type of Industry	Non-Info Staff	Management Staff	Support Staff	Hardware Staff	Knowledge Staff	Total %	Total Absolute Thousands
Agriculture	1.32	0.20	0.27	0.05	0.13	1.64	1,636
Lo Info Use	34.22	5.49	9.10	1.82	4.24	54.87	54,871
Hi Info Use	3.74	2.06	3.41	3.41	7.96	20.58	20,584
Hardware	0.72	0.36	0.60	0.55	1.41	3.65	3,647
Transaction	1.16	0.59	0.88	0.97	2.27	5.86	5,857
Knowledge	2.17	0.99	1.65	1.65	3.48	9.95	9,946
Academic	0.68	0.31	0.51	0.51	1.08	3.09	3,094
Total	44.03	10.00	16.42	8.97	20.57	100.00	100,000

Croatian: Industry-Function Structure by Sectors

Industry	%	Assignment
Agriculture. hunting and forestry	16.50	1.0 Agriculture
Fishing	0.30	1.0 Agriculture
Mining and quarrying	0.80	1.0 Lo Info Use
Manufacturing	19.70	0.9 Lo Info Use 0.1 Info Tech
Electricity. gas and water supply	1.60	1.0 Lo Info Use
Construction	8.10	1.0 Lo Info Use
Wholesale and retail trade	13.90	1.0 Hi Info Use
Hotels and restaurants	5.40	1.0 Hi Info Use
Transport. storage and communication	6.40	0.7 Lo Info Use 0.3 Transaction
Financial intermediation	2.20	1.0 Transaction
Real estate. renting business activities	4.10	1.0 Transaction
Public administration and defence	6.40	0.75 Lo Info Use 0.25 Transaction
Education	5.30	1.0 Knowledge
Health and social work	5.60	1.0 Knowledge
Other service activities	3.30	1.0 Lo Info Use
Private households with employed	0.30	1.0 Lo Info Use
Total	100.00	

Notes: The third column shows assignments made for application of the Industry-Function Model. They are mostly guesses. At this stage, I must make such guesses (as shown in this display and in the next). However, the assignment of 0.10 for Info Tech in Manufacturing is based on the Input-Output Matrix. "Office Machines, Computers", "Communication Equipment", and "Medical and Precision Equipment" totaled 7,630 million kuna out of the gross total of 338,327 million kuna, or about 2% of the total. Thus, they are about 10% of manufacturing. Similarly, Post and Telecom services totaled 7,308 kuna, again about 2% of the national total. Thus they are about 30% of Transportation and Communication.

Work Category	%	Assignment
Legislators, senior officials, managers	4.70	1.0 Management
Professionals	9.20	0.7 Management
0.3 Information		
Technicians and		
associate professionals	14.00	1.0 Information
Clerks	11.10	1.0 Clerical
Service workers, and		
shop sales workers	13.80	0.7 Manual
0.3 Clerical		
Skilled Agriculture		
and Fishery Workers	14.90	0.7 Manual
0.2 Clerical		
0.1 Information		
Craft and related trades workers	13.20	0.7 Manual
0.3 Information		
Plant and machine		
operators and assemblers	10.70	1.0 Manual
Elementary occupations	7.70	1.0 Manual
Armed forces	0.70	1.0 Manual
Total	100.00	

Type of Industry	Non-Info Staff	Management Staff	Support Staff	Hardware Staff	Substantative Staff	Total	Total Absolute thousands
Agriculture	10.92	1.68	2.52	0.50	1.18	16.80	269
Non-Info Industries							
Low Info Use	27.55	4.24	6.36	1.27	2.97	42.39	678
High Info Use	4.83	1.93	2.90	2.90	6.76	19.30	309
Info Industries							
Hardware	0.49	0.20	0.30	0.30	0.69	1.97	32
Transactions	2.14	0.85	1.28	1.28	2.99	8.54	137
Distribution	2.08	0.83	1.25	1.25	2.91	8.30	133
Academic	0.65	0.26	0.39	0.39	0.91	2.60	42
Total	48.65	9.99	14.99	7.88	18.39	99.90	1,598

	Manual	Manage	Clerical	Information		Total
Model	48.65	9.99	14.99	7.88	18.39	99.90
Table 6-20	47.59	10.86	15.24		26.31	100.00

Application of Input-Output Matrix Grouped by Sectors

The application of the Input-Output Matrix will be limited to simply a gross analysis of the magnitude of the three segments of the Information Sector (of which libraries and archives are a part) and the use of it by the several sectors of the economy.

United States: I-O Matrix Grouped by Sectors

Industries in the U.S. Input-Output Table are assigned to categories as follows:

	SIC	Industry
A	01	Livestock and livestock products
A	02	Other agricultural products
A	03	Forestry and fishery products
A	04	Agricultural, forestry, and fishery services
A	14	Food and kindred products
A	15	Tobacco products
B	05+06	Metallic ores mining
B	07	Coal mining
B	08	Crude petroleum and natural gas
B	09+10	Nonmetallic minerals mining
B	11	New construction
B	12	Maintenance and repair construction
B	13	Ordinance and accessories
B	16	Broad and narrow fabrics, yarn and thread mills
B	17	Miscellaneous textile goods and floor coverings
B	18	Apparel
B	19	Miscellaneous fabricated textile products
B	20+21	Lumber and wood products
B	22+23	Furniture and fixtures
B	24	Paper and allied products, except containers
B	25	Paperboard containers and boxes
B	27A	Industrial and other chemicals
B	27B	Agricultural fertilizers and chemicals
B	28	Plastics and synthetic materials
B	29A	Drugs
B	29B	Cleaning and toilet preparations
B	30	Paints and allied products
B	31	Petroleum refining and related products
B	32	Rubber and miscellaneous plastics products
B	33+34	Footwear, leather, and leather products
B	35	Glass and glass products
B	36	Stone and clay products
B	37	Primary iron and steel manufacturing
B	38	Primary nonferrous metals manufacturing

B	39	Metal containers
B	40	Heating, plumbing, and fabricated structural metal products
B	41	Screw machine products and stampings
B	42	Other fabricated metal products
B	43	Engines and turbines
B	44+45	Farm, construction, and mining machinery
B	46	Materials handling machinery and equipment
B	47	Metalworking machinery and equipment
B	48	Special industry machinery and equipment
B	49	General industrial machinery and equipment
B	50	Miscellaneous machinery, except electrical
B	52	Service industry machinery
B	53	Electrical industrial equipment and apparatus
B	54	Household appliances
B	55	Electric lighting and wiring equipment
B	58	Miscellaneous electrical machinery and supplies
B	59A	Motor vehicles (passenger cars and trucks)
B	59B	Truck and bus bodies, trailers, and motor vehicles parts
B	60	Aircraft and parts
B	61	Other transportation equipment
B	64	Miscellaneous manufacturing
C	65A	Railroads and related services; passenger ground transportatio
C	65B	Motor freight transportation and warehousing
C	65C	Water transportation
C	65D	Air transportation
C	65E	Pipelines, freight forwarders, and related services
C	68A	Electric services (utilities)
C	68B	Gas production and distribution (utilities)
C	68C	Water and sanitary services
C	69A	Wholesale trade
C	69B	Retail trade
C	71A	Owner-occupied dwellings
C	72A	Hotels and lodging places
C	72B	Personal and repair services (except auto)
C	74	Eating and drinking places
C	75	Automotive repair and services
C	81	General government industry
C	82	Household industry
I1	51	Computer and office equipment
I1	56	Audio, video, and communication equipment
I1	57	Electronic components and accessories
I1	62	Scientific and controlling instruments
I1	63	Ophthalmic and photographic equipment
I2	66	Communications, except radio and TV
I2	70A	Finance
I2	70B	Insurance
I2	71B	Real estate and royalties
I2	73A	Computer and data processing services, including own-account s
I3	26A	Newspapers and periodicals

