

STATISTICAL METHODOLOGY

Chapter 2 Statistical Methodology

The purpose of this chapter is to give an insight into the statistical problems encountered in compiling the data and the ways they were solved. Though it is important, general readers may well find it less interesting than the results themselves and may, therefore, wish to move on directly to Chapter 3.

GENERAL DATA PROBLEMS & INTERPOLATION PROCEDURE

First stage grossing

Returns received from individual country co-ordinators were first checked and validated. When all queries had been resolved for the country, an initial stage of grossing and estimation was carried out, based on the figures provided. The problem is illustrated in this comment from Germany -

“All figures are related to those libraries only which have participated in the survey of the relevant year (85 p. c. or more). In German library statistics it is not usual to gross up or estimate the figures: either total of libraries is unknown or the character of libraries within the groups is very varying or libraries have not given figures to each position”.

The procedure comprised a number of steps:

Grossing for incomplete responses. If the individual country respondent provided incomplete figure, an adjustment was necessary.

For example: if a figure of 20,000 books was given in line 4, representing responses from 100 out of a total of 110 administrative units, the figure was grossed up by a factor of 110/100 to 22,000.

Adding population data. Where data were not provided on the sector population to be served (line 21), figures were taken from UNESCO, using the estimates of population in the relevant age group - the whole population for National, Public and Other Major Non-specialised libraries, age 20-64 for Special libraries, and age 5-15 for School libraries. For Tertiary sector libraries a different approach was used (see chapter 6) - figures for the total staff and student population were obtained from UNESCO education statistics.

Data from previous surveys In a small number of cases, figures for the first years included on the return were not given, but had been supplied to previous LIBECON surveys. In such cases, these were inserted. Note that estimates derived from previous studies were not used, only original data supplied in previous surveys.

Interpolation In some countries data are not collected annually, but once every two or three years. Where data were missing in the middle of the sequence, estimates were made by interpolation - assuming that the rate of change between known figures is constant, and estimating accordingly.

For example, suppose we had these figures:

1991	1992	1993	1994	1995	1996	1997	1998
200,000			210,000				220,000

then the calculations would be:

	200,000 +10,000/3	200,000 + 2*10,000/3		210,000 +10,000/4	210,000 + 2*10,000/4	210,000 + 3*10,000/4	
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and the final data line (with all estimates rounded appropriately):

200,000	203,000	207,000	210,000	213,000	215,000	218,000	220,000
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Extrapolation Where values were missing at one or other end of the sequence, estimates were made by extrapolation. This involves identifying any trend in the observed data, and continuing that trend to the ends of the sequence. A relevant ratio, usually per head of sector population (which was available for all years from UNESCO sources) was calculated from the known data, then estimates made for that ratio for the missing years. These might be assumed to be constant at the level of the nearest year, at the average of the available data, or, if a clear trend was visible, this would be continued at the same rate of change. Estimates were then calculated based on these ratios.

For example:

1991	1992	1993	1994	1995	1996	1997	1998
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Data supplied for book stock

		57200	61000	60000	66000		
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Sector population to be served

1449000	1448000	1447000	1447000	1447000	1448000	1449000	1449000
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Book stock per head of population

		0.0395	0.0422	0.0415	0.0456		
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Estimated book stock per head of population

.038	.039					.046	.047
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Estimated book stock

.038*	.039*					.046*	.047*
1449000	1448000					1449000	1449000

and the final data line (with all estimates rounded appropriately):

55000	56500	57200	61000	60000	66000	66700	68100
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For figures relating to staff and finance, all estimation was carried out on the total lines as far as possible, then the estimates apportioned between the categories according to the ratios in years where data were available.

Presentation of data The database tables, on the website and in this report, do not show which data are original and which are interpolated/extrapolated. It is possible to check this by downloading the original questionnaire returns from the website (ZIP software required) via the 'Survey Forms' heading.

SCOPE AND SCALE OF RESPONSE

The following Table lists countries and sectors for which data (1998) has been supplied, validated and included in the database. In some cases (for example 6 out of the 15 providing Schools data) there was no financial data. Incompleteness on particular variables is described in more detail in chapters 5 - 9.

