

## Analysis of the Efficiency of Public Libraries by CBA

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### Abstract

*The efficiency expresses the effectiveness of embedded resources and benefits obtained by them. Monitoring of the effectiveness indicator has crucial importance in economic theory, where the main objective is to provide and ensure a sufficient quantity of goods and services with proportionate costs for their production. The issue of efficiency in public services is very important, particularly for the reasons a tendency to reduce government spending on public services and there is also the continuous development, growth and expansion of needs of the public in accordance with the dynamic development of the society. Services of public libraries are among the mixed public services, which are financed from public funds and it is very difficult to evaluate their effectiveness. The paper deals with the evaluation of the efficiency of two selected libraries: City Library in Tabor and the Municipal Library in Prague. For analysis is used method CBA. For determine the benefits of the various services are used results from research of the Municipal Library in Prague, entitled "Methodology of measuring the value services of libraries", that was held in 2011 - 2013. It is a research which has not been yet implemented in this segment. It uses a unique approach to evaluate the benefits of individual services. The aim of this paper is to determine which services are provided efficiently. Mutual comparison of public libraries allows to glimpse into their economy, find the differences between the level of unit costs of individual services and the differences between efficiency. Documents will enable to assess by public libraries their economic situation, the amount of expended financial resources, or the direction of orientation for further development activities.*

**Key words:** Efficiency, cost-benefit analysis, public services, library.

**JEL Classification:** D61, H4, H83

### 1 Introduction

The contemporary economic system works on the principle of a mixed economy. It is made up of private and public sector. Public libraries are provided by public institutions, municipalities and cities operate their business, public libraries are financed from public funds, decision-making is public choice and public libraries subject to public control. The emphasis is on efficiency also in the public sector in these days. Public sector is often characterized by a high degree of inefficiency. The cost of the operation of public libraries can be relatively easy to determine, on the other hand, the price of services of public libraries is not easy to measure. The characteristic of public service is specific in itself, we can't use routine calculations and procedures for its determination. The problem is additionally complicated by the fact that the main criterion for decision-making in the public sector is the public interest, which is considered such an interest that meets the needs of society. Precise and clear definition of the public interest does not exist, this is due to the different views on the issue and also different social and economic impacts on different population Gross (Ochrana, 2010). This presentation will discuss the determination of costs and benefits for

each public library services, there will be calculated their efficiency and their comparison will be done by two libraries - in a town Tabor and in the capital city of Prague.

## **2 Public Library Services**

Public library services are public services and there are provided for the purpose of welfare of the whole society. We rank them among the mixed collective services, because they meet the characters; divisibility, exclusion from consumption and rivalry in consumption. The Directive IFLA / UNESCO (2012) defines a public library as an organization that is "established, supported and subsidized by the society, through local, regional or national government or any other form of social organization. It provides access to knowledge, information and works of art through a variety of resources and services. It is accessible to all members of society equally, regardless of race, nationality, age, gender, religion, language, disability, economic status, occupation and level of education achieved. " It was necessary to define the scope of services which public libraries provide and thus meet the needs of users. They are defined by the Directive IFLA / UNESCO (2012). Public library services should be easily accessible, the library have to provide them in a library environment or in public and these include: (off-site) lending of books and other documents / other media, providing books and other documents locally at the library, information service using printed and electronic media, readers advisory services including reservations and information services for local communities, educating customers, including support for libraries literacy programs, events and activities, use of modern communication tools such as blogs, news through mobile phones and social networks for both reference services and also for Public relations.