I3	26B	Other printing and publishing
I3	67	Radio and TV broadcasting
I3	73B	Legal, engineering, accounting, and related services
I3	73C	Other business and professional services, except medical
I3	73D	Advertising
I3	76	Amusements
I3	77A	Health services
I3	77B	Educational and social services, and membership organizations
I3	78	Federal Government enterprises
I3	79	State and local government enterprises

The resulting structure of the U.S. Input-Output Matrix is the following (the figures being in millions of dollars)

	A	B	C	I1	I2	I3	Total
A	294941	27247	80702	307	4581	13762	421540
B	82021	1369840	294226	56921	71065	168438	2042511
C	84019	438837	339005	48223	78603	143200	1131885
I1	74	38144	15089	123008	39410	22349	238073
I2	29828	96188	260878	14642	425576	202080	1029192
I3	32285	179054	260560	21467	191789	358319	1043472
Total	523167	2149309	1250459	264569	811023	908148	5906674

Croatian: I-O Matrix Grouped by Sectors

Industries in the Croatian Input-Output Table are assigned to categories as follows:

Code	Industry
A 1	Agriculture, hunting and related service activities
A 2	Forestry, logging and related service activities
A 5	Fishing, operation of fish hatcheries and fish farms; service activities incidental to fishing
B 10	Mining of coal and lignite; extraction of peat
B 11	Extraction of crude petroleum and natural gas; service activities incidental to oil and gas
B 12	Mining of uranium and thorium ores
B 13	Mining of metal ores
B 14	Other mining and quarrying
A 15	Manufacture of food products and beverages
A 16	Manufacture of tobacco products
B 17	Manufacture of textiles
B 18	Manufacture of wearing apparel; dressing and dyeing of fur Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear
B 19	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
B 20	Manufacture of paper and paper products
I3 22	Publishing, printing and reproduction of recorded media
B 23	Manufacture of coke, refined petroleum products and nuclear fuel
B 24	Manufacture of chemicals and chemical products
B 25	Manufacture of rubber and plastics products
B 26	Manufacture of other non-metallic mineral products

B	27	Manufacture of basic metals
B	28	Manufacture of fabricated metal products, except machinery and equipment
B	29	Manufacture of machinery and equipment n.e.c.
I1	30	Manufacture of office, accounting and computing machinery
B	31	Manufacture of electrical machinery and apparatus n.e.c.
I1	32	Manufacture of radio, television and communication equipment and apparatus
I1	33	Manufacture of medical, precision and optical instruments, watches and clocks
B	34	Manufacture of motor vehicles, trailers and semi-trailers
B	35	Manufacture of other transport equipment
B	36	Manufacture of furniture; manufacturing n.e.c.
B	37	Recycling
C	40	Electricity, gas, steam and hot water supply
C	41	Collection, purification and distribution of water
B	45	Construction
		Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive
C	50	fuel
C	51	Wholesale trade and commission trade, except of motor vehicles and motorcycles
		Retail trade, except of motor vehicles and motorcycles; repair of personal and household
C	52	goods
C	55	Hotels and restaurants
C	60	Land transport; transport via pipelines
C	61	Water transport
C	62	Air transport
C	63	Supporting and auxiliary transport activities; activities of travel agencies
I2	64	Post and telecommunications
I2	65	Financial intermediation, except insurance and pension funding
I2	66	Insurance and pension funding, except compulsory social security
I2	67	Activities auxiliary to financial intermediation
I2	70	Real estate activities
I2	71	Renting of machinery and equipment without operator and of personal and household g
I2	72	Computer and related activities
I3	73	Research and development
I3	74	Other business activities
I3	75	Public administration and defence; compulsory social security
I3	80	Education
I3	85	Health and social work
C	90	Sewage and refuse disposal, sanitation and similar activities
I3	91	Activities of membership organizations n.e.c.
I3	92	Recreational, cultural and sporting activities
I3	93	Other service activities
B	95	Private households with employed persons

The resulting structure of the U.S. Input-Output Matrix is the following (the figures being in millions of Kuna):

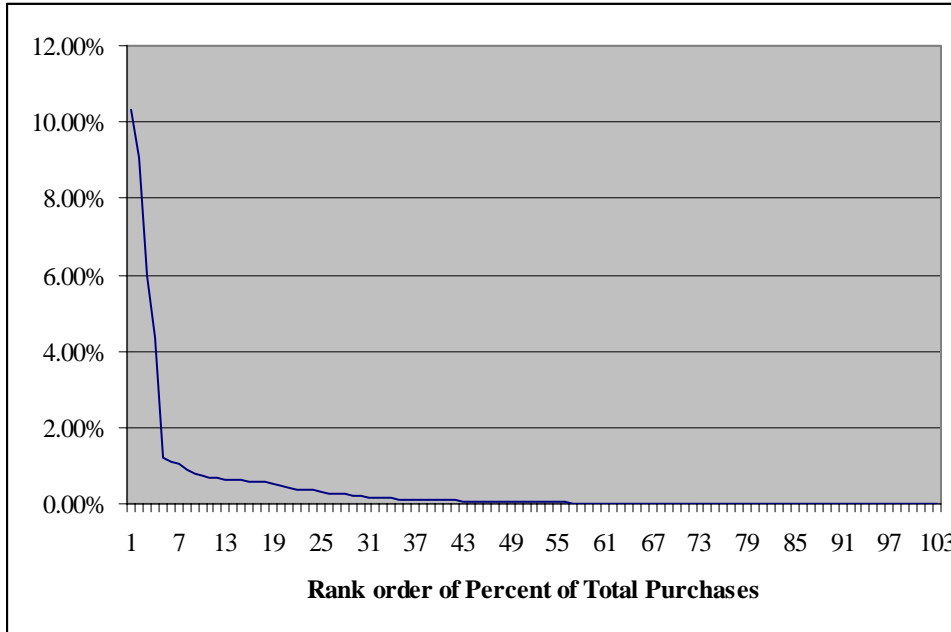
	A	B	C	I1	I2	I3	Total
A	16,362	975	4,315	0	8	41	21,701
B	2,214	33,416	9,757	939	469	1,725	48,520
C	3,945	12,332	15,252	33	641	3,282	35,484
I1	16	618	43	297	1	7	982
I2	93	500	442	1	10,939	136	12,110

13	497	863	3,236	6	78	20,702	25,381
Total	23,127	48,704	33,044	1,276	12,135	25,893	144,180

Application of Input-Output Matrix Distribution of Publishing

United States: Publishing Purchases by Industries

The following graphically shows the purchases from publishing (i.e., SIC codes 26A, Newspapers and periodicals and 26B, Other printing and publishing) in rank order of their percentages of total purchases:



As this graph shows, the purchases from publishing appear to fall into three or perhaps four main groups. The 5 to 7 at the far left are the heavy purchasers from publishing. Then there are the 20 or so in the next group, followed by another 20 or so in the third group, followed by the remaining 60 or so that have very low percentages of purchases of publishing. The first two groups are as follows:

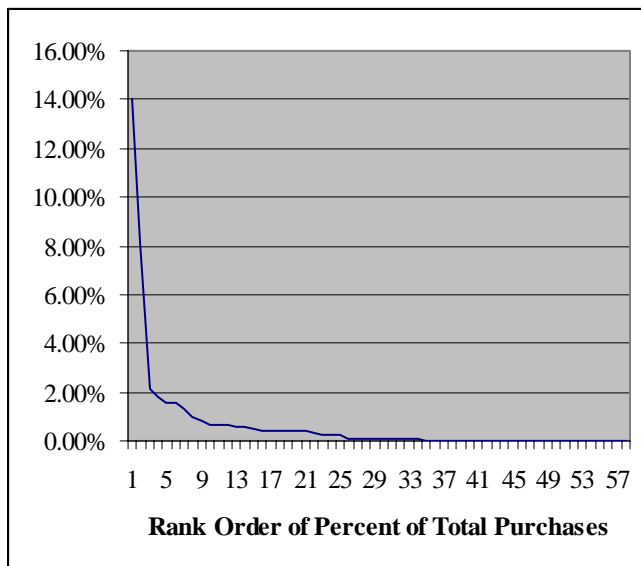
GROUP 1	Publishing	Total Purchases		
Other printing and publishing	13647	132108	10.33%	1
Newspapers and periodicals	5895	64842	9.09%	2
Advertising	2339	39066	5.99%	3
Educational and social services, and membership organizations	12785	292790	4.37%	4
Local Govt	8678	726525	1.19%	5
Wholesale trade	8303	769833	1.08%	6
Federal Government enterprises	837	78281	1.07%	7

GROUP 2	Publishing	Total Purchases		
Personal and repair services (except	1040	114884	0.90%	8

auto)				
Computer and data processing services, including own-accounts	2005	251768	0.80%	9
Legal, engineering, accounting, and related services	2369	317815	0.75%	10
Personal Consumption	35766	5237500	0.68%	11
Finance	4051	601756	0.67%	12
Drugs	498	78432	0.64%	13
Other business and professional services, except medical	2992	488209	0.61%	14
Fed Non-defense	869	142887	0.61%	15
Insurance	1785	303241	0.59%	16
Pipelines, freight forwarders, and related services	241	41653	0.58%	17
Tobacco products	219	39784	0.55%	18
Health services	3613	684829	0.53%	19
Exports	3918	814769	0.48%	20
Metal containers	58	13068	0.44%	21
Agricultural fertilizers and chemicals	87	22446	0.39%	22
Communications, except radio and TV	1132	291856	0.39%	23
Cleaning and toilet preparations	173	47447	0.36%	24
Railroads and related services; passenger ground transportatio	208	68695	0.30%	25
Hotels and lodging places	211	73214	0.29%	26
Eating and drinking places	914	336205	0.27%	27
Amusements	459	173480	0.26%	28

Croatia: Publishing Purchases by Industries

The picture for Croatia is virtually identical with that for the United States:



The evident groups are very similar to those for the United States:

GROUP 1	Publishing	Total Purchases		
Publishing, printing, reproduction of recorded media	501	3573	14.02%	1
Other business activities	753	9233	8.16%	2
Manufacture of furniture; manufacturing n.e.c.	46	2176	2.12%	3
Wholesale trade and commission trade, except of motor vehicles and motorcycles	269	14909	1.81%	4
Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods	153	9546	1.60%	5
Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel	39	2431	1.59%	6
Manufacture of wearing apparel; dressing and dyeing of fur	34	2551	1.33%	7

Application of Input-Output Matrix Distribution of Advertising

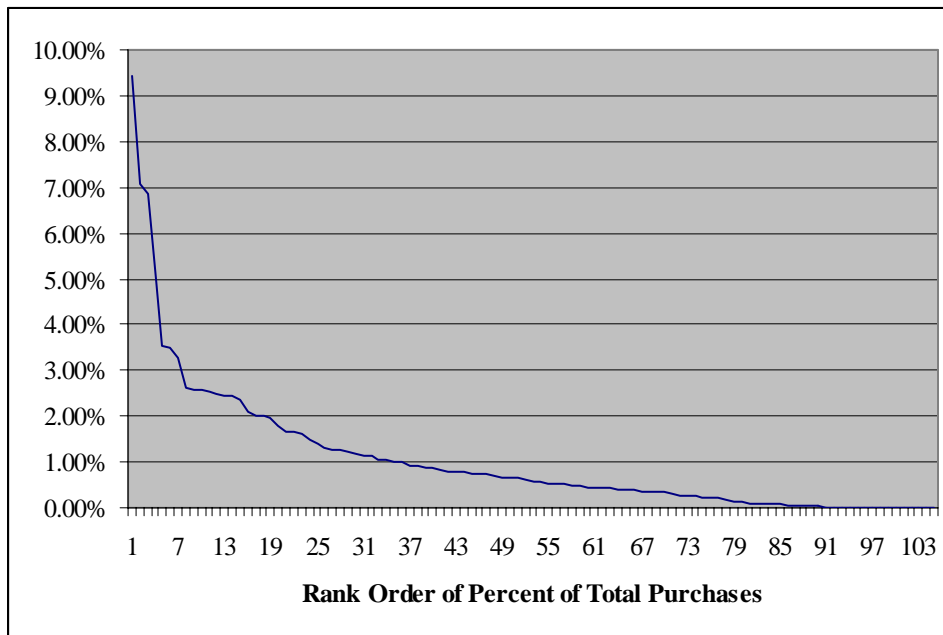
GROUP 2	Publishing	Total Purchases		
Air transport	7	690	0.97%	8
Manufacture of food products and beverages	126	15763	0.80%	9
Water transport	24	3748	0.63%	10
Land transport; transport via pipelines	45	7203	0.62%	11
Supporting and auxiliary transport activities; activities of travel agencies	19	3038	0.62%	12
Forestry, logging and related service activities	9	1438	0.61%	13
Hotels and restaurants	40	7427	0.54%	14
Sewage and refuse disposal, sanitation and similar activities	4	736	0.52%	15
Manufacture of electrical machinery and apparatus n.e.c.	11	2772	0.41%	16
Manufacture of other non-metallic mineral products	14	3547	0.39%	17
Other service activities	3	876	0.39%	18
Collection, purification and distribution of water	6	1678	0.38%	19
Manufacture of other transport equipment	13	3579	0.37%	20
Manufacture of chemicals and chemical products	28	7540	0.37%	21
Post and telecommunications	15	4636	0.32%	22
Electricity, gas, steam and hot water supply	19	6714	0.29%	23
Manufacture of fabricated metal	8	3617	0.22%	24

products, except machinery and equipment

Manufacture of tobacco products	2	1114	0.21%	25
Manufacture of coke, refined petroleum products and nuclear fuel	10	8531	0.12%	26
Fishing, operation of fish hatcheries and fish farms; service activities incidental to fishing	1	480	0.10%	27

United States: Advertising Purchases by Industry

The following graphically shows the purchases from advertising in rank order of their percentages of total purchases:



As with publishing, one can identify groups of industries:

GROUP 1	Advertising	Total Purchases	Percentage	
Tobacco products	3750	39784	9.43%	1
Drugs	5555	78432	7.08%	2
Cleaning and toilet preparations	3252	47447	6.85%	3
Retail trade	33919	683714	4.96%	4
Amusements	6171	173480	3.56%	5
Water transportation	1221	34825	3.51%	6
Miscellaneous manufacturing	1665	51004	3.27%	7

GROUP 2	Advertising	Total Purchases	Percentage	
Pipelines, freight forwarders, and related services	1095	41653	2.63%	8
Wholesale trade	19831	769833	2.58%	9

Radio and TV broadcasting	1014	39488	2.57%	10
Food and kindred products	11822	465180	2.54%	11
Household appliances	492	19641	2.50%	12
Newspapers and periodicals	1584	64842	2.44%	13
Educational and social services, and membership organizations	7132	292790	2.44%	14
Personal and repair services (except auto)	2724	114884	2.37%	15
Footwear, leather, and leather products	185	8761	2.11%	16
Electric lighting and wiring equipment	478	23782	2.01%	17
Eating and drinking places	6707	336205	2.00%	18
Truck and bus bodies, trailers, and motor vehicles parts	2388	121710	1.96%	19
Hotels and lodging places	1310	73214	1.79%	20
Finance	9940	601756	1.65%	21
Communications, except radio and TV	4788	291856	1.64%	22
Automotive repair and services	3069	189382	1.62%	23
Scientific and controlling instruments	1772	120125	1.48%	24
Ophthalmic and photographic equipment	341	24657	1.38%	25
Electronic components and accessories	1636	124761	1.31%	26
Paints and allied products	223	17372	1.28%	27
Air transportation	1489	118316	1.26%	28

Croatia: Advertising Purchases by Industry

The Croatian Input-Output Matrix does not identify Advertising as a separate industry so I am not yet able to make this application.

Application of Cobb-Douglas Model to Academic and Research Libraries

United States Academic and Research Libraries

The application of the Cobb-Douglas model is very speculative and difficult. However, the following is a first cut at doing so.

The first issue, of course, is what constitutes expenditure for capital versus expenditure for labor. I will assume that purchased information resources plus the cost of staff required for the related technical service functions is the investment in information capital and that the cost of the remaining staff is the cost of labor (for delivering information products and services).

I will use the results from LPM applied to the ARL libraries, showing technical services costs as 16 FTE per \$1 million (using the average salary rate for each institution). I apply that to each of the ARL libraries and then perform a linear regression analysis using Circulation as the measure of output. The results is:

$\text{Log}(\text{Circulation}) = 0.043 + 0.45 \cdot \text{Log}(\text{Capital}) + 0.34 \cdot \text{Log}(\text{Labor})$, R is 0.58, $R^2 = 0.33$

Croatian Academic and Research Libraries

There simply is not enough data by institution to replicate that analysis on Croatian academic and research libraries.

Application of Cobb-Douglas Production Model to Public Libraries

United States Public Libraries

I will use the results from LPM applied to the public libraries, showing technical services costs as 13 FTE per \$1 million (using the average salary rate for each institution). I apply that to each of the 50 states' public libraries and then perform a linear regression analysis using Circulation as the measure of output. The results is:

$\text{Log}(\text{Circulation}) = -0.321 + 0.54 \cdot \text{Log}(\text{Capital}) + 0.51 \cdot \text{Log}(\text{Labor})$, R is 0.92, $R^2 = 0.85$

Croatian Public Libraries

There simply is not enough data by institution to replicate that analysis on Croatian public libraries.

3. Conclusions

Substantive Conclusions

The assumption that data for libraries and the economy would be available has been confirmed for the United States and for Croatia. The hypothesis that library staffing could serve as the basis for estimating staff time in industry is still to be tested, but the preliminary results are positive.

Suggestions for future research

I have discussed with colleagues in the United Kingdom (at Loughborough University), from the Faculty of Organization and Information of the University of Zagreb (in Croatia), and from the University of Graz (in Austria) to continue this research with the objective of comparing among countries at various stages in development of their information economies. Discussions have been held with each of them with the objective of developing a proposal to the European Union for support to such a collaborative project.

Recommendations for the US Policy Community

Support to countries in the process of transition from nationalized economies to privatized economies and from economies based on agriculture and manufacturing to ones based on information should be a national policy. It is in the best tradition of United States policies internationally, and the results will further United States interests.

4. Appendices

Appendix 1. Original proposal

Libraries in the Information Economy of Croatia

Abstract

This research project is intended to identify and, to the extent possible, measure the role of libraries in the "information economy" of Croatia. The methodology for the research is based, first, upon allocation of industries to identified sectors of the economy and to segments within

them, second, on the use of an input-output matrix to represent the structure of the economy and the use of information segments within it by the various sectors of the economy, third, upon measurement of the labor and capital involved in libraries in each component of that structure, and, fourth, on the resulting relationship between libraries and the use of information by the various sectors. In measuring the role of libraries, specific attention will be given to the relative use of publications and Internet resources, each as accessed through libraries.

1. Research Objective

This proposal is for a research project to identify and, to the extent possible, measure the role of libraries in the "information economy" of Croatia. It is to be done by Robert Mayo Hayes in collaboration with colleagues at University J.J. Strossmayer in Osijek, Croatia (under the leadership there of Professor Tatjana Aparac-Jelusic, Head, Department of Information Sciences of the Faculty of Philosophy), and with colleagues at the University of Zagreb (under the leadership there of Professor Damir Boras, Head, Department of Information Science, Faculty of Philosophy).

2. Preparatory Work Completed

The primary methodology, namely the use of national input-output matrices for evaluation of the role of libraries and the Internet in national economies has been developed and applied in the contexts of national economies (specifically of the United States and Australia). As part of the preparatory work, Robert Mayo Hayes will be a Visiting Professor at University J.J. Strossmayer, Osijek, Croatia during the month of May 2006 during which this project will be a focus of discussion with colleagues there and at the University of Zagreb.

3. Research Venue

The venue for this research is Croatia and, more specifically, University J.J. Strossmayer, Osijek, and the University of Zagreb. The choice of this venue reflects the long-standing cooperation between Robert Mayo Hayes, for whom IREX funding is requested, and colleagues at those two universities. The collaboration has continued, on virtually a yearly basis, for nearly thirty years, since 1977. It is specifically reflected in the fact that Robert Mayo Hayes has served as co-director, with those colleagues, of conferences held in Dubrovnik each year and focused on universities and libraries in the world of digital information networks.

The collaboration in this research will be initiated in May 2006 during a month-long visit Robert Mayo Hayes will make to University J.J. Strossmayer, at their invitation, for this purpose as well as to teach several seminars on related topics and, while there, to meet with the colleagues in Zagreb.

4. Research Methodology

The methodology for the research is based, first, upon allocation of industries to identified sectors of the economy and to segments within them, second on the use of an input-output matrix to represent the structure of the economy, third upon measurement of the labor and capital involved in libraries in each component of that structure, and fourth on the resulting relationship between the use of information segments by the various sectors of the economy and, by inference, of the libraries within them.