There are good prospects of virtually complete response from all significant states for the National, Tertiary and Public library sectors. Expectations in the other sectors are more problematic - and these are discussed in detail in chapters 8 and 9. But the survey results for Special and Schools library sectors - although very incomplete - represent a most substantial improvement on previous surveys.

Response levels for Special and Other Major Non Specialised library sectors have to be considered in the light of the major change proposed here (in harmony with ISO and UNESCO) - and these matters are discussed fully in chapter 9.

Table 2.1 Responses by country & sector							
Code	Country	National	Tertiary	Public	Special	Other MNS	Schools
1	Bulgaria	R	R	R	R	R	R
2	Czech Republic	R	R	R		0	R
3	Estonia	R	R	R	R	R	R
4	Hungary	R	R *	R	R		R *
5	Latvia	R	R	R	R *	0	
6	Lithuania	R	R	R	R		R
7	Poland	R	R	R	R *	R *	R *
8	Romania	R		R		0	
9	Slovak Republic	R	R	R			R
10	Slovenia		R	R	R *	0	R
11	Austria	R	R	R			
12	Belgium	R	R	R			
13	Denmark	R	R	R	R	0	R
15	Ireland	R	R	R	R *	0	R *
16	Finland	R	R	R	R		
17	France		R	R			
18	Greece	R *		R *	R *		
19	Iceland			R		0	R *
20	Italy	R	R				
21	Liechtenstein					0	
22	Luxembourg	R				0	
23	Netherlands	R	R		R	0	
24	Norway	R	R	R	R	0	R *
25	Portugal	R	R	R	R	R	R *
26	Spain	R	R	R	R	R	
27	Sweden	R	R	R	R		R*
28	Switzerland	R	a	a		0	
29	UK	R	R	R	R	0	R
31	Germany	R	R	R	R		

KEY: R = data received and incorporated
0 = nil return received
a = published statistics cover only selected largest libraries
* = no financial data

The next section of this report outlines our procedures to deal with the situation where no data were supplied for a country/sector in order to calculate reasonable or 'best' estimates to arrive at averages and totals for the whole of Europe - the procedure described as 'Grossing Up'.

GROSSING METHODOLOGY

Outline

- i. The survey figures have been extracted and population weighted averages were calculated for each line on the form based on the responding countries. These were used to establish annual trend indices for each line on the form;
- ii. Where data were not available, UNESCO and / or previous LIBECON survey data were used to calculate an overall average for the line for the country, which is taken to be the situation in 1993. Then the annual trend index established from the above procedure (i) is used to "cantilever" the computed 1993 situation deriving from the UNESCO / previous LIBECON averages;
- iii. The estimates deriving from procedure (ii) are over-written by the more recent results deriving from LIBECON2000;
- iv. Per capita results for EU / EFTA / CEE countries are calculated separately and applied to the relevant line on the sector form for non-responding countries (i.e. those where we have no UNESCO, previous or current LIBECON data).
- v. The financial data are converted to euros using the average ecu exchange rates before grossing. At this stage only staffing and acquisition expenditure have been estimated. These have been grossed on the estimated number of staff and additional books and bound periodicals acquired per annum. No attempt has been made to convert the prices either to fixed prices or to purchasing power parity. Therefore, the estimates represent cash expended each year.

Detail

- i. The survey figures have been extracted and population weighted averages were calculated for each line on the form based on the responding countries. These were simply used to establish annual trend indices for each line on the form for the relevant sector and grouping of countries (EU / EFTA / CEE). These trend ratios were selectively used to progress an incomplete series of returned data across missing years. Various "trend" options were employed according to the plausibility of the result: Average change over the known series of years applied to the most recent year; the minimum observed value in the known series applied to subsequent years; the maximum observed value in the known series applied to subsequent years; the average of the observed values in the known series applied to subsequent years; the last observed value in the series applied to subsequent years. In many instances this latter method was employed in the interests of avoiding spurious precision. A primary level of grossing was thereby established;