## **3 Evaluation of Public Library Services**

Because library services are very important for their particular cultural and educational activities and in these days there is tendency to reduce public expenditure, it is necessary to examine whether public expenditure is being spent effectively or not. For public services, there is a problem in the evaluation of their contribution, benefit, benefit. Each individual has a personal preference and for each person public service brings a variety of value-added service. In the analysis of the value of goods there is not enough to appeal to its subjective character or the functional characteristics (Menger, 1994). An individual does not evaluate abstract class (eg. fridge), but the specific threshold quantity, that he compares with the total available supply (specific brand refrigerators, equipment, availability of in-store). Value of goods we can not establish universally in terms of rarity, but it is methodologically appropriate to apply the value of goods to the utility it brings in consumption, ie. determine the value of goods ex-post by benefit of consumers (Stejskal, 2013). It is important to realize that public library services does not bring benefit only to one specific person, but it bring benefit to the general public. Knowledge transfer and spillover effects we can see for example in the promotion of literacy of the population (Aabo, 2007). These side effects are called positive externalities. The key concept for the valuation of public library services is to determine the economic value that is not the same as a commercial or financial value. Throsby (2003) states that it is the monetary expression of value in use of cultural goods and services, where is not included in the non-market value. All methods for measuring the economic value of library services must according to Holt, Elliot and Moore (1999) to meet certain characteristics: simplicity, reliability and punctuality.

## **4 Analysis of the Effectiveness of Selected Libraries**

### **4.1 Methodology**

The CBA method was chosen to calculate the efficiency of public libraries. This method allows to evaluate the activities of the societal scale, thus activities of groups of people who live in a certain area. It analyzes the costs and benefits that apply to the service provider for a certain period of time. Using the formula for the calculation of the analysis CBA:  $E = B / C$ , where E indicates efficiency, B is the perceived value of the service provided and C is the cost of provided service. Through the CBA we determine the effectiveness of services of public libraries. The rule is that the higher the value is, the greater is the efficiency. 100% corresponds to the value 1, there is balance between costs and benefits in this point. If the value of the efficiency is smaller than 1, it means that costs outweigh the benefits, and the service is not efficient. In case the efficiency is greater than 1, then the benefits are higher than the cost and providing such a is efficient.

The research data are drawn from the financial statements of the library, from the library statistics and computer software programs for library services. Furthermore data was collected through a questionnaire survey, which was part of the research project "Methodology for measuring the value of library services" funded by the Ministry of Culture of the Czech Republic in 2011-2013. The project was implemented in the Municipal Library in Prague (hereinafter MLP), which is the largest public library in the Czech Republic, the extent of their services is considerable and includes all services that are provided in other public libraries in the Czech Republic. The number of users with a valid library card and at least one visit in 2013 was 182 890. The values were investigated with readers MKP (total approached 11 397 readers) and the research results were processed from a total of 2,227 responses obtained. To verify the results obtained in MLP research survey was conducted in the following libraries:

- Municipal Library in Tabor, which was addressed 2,020 readers and the number of responses obtained was 387;
- Municipal Library in Kutna Hora, which was addressed 169 respondents, the number of returned responses was the number 78;
- Library of Bedrich Benes Buchlovana in Uherske Hradiste, which was interviewed 6,131 readers, number of responses was the 894th.

The libraries were selected for observing especially because of the size of the municipality in which the library is located, another criterion was the geographic location of libraries. The research showed that the values in the majority of the value of services do not differ and the methodology for calculating the value of the services we can use to libraries with different numbers of readers and in municipalities with different populations. Population, as well as the number of readers and geographical location of libraries, does not affect the value of the service. It is therefore a validated procedure, which can be considered as generally valid. The following calculations are based on the results of this research.

### **4.2 The procedure for analyzing the efficiency of library**

The process of economic evaluation of the activities of libraries proceeds in the following four steps:

1. definition of outputs,
2. valuation of the output,
3. calculation of costs of individual outputs,
4. calculation efficiency.

The individual steps need to be further characterized.

#### 4.2.1 Definition outputs of the library

The outputs of the library are necessary to define and standardize by disjoint manner. Standardization consists in defining all services provided by the library and their subsequent breakdown and grouping. The range of services which public libraries must provide, are defined by the Directive IFLA / UNESCO (2012). Based on the book "Invaluable library services and how to appreciate it" (Mikušová Měřičková, Stejskal, 2013), can be outputs for analysis divided into 6, 12 or 24 groups. In this paper, is applied breakdown by 12 groups of services that are listed below with more details of the activities which belong to each group:

- absence books borrowing with the assistance - which include borrow of books, magazines, CD outside of the library which have been found with the help of librarian;
- absence books borrowing without assistance - borrow of books, magazines, CD outside of the library which have been found without the help of a librarian;
- attendance books borrowing with the assistance – reading books, newspapers or magazines, study documents, etc. in library - searched with the help of a librarian;
- attendance books borrowing without assistance – reading books, newspapers or magazines, study documents, etc. in library - searched separately;
- copying and printing of documents – includes self-service printing and copying documents with the help of a librarian;
- attendance digital services - the use of computers in the library for Internet access or for office applications, image editing, etc. (not to work with catalogs and databases) and other digital services in the library (eg. database access, reading e-books, etc.);
- digital services with remote access - searching in the catalog on the library website (Library system of libraries), downloading e-books from the library website and downloading or viewing articles and other electronic documents of professional electronic databases (eg. Proquest, EBSCO) via libraries website (in addition to using its own library catalog);
- information and literature search - request the librarian for help in finding some information in the library or on the Internet, finding a fact (not query the library services and library fund) and request e-mail or phone for help finding some information, findings some fact (not query the library services and library fund);
- cultural and educational events – it is a participation in educational or cultural program at the library or at the program organized by the library outside the libraries;
- technical services – they means staying in the library with the use of the wifi-connection, other technical equipment of libraries (players, digital piano, game console, etc., electrical outlets);
- library services for the life of the community – they are meant to use the library for services related to a communal agenda, for example agenda Opencard in Prague (Cards Prager);
- staying in the library – here is included staying in the library for personal relaxation and rest, study documents other than library materials or meeting and chat with acquaintances, etc. (time spent in the library more than the time necessary for processing borrowing and the other above-mentioned library services).

#### 4.2.2 Valuation of outputs of the library

The outputs libraries is not easy to determine and calculate their value (for reasons already stated above, one example is the specific nature of public services, the existence of spill-over effects, different preferences and different levels of benefit from the services provided for each individual). During valuing the services provided by libraries, you can use the value of the perceived values that were identified in the research project (eg willingness of readers to accept compensation for losses arising from certain activities or willingness of readers to pay

for the availability of certain benefits, application of Throsby access, for more see Throsby 2003). The paper presents the value of CZK 742, which corresponds to the one visit in the library and the amount of CZK 66.45, which represents the value of one absence borrowing. Another possibility of libraries how to determine the perceived value of the services is to conduct your own research and investigation to determine the value of the services of its readers (eg questionnaire).

#### 4.2.3 Quantifying the cost of individual outputs

Now it is necessary to analyze the costs of different types of outputs (provided services) library. Categorizing of costs shall be made through an analytical breakdown of accounts in accounting, the cost will be divided into four basic groups: the cost to fund educational and cultural activities, cost of premises, staff costs and overheads.

#### 4.2.4 Calculation of efficiency

Calculation of efficiency will be calculated as the ratio of benefits and costs of various services provided by the public library. The above is how and from what sources we obtain data on the costs of the library, by means of which created two options for calculating efficiency of libraries - fast calculations and detailed calculation.

Fast calculations may be performed in two ways, using realistic or conservative estimate. They use values and coefficients determined by analyzing the Municipal Library in Prague, for their calculation is necessary to know the following values:

- the total cost of the library for one year (data sources are documents of accounting);
- the number of physical visits to libraries for one year (data sources are outputs from the library statistics and software);
- the amount of borrowings for one year (data sources are outputs from the library statistics and software).

In the case of a realistic estimate is needed first calculate the value of library services for 1 year = 742 CZK \* number of physical visits to the library for one year. Thus, the calculated value is substituted into the final calculation of the efficiency of libraries = value of library services for 1 year / total costs of the library for one year.

If we calculate using a conservative estimate, first compute the value of absence book borrowings for 1 year = 66.45 CZK \* the number of absence book borrowings in one year. Then find out the cost for services of absence book borrowing for 1 year = total cost libraries for one year \* 0.7 and then we substitute the values in the calculation of the efficiency of library = value of absence book borrowings for 1 year / costs of service for absence book borrowing book for one year.

Detailed calculation is more difficult to process, since the calculation is performed on more detailed data, gives us more accurate results, namely the efficiency of individual public services provided by libraries. Detailed calculation involves the following steps:

1. standardization of services;
2. breakdown of costs for each standardized services;
3. followed by the allocated time frame librarians again on individual standardized services;
4. as the last of the necessary steps before calculating detailed efficiency of the library is perform an passportization of space that consists of measurement and distribution of the library space on various standardized services (by square metres).