A. Rationale for considering the Information Sector

The so-called "Information Sector" has increasing importance in national economies, both as a support to other sectors of the economy and as a major component of the economy itself. Information-related work is today the responsibility of a substantial majority of the United States workforce, half within what has been called the "information industries" and half within other industries. In the years since it was first identified, that percentage has steadily grown and today is probably close to 60% of the U.S. workforce. Indeed, the growth within the information industries during the past decade has been spectacular not only in the U.S. but in other countries as well, including specifically Croatia.

Given that exceptional rate of growth, the information sector certainly must be considered in any national economic policy decisions. Clearly, there are two aspects to be considered. One is the effect of the information industries themselves. The other is the relationship between those information industries and other industries.

In general, the evidence is that industrial productivity is highly and positively correlated with expenditures for products and services from the information industries. It must be said that much of that correlation reflects the productivity of the information industries themselves and that, if they are removed from the correlation analysis, the relationships are significantly lower in magnitude, though still positive

B. The Segmentation of the Information Sector

To understand what is happening, the need is to examine the information sector itself in more detail. There is a tendency to identify the growth of the information sector with what has been called "information technology" (IT) or, frequently, "information and communications technology" (ICT). The view in such identification is that the phenomenal growth of the information sector of the economy reflects the impact of information technology—the role of computers and of broadband communications.

Clearly information technology is important, but it is by no means the whole story or even the most important part of the story. It is therefore necessary to define the segments of the information sector so that all can be considered in analysis of the economic role of the information sector in other sectors.

Three segments will be identified:

- (1) Information Technology segment
- (2) Information Transaction Processing segment
- (3) Knowledge Providing Services segment

It is recognized that there will be overlaps among these segments. But first, consider the following definitions of the segments.

(1) Information Technology Segment

Definition of the Information Technology segment (frequently called "Information Technology and Communication" segment, or ICT for short) has been a matter of continuing discussion. Among the more definitive statements is that from the OECD Committee on Information, Computer and Communications Policy (ICCP).² The Information Technology sub-sector provides the modern-day tools that support information activities, both within the information sector itself and within the other sectors. It includes the manufacture of hardware. Computers and their peripheral equipment and telecommunication equipment are the usual examples but not the only ones. It also includes the creation of software that makes the hardware function to meet specific needs.

(2) Information Transaction Processing Segment

A major component of the information economy is concerned with the processing of transactions. The simplest example is telecommunications services (in contrast to

² "A draft definition of the ICT sector", a discussion document prepared by the Statistical Panel under aegis of the OECD ICCP Committee August 1997

telecommunications technology). It uses communications technology to provide that service, of course, but it is far more than the technology. But telecommunications is not the only example of transaction processing. Banking, brokering, accounting, retail sales entry, airline reservations, online purchasing—each is an example of transaction processing. In each case, the information technology is simply a tool used to process the transaction. In each case, the service handles the transaction without concern for its content except as it relates to the transaction handling.

(3) Knowledge Providers Segment

The third segment of the information economy consists of those services in which the important thing is the substance of the information—the content of whatever is represented by the bits or bytes or pieces of paper. The examples are myriad: education, research and development, publishing, television and radio, motion pictures, consulting and miscellaneous business services, the professions (law, medicine, architecture, engineering), the performance arts and the fine arts, libraries and the Internet. Libraries are an integral part of this segment and indeed serve as a significant means for access to the Internet by the public. The purpose of the proposed research collaboration is to identify the magnitude of their role within the Croatian information economy.

C. Assignment of Industries & Services to Segments and Groups

As part of the research, we will consider industries and services from the national accounts of Croatia and we will make assignments of them to each of the three segments identified above as well as to other major groups within the non-information industries.

The assignments made will be to some extent arbitrary, based on an assessment of the primary focus of each specific industry. For any given industry there may be elements or portions of activity that could be assigned to other segments or groups. However, the nature of the national accounts and the level of detail for each precludes dealing with divisions of them that would not be even more arbitrary.

The situation is complicated, though, beyond the nature and level of the detail in the national accounts. The boundaries between the several segments are porous and there are many activities in each that are within the definition of others, especially within the knowledge providers segment. Despite such potential overlaps, each of the information related industries has clear focus in one of the three segments, deriving the overwhelming majority of its income from sales of the type represented by that segment. It is therefore meaningful to make those assignments.

D. Information in Industrial Operation & Management

We turn now to an examination of the use of information resources by industry, using the structure presented above, in which the information resources are categorized in the three segments (1) information technology, (2) information transaction services, and (3) knowledge provision.

(1) Information Technology Applications

In general, the use of information technology by industry in general includes CAD/CAM, automation in general manufacturing, flexible manufacturing, automation in management of operations.

(2) Information Transaction Processing

Information transaction processing occurs both internally and in the purchase of external services from the information transaction processing segment of the information economy. The former is typically part of a management, so the focus here will be on the use of external services. They arise primarily in two quite distinct areas of management concern: (1) funding of capital and operational expenditures, which involves the banking and investment community, and (2) communication with suppliers and customers, which involves the telecommunications community. In both of these respects, the needs of industry are generally quite similar. There is one development, though, that deserves special attention. It is "e-Commerce"—the use of the Internet for communication with suppliers and customers. Many Internet-based global marketplaces have been developed in a very short time.

(3) The Knowledge Industries and Substantive Information Use

The picture for use of information technology and information transaction services by industry is represented by technical knowledge and skills, research, expenditures for research and development (R&D), management and control, management consultation

E. Magnitude of Information Use by Croatian Industry

We turn now to a quantitative assessment of the extent to which Croatian industry uses the information sector of the Croatian economy. The basis for the analysis is the Input-Output matrix of the Croatian economy, which is now briefly discussed.

(1) National Input-Output Matrix

A national input-output matrix (called a Leontief matrix) shows the purchases by each industry from every other industry. It also shows the distribution of the remaining output from each industry to other destinations (export, government, and final consumption or use). And it also shows the costs of labor for each industry, the imports for each industry, the taxes paid by each industry.

Thus, if there are 107 national accounts at the four digit level of detail (as is the case with the data for the U.S. that will be used as one of the bases for comparisons and calibrations), the matrix will consist of 107 rows (one for each selling industry) and 107 columns (one for each purchasing industry) to which are added columns for the other destinations and rows for the other sources of costs.

The most important use of an input-output matrix is to determine the distribution of production in order to achieve a desired level of final consumption. But the input-output matrix can serve many other purposes as well, among them identifying the relationship between production in a given industry or group of industries and a given industry's use of the resources from other industries. It is this application with which this research project is concerned.

(2) Sources of Data

In this project we will need to use a surrogate for the input-output matrix for Croatia. One has been derived from the GTAP Database.³ In the referenced publication, the methodology for doing so is well identified and will be adapted for the specific purposes of this study.⁴

³ Jasminka Sohinger, Davor Galinec, Glenn W. Harrison. General Equilibrium Analysis of Croatia's Accession to the World Trade Organization. Published by Croatian National Bank, Public Relations and Publishing Department, Trg hrvatskih velikana 3, 10002, Zagreb

Two other sources of data will be the input-output matrices for the United States and Australia. They will be used to provide bases for comparison and calibration of the surrogate matrix for Croatia.