- ii. Where data were not available for any survey year, UNESCO and / or responses to previous LIBECON survey data were used to calculate an overall average for the line for the country, which was taken to be the situation in 1993. Then the annual trend index established from the above procedure (i) was used to "cantilever" the computed 1993 situation deriving from the UNESCO / previous LIBECON averages. Note that only data provided in response to UNESCO or previous LIBECON surveys was employed - not derivations from previous grossing exercises;
- iii. Per capita (or another base - see v. below) results for EU / EFTA / CEE countries were calculated separately and applied to the relevant line on the sector form for non-responding countries (i.e. those where we have no UNESCO, previous or current LIBECON data).
- iv. The estimates deriving from procedure (i) were over-written by those deriving from procedure (ii) and the resulting table was then over-written by the more recent results deriving from LIBECON2000 to provide a secondary level of grossing. i.e. only grossed results based on per capita (or another base) were left if there had been no response to the present of previous surveys;
- v. A "progressive logic" was employed, which attempted to relate the scale of activity in each country to their known infrastructures: e.g. Total staff were estimated before apportioning the estimated total between Trained Librarians and Other staff. Also where it was thought that the population base might misrepresent the potential activity another base was used: e.g. Additions to stock were estimated on the basis of existing stock, by applying the observed replacement rate in the sector for known countries.
- vi. The financial data are converted to euros using the average ecu exchange rates before grossing. At the first stage only staffing and acquisition expenditure were grossed. These were grossed on the estimated number of staff and additional books and bound periodicals acquired per annum. No attempt has been made to convert the prices either to fixed prices or to purchasing power parity. Therefore, the estimates represent cash expended each year.
- vii. The second stage in the grossing of the financial data was to calculate the proportion of employee and acquisition expenditure to reported total expenditure, to derive an estimate of remaining expenditure. This remaining expenditure was apportioned across the other expenditure headings according to the average pattern observed amongst more complete survey responses. Where it was evident that this ratio was implausible for counties who had supplied incomplete total expenditures, then their totals were adjusted prior to grossing other countries.
- viii. Total income was estimated to equal revenue expenditure in the year of account when no survey figures were returned. The total income was then apportioned across the source headings according to the observed pattern deriving from completed survey forms.

ix. The principles of grossing may be better explained by way of an example. For instance, where a country, has provided no data for staffing costs for the National Library the following steps were taken to calculate a notional amount for including in the overall total for all countries:

- Country is in the EU and has 500 staff employed in the National Library.
- The average expenditure per member of staff in National Libraries amongst other EU countries is €27, 425.
- Therefore, the estimated value of staffing expenditure for Country X is:

$$27, 425 \times 500 = \text{€}13.7 \text{ millions.}$$

REGIONAL ANALYSIS

One purpose of the grossing up exercise is to allow sub totals and averages to be calculated for country groupings. There are two groups for this purpose. First, states are grouped according to their political status: CEE, EFTA, & EU. This follows previous practice and is important in permitting historical trend analysis for like country groups. It will be even more important in future as and when there are further admissions to the European Community.

The second grouping, new for this survey, is geographical - with states divided into five areas: Northern Europe; Central Europe; Southern Europe; Baltic States and Eastern Europe. The area results are meaningful for National, Tertiary and Public library sectors. In view of much lower level response rates, they are not at present meaningful for the Special and Schools library sectors - and are therefore not reproduced in tables in this report.

The following table shows the allocations.