### 4.3 Results of analysis

Comparison of libraries in terms of statistical data collected from information on library websites, the financial statements and library statistics is shown in Table 1. From the values it is clear that the Municipal Library in Prague and Tabor differ significantly in all the above-mentioned data, as the number of readers, the size of the book collection, the cost of library operations and more.

**Tab. 1 Comparison of statistical data Urban Libraries in Prague and Tabor**

Name of data	Tabor	Prague
Number of readers	9 470	182 890
Number of library units	171 406	2 061 912
Number of cultural events	156	3 483
Number of visits to libraries	144 445	2 179 568
Number of borrowings	378 800	6 435 873
Number of branches of the library	6	42 + 3 bibliobus
The cost of library	12 542 380	251 513 389
The perceived value of the library	19 779 597	371 834 474

Source: own processing on the basis of data available from the library websites ([www.mlp.cz](http://www.mlp.cz), [www.knihovnatabor.cz](http://www.knihovnatabor.cz))

The efficiency of each library was calculated by fast and detailed calculation. For a detailed calculation was used calculator for 12 groups of services available on the website of the Municipal Library in Prague (<http://roi.mlp.cz>).

#### 4.3.1 Fast calculations

The values needed for the procedure and representation of the overall efficiency the libraries in the form of fast calculations are presented in Table 2.

**Tab. 2 The resulting values of fast calculations efficiency of libraries**

	Tabor	Prague
The total cost of the library	12 720 054	251 513 389
The number of physical visits to libraries in 2013	144 445	2 298 272
The amount of borrowings in 2013	242 709	4 781 466
<b>Realistic estimate</b>		
The value of library services for one year	107 178 190	1 705 317 824
<b>Efficiency of library</b>	<b>8,42592</b>	<b>6,78023</b>
<b>Conservative estimate</b>		
The value of absence book borrowing for one year	16 128 013	317 728 416
The cost of absence book services for one year	8 904 038	176 059 372
<b>Efficiency of library</b>	<b>1,81131</b>	<b>1,80467</b>

Source: Own processing based on data obtained from library statistics and financial statements libraries

Overall efficiency of libraries in the case of a realistic estimate is based on high levels: 8.42592 for library in town Tabor and 6.78023 for Municipal Library in Prague. The reason for the difference between efficiency can be substantial difference between the costs of libraries. The amount of the resulting efficiency can also be determined by the value of CZK 742. The benefits of public services provided are considerably higher than the costs incurred for these services libraries (efficiency value is higher than 1).

The results of overall efficiency of the libraries in Prague and Tabor in the case of a conservative estimate are the same (the difference between the efficiency of only 0.00664). We can say that the activities of both libraries are efficient (efficiency value is higher than 1).

The rate of return on investment therefore the costs, which we put on public library services and they will return (evaluate) worth more than 180%.

#### 4.3.2 Detailed calculation

Detailed calculation allows to determine the efficiency of individual services of libraries, so we can compare which services are effective and which are ineffective.

**Tab. 3 The resulting values of a detailed calculation efficiency of libraries**

Standardized library services	Total costs of services (in CZK)		Quantification of service (pieces)		The unit cost of service (in CZK)		The perceived value of services (in CZK)	The effectiveness of library	
	Tabor	Prague	Tabor	Prague	Tabor	Prague		Tabor	Prague
Absence book borrowing with the assistance	2 825 833	59 362 748	21 112	941 049	60,84	63,08	66,45	<b>1,09</b>	<b>1,05</b>
Absence book borrowing without assistance	6 429 363	117 271 697	221 597	3 840 417	29,01	30,54	66,45	<b>2,29</b>	<b>2,18</b>
Attendance book borrowing with the assistance	616 166	14 814 531	2 548	202 853	80,61	73,03	8,44	<b>0,10</b>	<b>0,12</b>
Attendance book borrowing without assistance	1 009 427	20 634 454	7 138	860 217	47,14	23,99	5,51	<b>0,12</b>	<b>0,23</b>
Copying and printing of documents	72 697	1 465 452	9 225	157 392	7,88	9,31	3,05	<b>0,39</b>	<b>0,33</b>
Attendance digital services	189 576	3 916 291	17 250	208 850	10,99	18,75	16,74	<b>1,57</b>	<b>0,89</b>
Digital services with remote access	380 495	7 157 661	102 027	9 734 303	0,75	0,74	2,96	<b>2,76</b>	<b>4,02</b>
Information and literature search	174 848	3 464 363	237	52 333	737,76	66,20	8,12	<b>0,01</b>	<b>0,12</b>
Cultural and educational events	364 253	11 208 745	4 770	128 442	76,36	87,27	53,02	<b>0,69</b>	<b>0,61</b>
Technical services	78 864	2 745 831	480	228 560	13,69	12,01	22,72	<b>1,66</b>	<b>1,89</b>
Library services for the life of the community	45 990	921 271	1	16 712	3 832,54	55,13	82,38	<b>0,02</b>	<b>1,49</b>
Staying in the library	354 868	8 550 345	324	188 112	91,27	45,45	5,83	<b>0,06</b>	<b>0,13</b>