(3) Categorization of Industries

Each industry in the industrial economy will be assigned to one of the following eight groups

- A Agriculture and Agricultural products
- B0 Mining
- B1 Low technology industry
- B2 Non-information services
- C High technology industry
- I1 Information Technology
- I2 Transaction Information Services
- I3 Substantive Information Services

(4) Assignments of Industries to Groups

The following shows just the first small set of assignments as to each group as possible starting points for each of the industry groups (in this case based on the Australian input-output table, but simply to illustrate):

- A 0101 Sheep, 0102 Grains, 0103 Beef cattle, 0104 Dairy cattle, 0105 Pigs, 0106 Poultry, 0107 Other
- B0 1100 Coal; oil and gas, 1301 Iron ores, 1302 Non-ferrous metal ores, 1400 Other mining, 1500 Services
- B1 2201 Textile fibres yarns etc, 2202 Textile products, 2203 Knitting mill products, 2204 Clothing, 2205
- B2 4501 Wholesale trade, 5101 Retail trade, 5401 Mechanical repairs, 5402 Other repairs, 5701
- C 2501 Petroleum and coal products, 2502 Basic chemicals, 2504 Pharmaceuticals etc, 2507 Other
- I1 2805 Scientific, etc. equipment, 2806 Electronic equipment
- I2 7101 Communication services, 7301 Banking, 7302 Non-bank finance, 7401 Insurance
- I3 2401 Printing; services to printing, 2402 Publishing; recorded media etc, 7303 Financial asset investors,

The rows and the columns for each industry in the input-output table will then be associated with the group to which the industry was assigned, and the values from the matrix will be accumulated into a 8 by 8 summary matrix, to which will be added a row for labor and other costs, a column for other consumers (exports, final consumers, etc.), and rows and columns for totals. The following Table 1 illustrates (using Australian data) the results from such an analysis

⁴ The Global Trade Analysis Project (GTAP) is a research program initiated in 1992 to provide the economic research community with a global economic dataset for use in the quantitative analyses of international economic issues. GTAP objectives include the provision of a documented, public, global, general equilibrium data base. For complete documentation of the GTAP database, see <http://www.agecon.purdue.edu/gtap/>.

and show the percentage of value added spent by each industry in Australia for purchases of information products and services. Again, the three categories of information products and services are:

- I1 = Information Technology (e.g., computers and software, telecommunications hardware),
- I2 = Information Transaction Services (e.g., communications services, banking)
- I3 = Substantive Information – Knowledge Providing Services (e.g., consulting, publications, libraries)

		Information/Value Added		
		I1	I2	I3
A	Agriculture	0.01%	0.44%	4.02%
B0	Mining	0.20%	0.19%	1.50%
B1	Low Technology Mfg	0.65%	1.10%	8.73%
B2	Services	0.68%	3.23%	9.13%
C	High Technology Mfg	1.35%	4.04%	17.62%
I1	Information Technology	9.14%	5.32%	19.58%
I2	Information Transaction Services	0.18%	11.60%	24.24%
I3	Information Substantive Services	0.38%	7.02%	25.98%
Tot	For all Industries and Services	0.85%	3.99%	13.81%

G. Role of Libraries in the Croatian Information Economy

The results from such an analysis then provide a context within which to identify and measure the role of libraries in the national information economy. Of course, by their very nature, libraries are part of the Substantive Information segment (the Knowledge component), of the Information Sector, identified above as I3. They appear in universities, of course, and more generally as part of educational programs.

But they also appear, as special libraries and information centers, in businesses of all kinds. They are of special importance as means for public access to the Internet and the array of information available there.

The analysis of the role of libraries will be a three stage process. The first stage will identify the functional roles of libraries within the Knowledge Component and, for each role, the qualitative contribution they make.

The second stage will then measure the magnitude of those roles, as represented by staff (i.e., librarians and others working in libraries) and capital investment, as represented by the information collections for which they are responsible, building and facilities, computer networks.

The third stage will then examine and try to measure the contribution of those investments to the productivity of those industries that purchase from the Knowledge Component (illustrated by Table 1, above). Specifically, the use of publications and the Internet, as accessed through libraries, will be measured and compared with the extent to which each industry segment uses information resources (as determined from the national input-output matrix).

5. Impact of Research

The impact of information on national economies is well recognized, and the role of libraries in the knowledge industries segment of the information economy also is well recognized. The proposed research is intended to provide results that would have value in national and university

policy decisions concerning the allocation of resources, including people as well as capital resources to development of Croatian capabilities in these areas. This is of special importance at this time in the context of Croatian objectives with respect to the European Union.

Beyond those broad objectives, this research should have direct impact on the educational programs of the two Croatian universities that would be involved in the study. Indeed, one of the objectives for the preliminary stage, which will be in May 2006, is precisely to determine what curricular development may be appropriate.

6. Travel Information

The time schedule for the proposed project is as follows:

- (1) Preliminary Stage. This stage is NOT included in the requested IREX funding for this project since it has already been established and funded by the University (for local living expenses) and from other sources for travel costs. It will be conducted during a one-month appointment of Robert Mayo Hayes as Visiting Professor at University J.J.Strossmayer in Osijek, Croatia. The purpose of this stage is to establish working relationships for subsequent conduct of the research with colleagues at University J.J. Strossmayer and at University of Zagreb. To the extent possible, of course, data will also be acquired but probably only on a preliminary, pilot-test basis.
- (2) On-site Stage in Croatia. It is proposed that the on-site in Croatia segment of this research be conducted during the three (3) month period from 1 July 2006 through 30 September 2006 (subject to minor change as may be necessary to meet the schedules of the participants). This stage is that for which IREX funding is requested. It is planned as a three-month investigation on-site at University J.J.Strossmayer in Osijek, Croatia and at University of Zagreb. During this stage, data will be acquired for both the surrogate input-output matrix for the Croatian economy and for the economic evaluation of libraries in Croatia. The working models, as outlined in the methodology segment of this proposal, will be developed and tested. And preliminary test results will be assessed jointly by the several participants.
- (3) Subsequent Stage. Subsequent to the on-site stage, it is intended that there will be continuing dialogue among the participants, each operating in his or her home institution, primarily using e-mail communication through the Internet. This is intended to result in the completion of one or more papers for submission to appropriate journals in Croatia and the United States and/or elsewhere.
- (4) Final Stage. As the final stage, it is planned that the results of this investigation will be presented at the LIDA 2007 annual conference in Dubrovnik in May 2007. Funding for this stage is NOT included in the request for IREX funding.