Table 2.2 Political and Geographic Grouping

Code	Country	Political	Geographic	Code	Country	Political	Geographic
1	Bulgaria	CEE	Eastern	16	Finland	EU	Northern
2	Czech Rep	CEE	Eastern	17	France	EU	Central
3	Estonia	CEE	Baltic	18	Greece	EU	Southern
4	Hungary	CEE	Eastern	19	Iceland	EFTA	Northern
5	Latvia	CEE	Baltic	20	Italy	EU	Southern
6	Lithuania	CEE	Baltic	21	Liechtenstein	EFTA	Central
7	Poland	CEE	Eastern	22	Luxembourg	EU	Central
8	Romania	CEE	Eastern	23	Netherlands	EU	Central
9	Slovak Rep	CEE	Eastern	24	Norway	EFTA	Northern
10	Slovenia	CEE	Eastern	25	Portugal	EU	Southern
11	Austria	EU	Central	26	Spain	EU	Southern
12	Belgium	EU	Central	27	Sweden	EU	Northern
13	Denmark	EU	Northern	28	Switzerland	EFTA	Central
15	Ireland	EU	Central	29	UK	EU	Central
				31	Germany	EU	Central

FUNCTIONAL SCOPE

Data requested was conventional in that it mainly followed practice adopted by UNESCO, defined in ISO 2789 *Library Statistics*, and used in previous LIBECON statistical surveys. Some new questions were included to cover electronic developments and automation. The low level of response to these new questions was anticipated: it will take time for them to be incorporated into standard statistical series at the country level. But any criticism received has been on the lines that we could have innovated further - and further innovation can be expected with the current revision of ISO 2789. The data items collected are as follows.

Non Financial Data:

Line 1 - Total Administrative Units
Line 2 - Number of Respondents
Line 3 - Service Points
Line 4 - Books & Bound Periodicals
Line 5 - Current Periodicals - Titles
Line 6 - Current Periodicals - Subscriptions
Line 7 - Manuscripts
Line 8 - Microforms
Line 9 - Audio-visual Materials
Line 10 - CD-ROMs
Line 11 - Books & Bound Periodicals - Additions
Line 12 - Audio-visual Materials - Additions
Line 13 - Percentage Stock on Open Access
Line 14 - Percentage Catalogue Records Automated
Line 15 - Number of Workstations for users
Line 16 - Registered Members
Line 17 - Loan Transactions
Line 18 - Number of Visits
Line 19 - Inter Library Loans - Issued
Line 20 - Inter Library Loans - Received
Line 21 - Sector Population to be Served
Line 22 - Trained Librarians
Line 23 - Other Library Staff
Line 24 - Total Staff

Financial Data:

Line 25 - Staff costs
Line 26 - Cost of Stock Acquisition
Line 27 - Cost of Electronic Information
Line 28 - Cost of Automation
Line 29 - Premises and Related Costs
Line 30 - New Buildings / Refurbishment Costs
Line 31 - Other Revenue Expenditure
Line 32 - TOTAL REVENUE EXPENDITURE
Line 33 - Institutional Funding
Line 34 - Fees & Charges
Line 35 - Other Income
Line 36 - TOTAL INCOME
Line 41 - TOTAL CAPITAL PAYMENTS

Derived Ratios Many more ratios have been provided as a facility on the LIBECON 2000 database. Most of these, but not all, relate resources and performance to population - frequently referred to as 'per head of population'. For this purpose data on population are required and have been provided in two ways. Line 21 asks for 'Population to be served'. For the Tertiary sector Line 21 responses have been overwritten by UNESCO totals of 'Staff + Students'.

In addition population figures, as estimated by the United Nations, are available, and the ratios based on responder populations [Line 21] have been duplicated using these UN sources. For comparisons between countries these are generally recommended.

National	Total Population - all ages
Tertiary (Higher Educ'n)	Persons aged 20 - 24 years
Public	Total Population - all ages
Special	Persons aged 15 - 64 years
Other Major	Total Population - all ages
School	Persons aged 5 - 19 years

The complete list of Derived Ratios is as follows. It is not technically difficult to add to this list of Derived Ratios.