Source: Own processing based on data obtained from library statistics and financial statements libraries through the use of a calculator available on <http://roi.mlp.cz>

From the obtained results it is clear that in most cases (except digital service attendance and library services for the life of the community) are the same for both libraries services provided efficiently (in the table highlighted in yellow) or inefficiently. It was found that effective services of both libraries include providing absence book borrowing with assistance and without assistance, digital services with remote access and technical services. Furthermore, the library in Tabor provides digital services attendance effectively, but the same service in MKP is provided inefficiently. A significant difference is in the efficiency of library services for the life of the village, where in Tabor City Library has a value of only 0.02 compared to MKP, which has the same the efficiency services in the amount of 1.89. This may mean that the library Tabor these services almost don't provide or here isn't interest from readers and the service is not used. The calculation refers to the fact that the library in Tabor has too high unit costs for certain services. It may also be given to employment of more workers than needed for the library services.

It is also possible based on the detected results say that in both libraries are preferred absence books borrowing of before attendance books borrowing. Borrowing books whether absence or attendance in both libraries are used more in the form without assistance. From this fact we

can conclude that people are well orientated in the library and they don't need help of librarian in searching books.

Significant inefficiency was found in the information services and research. For both libraries it is the highest degree of inefficiency from all the services, the lowest value (0.01) was found in Tabor city library.

Presented values of the efficiency of public library services should serve as a basis for their evaluation. In the case of inefficiency should be made by libraries to either a decrease in financial expenses for the services, or to improve the quality and efforts to increase interest among readers use the particular service. However, it should be noted that the scope of services is embraced by the Directive IFLA / UNESCO (2012), there are services that, despite the very low efficiency must be provided to the public.

## **5 Conclusions**

The aim of the article was to calculate the efficiency of public library services and their comparison. The article was used for this purpose method CBA and was proven that you can calculate the efficiency of individual libraries and enable their comparison. Methodology for calculating the efficiency of the public services is a very valuable tool for individual libraries. They provide better orientation in spending financial resources for libraries and they can decide which service to prioritize more or less. The calculation also allows to monitor the extent to which each service library visitors are requested and used. The advantage of calculating is the easy availability of data on the cost side (inputs). Each library has an internal cost information about library management, data about the number of visitors and the number of book borrowings are readily ascertainable from the internal software library, or easily measurable. Other information needed to calculate such as timetable of library staff and area passportisation can again be easily found directly at the place of the library. The advantage of this calculation is its simplicity, can be accomplished through referred formulas or insert informations into the calculator on the website of the MLP. The disadvantage is the problem of calculating the valuation of benefits (outputs), which is complicated and always depends on the respondent and his subjective valuation. In another disadvantage, we see the situation where, although there is a calculator, a tool which libraries can be used to improve its business, its own library unused. To calculate the efficiency of the services they need stimulus from surrounding environment and the calculation is not performed by the library itself, but often by the person from outside of the library. For these reasons it is appropriate to continue the research and the need to find for more detailed information on the topic. The results of the calculations should serve as a basis for deciding the future of libraries. The issue of evaluation of public services is broad and complex, moreover, in a dynamically developing company, changes in perception of values, therefore it is necessary to continue to devote and by the other research surveys complement the already acquired knowledge.

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