Appendix 2. Schedule of Meetings, Interviews, Data Gathering Activities, and Presentations

LAST	FIRST	POSITION	ORGANIZATION	DAY	DATE	CONTEXT
Kunštek	Dubravka		Econ Inst Lby	Mon	15-May	Economics Institute Library
Pavloković	Sanja	Director	Medvesčak Public Library	Mon	15-May	Public libraries in Croatia
Aleksić	Željka	Manager, Foreign Cataloging	City of Zadar Research Library	Sat	20-May	Management of City of Zadar Research Library
Bukvić	Milenka	Principal	City of Zadar	Sat	20-	Management of

		Director	Research Library		May	City of Zadar Research Library
Delaš	Jadranka	Deputy Director	City of Zadar Research Library	Sat	20-May	Management of City of Zadar Research Library
Dunatov	Radovan	Director of Cultural Affairs	City of Zadar	Sat	20-May	Management of City of Zadar Research Library
Kolega	Zivko	Mayor	City of Zadar	Sat	20-May	Management of City of Zadar Research Library
Skarica	Rade	Deputy Mayor, Zadar	Deputy Mayor, Zadar	Sat	20-May	Management of City of Zadar Research Library
Petričević	Jadranka	Director	University of Zadar Library	Sat	20-May	Management of City of Zadar Research Library
Ivanovic	Martina Dragija		Zadar Univ	Sat	20-May	Management of City of Zadar Research Library
Aleksić	Željka	Manager, Foreign Cataloging	City of Zadar Research Library	Sat	20-May	Management of City of Zadar Research Library
Pehar	Ivan	Director	Zadar Public Library	Sun	21-May	Public libraries in Croatia
Boras	Damir	Professor	Faculty of Philosophy	Sat	2-Sep	meet me at arrival
Boras	Damir			Mon	4-Sep	make arrangements for office, computer, etc.
Stipanov	Dr. Josip	Director General	National & University Library	Wed	6-Sep	arrangements for office, computer, access to National & University Library-1
Mihalić	Marina		National & University Library	Wed	6-Sep	arrangements for office, computer, access to National & University Library-2
Boras	Damir			Wed	6-Sep	register with Police Department
Čosić	Stjepan	Director General	National Archives	Thu	7-Sep	data about Croatian archives-1
Lemić	Vlatka		National Archives	Thu	7-Sep	data about

						Croatian archives-2
Rusan	Ivan		Econ Inst Lby	Mon	11-Sep	arrange contacts with key persons in economics and statistics
Galineć	Davor		Croatian National Bank	Mon	11-Sep	Croatian Input-Output Matrix
Jankov	Ljubinko		Croatian National Bank	Mon	11-Sep	interests of Croatian National Bank
Kraft	Evan		Croatian National Bank	Tue	12-Sep	government policies regarding banking and related statistics
Skender	Dubravka		National & University Library	Wed	13-Sep	available data regarding libraries in Croatia-1
Mihalić	Marina		National & University Library	Wed	13-Sep	available data regarding libraries in Croatia-2
Harrison	Glenn	Professor	Florida State University		13-Sep	Croatian Input-Output Matrix, surrogate
Grubisić	Mirko		FINA	Thu	14-Sep	data from FINA and Bureau of Statistics
Rusan	Ivan			Thu	14-Sep	meet Mirko Grubisić
Brlek	Saša (Aleksandra)		US Embassy	Fri	15-Sep	cooperation with US Embassy
Aparac-Jelusic	Tatjana	Professor		Fri	15-Sep	future programs in Zadar and Osijek
Gorjan	Maja		State Bureau of Statistics	Mon	18-Sep	Croatian Input-Output Matrix and data from Bureau of Statistics
Topić	Zheljko	Director General	State Intellectual Property Office	Wed	20-Sep	Intellectual Property Rights in Croatia
Lenardic	Mira		National Competitiveness Council	Wed	20-Sep	programs of National Comptitiveness Council
Zajec	Jasenka		National &	Thu	21-Sep	her role in the

			University Library			National & University Library
Farnell	Thomas	JFDP	Institute for the Development of Education	Thu	21-Sep	Junior Faculty Development Program procedures
Aparac-Jelusic	Tatjana			Fri	22-Sep	future programs in Zadar and Osijek
Jelusic	Srecko		Zadar Univ	Fri	22-Sep	future programs in Zadar and Osijek
Farnell	Thomas			Fri	22-Sep	interview candidates for Junior Faculty Development Program
Hayes	Robert			Fri	22-Sep	JFDP Interviews
Brlek	Sasha (Aleksandra)			Fri	22-Sep	observe interviews
Aparac-Jelusic	Tatjana			Sat	23-Sep	future programs in Zadar and Osijek
Jelusic	Srecko			Sat	23-Sep	future programs in Zadar and Osijek
Aparac-Jelusic	Tatjana			Sun	24-Sep	future programs in Zadar and Osijek
Jelusic	Srecko			Sun	24-Sep	future programs in Zadar and Osijek
Boras	Damir			Wed	27-Sep	project discussion
Boras	Damir			Thu	28-Sep	project discussion
Srica	Velimir	Professor	Faculty of Economics	Fri	29-Sep	project and future steps
Rusan	Ivan			Mon	2-Oct	other people to visit
Schlögl	Christian	Professor	University of Graz, Institute of Information Science	Thu	5-Oct	cooperation with Austria
Petrak	Jelka		Med Lby, U of Zagreb	Thu	5-Oct	medical library and, more generally, university libraries

Badurina	Boris & Ira		Osijek	Fri	6-Oct	imaging files
Hodonj	Željko		Vjesnik	Tue	10-Oct	database operations at Vjesnik-1
Pecnik	Lana Zaja	Interviewer	Vjesnik, Newspaper Documentation	Tue	10-Oct	database operations at Vjesnik-2
Toth,	Tibor		Pliva	Wed	11-Oct	travel to Porec
Hayes	Robert			Thu	12-Oct	conference in Porec
Hayes	Robert			Fri	13-Oct	conference in Porec
Hayes	Robert			Fri	13-Oct	my talk in Porec
Šojat	Gordana and Zorislav			Sat	14-Oct	computer networks, computer art
Toth,	Tibor			Sat	14-Oct	return from Porec
Škvarć	Goran		CARNet	Mon	16-Oct	data about CARNet
Skender	Dubravka			Tue	17-Oct	data about Croatian academic libraries
Tatalović	Mirjana		Megatrend, Bani 75, Buzin	Tue	17-Oct	operations at MegaTrend
Marztinčić	Marjan		INA, Nafta-Plin	Wed	18-Oct	technical data files at INA-1
Ivanisević	Ivan		INA, Šubičeva 29	Wed	18-Oct	technical data files at INA-2
Stojanovski	Jadranka		Bošcović Inst Lby	Fri	20-Oct	Boscovic Institute library and, more generally, academic libraries
Kos-Spoljarić	Mirjana		Ministry of Science, Educ, Sports	Mon	23-Oct	academic libraries as seen from the Ministry of Science
Janković	Ankica		Ministry of Culture	Tue	24-Oct	libraries as seen from the Ministry of Culture
Mihalić	Marina			Tue	24-Oct	operations at the National and University Library
Brlek	Saša (Aleksandra)			Tue	24-Oct	participate in US Embassy scholarship

						display
Stipanov	Dr. Josip			Tue	24-Oct	status of agreement
Hodonj	Željko			Wed	25-Oct	database operations at Vjesnik and HINA-1
Polojac	Fjodor	Asst General Manager	HINA (Croatian News Agency)	Wed	25-Oct	database operations at Vjesnik and HINA-2
Gulija	Darko	Chief Info Officer	HINA (Croatian News Agency)	Wed	25-Oct	database operations at Vjesnik and HINA-3
Marković	Milvija		Educ & Tchr Train, Banaličeva 24	Thu	26-Oct	teacher education programs 1
Fajdetic	Majda		Educ & Tchr Train, Banaličeva 24	Thu	26-Oct	teacher education programs 2
Tudor-Šilović	Neva		Referral Center	Fri	27-Oct	history since the Referral Center operations-1
Tezak	Djurdjica	Professor	Faculty of Chemistry	Fri	27-Oct	history since the Referral Center operations-2
Vdovic	Matija Skegro		Bureau of Statistics	Mon	30-Oct	data about libraries in Croatia
Hodonj	Željko			Mon	30-Oct	database operations at Vjesnik
Pavlaković	Veljko		Bureau of Statistics	Mon	30-Oct	replaced by his boss, Matija Vdović
Boras	Damir			Tue	31-Oct	plans for coming weeks
Škvarč	Goran			Thu	2-Nov	data about CARNet
Boras	Damir			Thu	2-Nov	schedule for lecture(s)
Matić	Sanja	Student	Translate	Thu	2-Nov	Translate
Bejaković	Predrag		Institute of Public Finance	Fri	3-Nov	parallel efforts
Ujevic	Tvrtko	Librarian	Hrvatska Narodna Banka	Fri	3-Nov	Special Library at Croatian National Bank
Banic Tomisic	Zrinka		Pliva	Mon	6-Nov	Discussion at Pliva