Respondents as % age of Administrative Units = [Line 2 ÷ Line 1 x 100]
 Population per Service Point = [Line 21 ÷ Line 3]
 Staff per Service Point = [Line 24 ÷ Line 3]
 Volumes per Service Point = [Line 4 ÷ Line 3]
 Transactions per Service Point = [Line 17 ÷ Line 3]
 Books and Bound Periodicals per 1,000 Population = [Line 4 ÷ Line 21 x 1,000]
 Books and Bound Periodicals per 1,000 Sector Population = [Line 4 ÷ UN Pop x 1,000]
 Current Periodicals per 1,000 Population = [Line 6 ÷ Line 21 x 1,000]
 Book & Bound Periodical Additions per 1,000 Population = [Line 11 ÷ Line 21 x 1,000]
 Book & Bound Periodical Replenishment Rate = [Line 11 ÷ Line 4 x 100]
 Audio-Visual Materials Additions per 1,000 Population = [Line 12 ÷ Line 21 x 1,000]
 Registered Members per 1,000 Population = [Line 16 ÷ Line 21 x 1,000]
 Transactions per 1,000 Population = [Line 17 ÷ Line 21 x 1,000]
 Transactions per Member = [Line 17 ÷ Line 16]
 Stock Turn = [Line 17 ÷ { Line 4 + Line 9 }]
 Visits per 1,000 Population = [Line 18 ÷ Line 21 x 1,000]
 Trained Librarians per 100,000 Population = [Line 22 ÷ Line 21 x 100,000]
 Ratio of Trained Librarians to Other Staff = [1 : { Line 23 ÷ Line 22 }]
 Total Staff per 100,000 Population = [Line 24 ÷ Line 21 x 100,000]
 Transactions per Member of Total Staff = [Line 17 ÷ Line 24]
 Expenditure on Staff per 1,000 Population = [Line 25 ÷ Line 21 x 1,000]
 Employee Expenditure per Member of Staff = [Line 25 ÷ Line 24]
 Employee Costs as a Proportion of Total Expenditure (%) = [Line 25 ÷ Line 32 x 100]
 Total Employee Costs divided by Trained Librarians = [Line 25 ÷ Line 22]
 Expenditure on Stock Acquisition per 1,000 Population = [Line 26 ÷ Line 21 x 1,000]
 Average Cost per Item Acquired = [Line 26 ÷ { Line 11 + Line 12 }]
 Materials costs as a proportion of Total Expenditure (%) = [{ Line 26 + Line 27 } ÷ Line 32 x 100]
 Materials Expenditure per Service Point = [{ Line 26 + Line 27 } ÷ Line 32]
 Other Costs as a Proportion of Total Expenditure (%) = [{ Sum of Lines 28 to 31 } ÷ Line 32 x 100]
 Total Expenditure per 1,000 Population = [Line 32 ÷ Line 21 x 1,000]
 Total Expenditure per Administrative Unit = [Line 32 ÷ Line 1]
 Total Expenditure per Service Point = [Line 32 ÷ Line 3]
 Proportion of Non-Institutional Income (%) = [{ Line 34 + Line 35 } ÷ Line 36 _ 100]
 Total Capital Expenditure per 1,000 Population = [{ Line 30 + Line 41 } ÷ Line 21 x 1,000]

EXCHANGE RATES

To assist the comparison of libraries' revenue investment across the different countries included in the survey, we have converted their reported expenditures to euros (ecu equivalent for earlier years), using the reported exchange rates published in the Financial Times.

Conversion rates are also published at:

<http://www.xe.net/ucc/>

<http://www.ft.com/cgi-bin/pft/etradingday.pl/report>

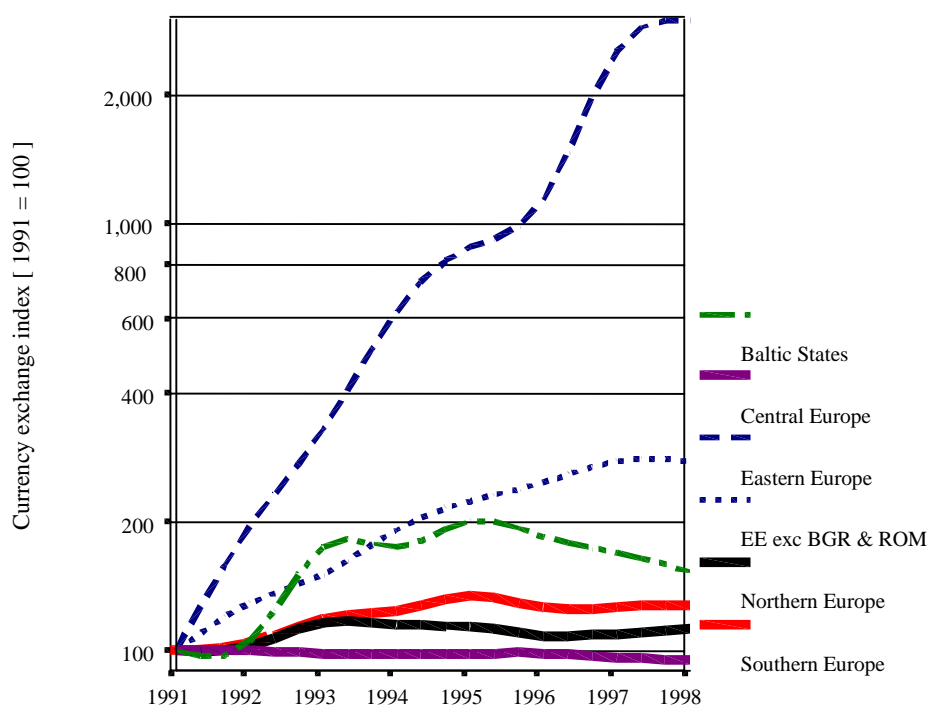
However, exchange rates can fluctuate considerably during the course of each financial year for which the survey of libraries' activities is reported. Therefore, the rate of exchange (whether an annual average or a fixed point in the middle of the year) can only provide an approximate translation of the national currencies to the common euro base. Furthermore, where countries have experienced high price inflation and / or economic instability the conversion rates fall out of phase leading to some peculiar and particularly skewed translations. The following table provides an index of exchange rate movements for the study period for the main summary groupings of countries.

Table 2.3

1991 = 100.0	1992	1993	1994	1995	1996	1997	1998
Northern Europe	102.9	116.6	115.1	114.0	108.7	109.8	112.7
Central Europe	100.1	98.8	98.1	98.5	98.8	96.3	95.8
Southern Europe	103.8	118.5	124.3	134.6	126.7	126.7	127.9
Baltic States	105.7	175.2	175.1	201.0	185.2	169.5	153.8
Eastern Europe	195.6	328.7	623.2	880.6	1,139.2	2,523.0	2,969.5
<i>exc Bulgaria & Romania</i>	129.7	151.2	191.9	224.1	247.6	277.8	278.2

It is evident that in Eastern Europe there has been considerable instability leading to a rapid rise in the denominations of national currencies required to purchase the euro. In particular, the movements in Bulgaria and Romania were considerably higher than in the remainder of Eastern Europe. After excluding these two countries, the movements in the exchange rates remain relatively high in the rest of Eastern Europe, but the overall increase is both steadier and less extreme.

Average movements in national currency requirements to purchase the euro:



In some cases there has been a change in the unit of national currency during the period. (For instance, Estonia has changed from the Rouble to the Tallar to the Kroon since 1988). To overcome the implausible effects which arise from converting currencies for some countries in some years, it has been necessary to “smooth” the published rates. The adjusted rates are shown in italics in the following table:-

Table 2.4 Equivalent units of national currency to match one ECU (euro):

Country	National Currency	Year:							
		1991	1992	1993	1994	1995	1996	1997	1998
Bulgaria	Lev	23.32	30.30	32.38	64.53	87.86	150.00	2700.00	2700.00
Czech Rep	Koruna	64.82	51.30	34.14	34.24	34.77	34.46	35.93	36.32
Estonia	Kroon	11.00	11.00	15.48	15.45	15.00	15.23	15.47	15.70
Hungary	Forint	92.61	102.53	107.65	125.09	164.55	193.74	211.65	240.57
Latvia	Lats	1.00	0.96	0.79	0.67	0.69	0.68	0.66	0.65
Lithuania	Litas	2.50	2.79	5.68	5.82	6.88	6.23	5.59	4.95
Poland	Zloty	1.31	1.77	2.12	2.72	3.17	3.50	3.94	3.92
Romania	Leu	94.66	399.75	890.02	1980.66	2947.10	3922.20	8111.50	9984.90
Slovak Rep	Koruna	56.76	49.42	36.03	38.12	38.86	39.10	38.11	39.54
Slovenia	Tolar	34.16	105.52	132.60	155.20	154.88	171.78	181.00	185.96
Austria	Schilling	14.43	14.22	13.62	13.54	13.18	13.43	13.82	13.85
Belgium	Franc	42.22	41.59	40.47	39.66	38.55	39.30	40.53	40.62
Denmark	Crown	7.91	7.81	7.59	7.54	7.33	7.36	7.48	7.50
Ireland	Pund	0.77	0.76	0.80	0.79	0.82	0.79	0.75	0.79
Finland	Markka	5.00	5.81	6.70	6.19	5.71	5.83	5.88	5.98
France	Franc	6.97	6.85	6.63	6.58	6.53	6.49	6.61	6.60
Greece	Drachma	225.22	247.03	268.57	288.03	302.99	305.55	309.36	330.73
Iceland	Krona	79.00	79.00	79.25	83.11	84.69	84.66	80.44	79.70
Italy	Lira	1533.24	1595.52	1841.23	1915.06	2130.14	1958.96	1929.30	1943.65
Liechtenstein	Franc	1.80	1.80	1.73	1.62	1.55	1.57	1.64	1.62
Luxembourg	Franc	42.22	41.59	40.47	39.66	38.55	39.30	40.53	40.62
Netherlands	Guilder	2.31	2.27	2.18	2.16	2.10	2.14	2.21	2.22
Norway	Crown	8.30	8.30	8.31	8.37	8.29	8.20	8.02	8.47
Portugal	Escudo	178.61	174.71	188.37	196.90	196.11	195.76	198.59	201.70
Spain	Peseta	128.47	132.53	149.12	158.92	163.00	160.75	165.89	167.18
Sweden	Crown	7.48	7.53	9.12	9.16	9.33	8.51	8.65	8.92
Switzerland	Franc	1.80	1.80	1.73	1.62	1.55	1.57	1.64	1.62
UK	Pound	0.70	0.74	0.78	0.78	0.83	0.81	0.69	0.68
Germany	Mark	2.05	2.02	1.94	1.92	1.87	1.91	1.96	1.97
United States	US Dollar	1.25	1.24	1.17	1.19	1.31	1.27	1.13	1.12

The simple principle adopted has been to divide the reported expenditures by the relevant units set out in the above table to gain an equivalent in euros. This process allows the survey returns to be summarised across all countries, and provides a basis for simple comparison. What it does not allow for is the very different purchasing powers of money in each country. For instance, part of the difference in the cost of staff (see below) is due to the economic circumstances prevailing in the countries of personnel with equivalent skills and responsibilities.

Therefore, although the costs of some library activities may seem higher in some countries, it may be possible to purchase more in the local economies of others.

Table 2.5 Cost of FTE staff

<i>Countries of:</i>	€ p.a.	<i>Geographic location:</i>	€ p.a.
Central & Eastern Europe	8,100	Northern Europe	27,000
European Union	25,000	Central Europe	26,100
European Free Trade Agreement	22,800	Southern Europe	16,900
		Baltic States	5,000
All States	19,200	Eastern Europe	8,600

Comparisons of expenditure on libraries are made later in this study compared with the Gross Domestic Product (GDP) of the country. GDP is the sum of the gross value added by all resident and non-resident producers in the economy of the country plus indirect taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. However, because of the relative differences in the economies of each country, a purchasing power parity (PPP) conversion factor has been applied. The factor is derived from price surveys - covering 118 countries - conducted by the International Comparison Programme (ICP). The surveys, completed in 1996, are based on a 1993 reference year.

To simplify the calculations, libraries expenditure has been expressed per head of population, and GDP has been expressed per head of population after adjusting for purchasing power parity. This provides a simple way of expressing the relative proportion of investment made in libraries in the economies of each country on a consistent basis.