Toth,	Tibor			Mon	6-Nov	Discussion at Pliva
Lasić-Lazič	Jadranka	Professor	Faculty of Philosophy	Mon	6-Nov	Lecture to class, Info Econ
Hayes	Robert			Mon	6-Nov	Lecture to Professor Lasic-Lazic class
Srica	Velimir			Tue	7-Nov	cooperation with the European Union
Fuchs	Dr. Radovan	Vice Minister, International Relations	Ministry of Science, Education, & Sports	Tue	7-Nov	cooperation with the European Union
Gladović	Antonija		Ministry of Science, Education, & Sports	Tue	7-Nov	International Relations
Maravić	Loredana		Ministry of Science, Education, & Sports	Tue	7-Nov	International Relations
Pavić	Dr. Helena		Ministry of Science, Education, & Sports	Tue	7-Nov	International Relations
Tudjman	Miroslav	Professor	Faculty of Philosophy	Tue	7-Nov	Lecture to class
Hayes	Robert			Tue	7-Nov	Lecture to Professor Miroslav Tudjman class
Matić	Sanja			Tue	7-Nov	received Translation
Mihel	Ivan	Director	Faculty of Philosophy Library	Wed	8-Nov	Faculty of Philosophy Library, LILITA
Hayes	Robert			Thu	9-Nov	Lecture to at Varaždin Faculty of Organization and Informatics
Kermek	Dragodin	Vice-Dean	Faculty of Organization and Informatics, Varaždin	Thu	9-Nov	Talk at Varaždin 1
Divjak	Blazhenka	Professor	Faculty of Organization and Informatics, Varaždin	Thu	9-Nov	Talk at Varaždin 2
Kirinić	Valentina	TA	Faculty of	Thu	9-Nov	Talk at Varaždin

			Organization and Informatics, Varaždin			3
Bekavac-Lokmer	Fila		INA, INDOK	Fri	10-Nov	Special Library at INA
Mihalić	Ivanka	Librarian	INA, INDOK	Fri	10-Nov	Special Library at INA
Jelusic	Srecko			Mon	13-Nov	University of Zadar Library
Magas	Damir	Rector	University of Zadar	Tue	14-Nov	Discuss agreement, Library Planning
Skara	Danica	Vice-Rector	University of Zadar	Tue	14-Nov	Discuss agreement, Library Planning
Dragija	Martina		University of Zadar	Tue	14-Nov	TAs for Tatjana and Srecko
Pehar	Franjo		University of Zadar	Tue	14-Nov	TAs for Tatjana and Srecko
Jelusic	Srecko			Tue	14-Nov	University of Zadar Library
Jokić	Dr. Maja		University of Zadar	Tue	14-Nov	Zadar Library Task Force
Sapać	Irena		University of Zadar	Tue	14-Nov	Zadar Library Task Force
Sečić	Dora		University of Zadar	Tue	14-Nov	Zadar Library Task Force
Jakić	Mirko	Vice -Rector, Education	University of Zadar	Tue	14-Nov	Zadar Library Task Force
Škara	Danica	Vice-Rector, Internation Relations and Researc h	University of Zadar	Tue	14-Nov	Zadar Library Task Force
Uglešić	Ante	Vice-Rector, Finance and Development	University of Zadar	Tue	14-Nov	Zadar Library Task Force
Hayes	Robert			Wed	15-Nov	Lecture to class at Zadar Department of Information Science
Hayes	Robert			Wed	15-Nov	Lecture to class at Zadar Department of Information Science
Jelusic	Srecko			Thu	16-Nov	University of Zadar Library Planning
Hodonj	Željko			Fri	17-Nov	database

						operations at Vjesnik
Boras	Damir			Fri	17-Nov	Lecture to class, linguistic analysis
Hayes	Robert			Fri	17-Nov	Lecture to Professor Boras class
Simic	Diana	Deputy State Secretary,	Central State Administrative Office for e-Croatia	Fri	17-Nov	Special Library
Lemić	Vlatka			Mon	20-Nov	Archives data
Burić	Domagoj	Head, Science and Education Department		Mon	20-Nov	Croatian RadioTelevision (HRT)
Čokolić	Krešimir			Mon	20-Nov	Croatian RadioTelevision (HRT)
Vadić	Maja			Mon	20-Nov	Croatian RadioTelevision (HRT)
Valušniĝ	Mirjana	Indok	Croatian Radio Television	Mon	20-Nov	Croatian RadioTelevision (HRT)
Stipanov	Dr. Josip			Mon	20-Nov	Final meeting 1
Mihalić	Marina			Mon	20-Nov	Final meeting 2
Skender	Dubravka			Mon	20-Nov	Final meeting 3
Toth,	Tibor			Mon	20-Nov	Meeting at National & University Library
Vadic	Maja		Croatian Radio Television	Mon	20-Nov	Meeting set
Sviličić	Dr. Nikša			Mon	20-Nov	Information services
Hayes	Robert			Mon	20-Nov	Information discussion with Information Professionals, National and University Library (Tibor Toth)
Schlögl	Christian			Tue	21-Nov	cooperation with University of Graz
Zotter	Hans			Tue	21-Nov	Department of Special

						Collections, University of Graz
Rauch	Prof. Dr. Wolf			Tue	21-Nov	Head, Institute of Information Science, Univeristy of Graz
Hayes	Robert			Tue	21-Nov	Lecture at University of Graz, Austria
Karlics	Karin			Tue	21-Nov	PhD candidate to work on Project(s)
Schlögl	Christian			Wed	22-Nov	cooperation with University of Graz
Lager	Christian	Professor	Faculty of Economics, University of Graz	Wed	22-Nov	cooperation with University of Graz
Hayes	Robert			Fri	24-Nov	Lecture for Librarians (Jadranka Stoyanovski)
Stojanovski	Jadranka			Fri	24-Nov	Lecture for Librarians (Jadranka Stoyanovski)
Valušnig	Mirjana			Fri	24-Nov	RadioTelevision Archive and Library
Hayes	Robert			Mon	27-Nov	Departure to Heathrow and Boston
Boras	Damir			Mon	27-Nov	Take me to Airport
Hayes	Robert			Wed	29-Nov	Meeting with faculty at Simmons College
Hayes	Robert			Thu	30-Nov	Meeting with students at Simmons College
Hayes	Robert			Fri	1-Dec	Lazerow Lecture