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INFLUENCE OF INFORMATION INFRASTRUCTURE ON THE FUNCTIONALITY OF SELECTED MILITARY UNIVERSITY LIBRARIES

A b s t r a c t : The purpose of the article is to present the results of research on the impact of information infrastructure on the functionality of selected military universities libraries. The first part of the article outlines the research methods used in research on the information infrastructure of scientific libraries. Then, the results of author's research on the impact of information infrastructure on the functionality of libraries at the selected military universities in Poland are presented. The rest of the article presents the ranking of the studied libraries, based on the results of the analysis of information infrastructure factors affecting their functionality. The summary summarizes the conclusions of the analysis carried out, along with suggested specific directions of actions to better optimize the management of the information infrastructure in the examined libraries.

K e y w o r d s : information infrastructure, libraries of military universities, functionality indicators, functional factors

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INTRODUCTION

Information infrastructure management is essential for the functioning of modern information centers, such as university libraries. The market of library services is developing dynamically and in order to meet its ever-increasing requirements, they should be developed and modernized. The key here is the efficient management of information infrastructure, without which the functioning of modern libraries would not be possible today. This acquires particular importance in the libraries of military universities, which, operating in the structure of the armed forces, are one of the elements of the security system – it is there that the key information for this system is collected and organized. In the era of

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hybrid threats, the range of services they provide is increasingly dynamically expanding and evolving. The efficient functioning of libraries means the need to optimize their information resources, where the key is to identify factors affecting their functioning and development. This article presents the results of a detailed analysis of these factors, in which the author compared data from selected scientific libraries of military universities. As a result, the impact of information infrastructure on the functionality of these organizations was determined. The following libraries of Polish military universities were analyzed: Library of the Polish Naval Academy, Library of the War Studies University, Library of the Military University of Technology and the Library of the Military University of Land Forces. Functionality indicators that were the subject of the analysis were developed by the *Project Analysis of the Functioning of Scientific Libraries in Poland* (AFBN), out of all indicators (109) detailing 41 that relate to strict information infrastructure.

1. OVERVIEW OF RESEARCH METHODS USED IN RESEARCH ON INFORMATION INFRASTRUCTURE OF SCIENTIFIC LIBRARIES

Research methods on the information infrastructure of scientific libraries, due to its heterogeneous structure, use the achievements of other disciplines such as bibliography, computer science, sociology, pedagogy, psychology, economics, history, scientific information, and book science. That is why book methods, especially typographic and bibliographic, are successfully used in research; historical methods - especially useful when the history of libraries is examined; sociological methods – when studying readership and the social significance of libraries; from economic sciences statistical and organizational research methods come into play - when the subject of analysis are the problems of library organization and management. The comparative method is also important when assessing library activities [Piotrowska-Do, 2001]. The author used the last method in her research. Book studies have developed specialized bibliological methods that are useful in a much wider scope. Three of them deserve special attention. They are: bibliographic, typographic and provenance methods. In the bibliographic method, special attention should be paid to data processing, which thanks to the use of computer techniques has recently gained unprecedented momentum [Piotrowska-Do, 2001]. Bibliography stood at the beginning of scientific literature and for many centuries their history intertwined [Korpała, 1975, pp. 247-262]. As a result of using this method, national and international information systems are created, with hitherto unimaginable ranges based on computer technology [Bieńkowska, 1989, pp. 331-342]. The typographic method, also known as the typographic analysis method, was developed in the nineteenth centu-

ry on the field of incunabulistics. According to Maria Cytowska, who studies 16th-century official prints, only this method is "The most effective means to achieve these goals" [Bajor, 2013, pp. 37-50]. Barbara Bieńkowska emphasized in turn that "The research procedure, based on a very meticulous analysis of comparative data on the equipment and habits of individual workshops requires not only skills and skill on the part of contractors, but also the collection of numerous scientific aids (images, templates, files, etc.) [Bajor, 2013, pp. 37-50]. In Poland, typographic analysis was initiated by Joachim Lelewel (Bibliographic Books two. Vilnius 1923-26) and perfected and developed Kazimierz Piekarski [Bajor, 2013, pp. 37-50]. The provenance method, propagated in the interwar period by Kazimierz Piekarski, in the 1950s by Bronisław Kocowski, was most fully presented by Maria Sipayłło, also distinguished in the field of methodology and practice of provenance research. This method consists in tracking the routes of individual copies based on the ownership marks left on them (e.g. superelibrisses, bookplates, seals, signatures, dedications). [Bieńkowska, 1989, pp. 331-342]. Traces of readers' contact with the book in the most tangible way possible indicate the reactions of users, circulation of works, ranges and ranges of their interactions, groups and environment, sympathies and animosities [Bieńkowska, 1989, pp. 331-342; Bieńkowska, 1989, pp. 331-342]. Information science and library science also use 'mixed methodology'. The terms "mixed methodology" and "mixed research" are equivalent to the English expression mixed methods research [Cisek, 2010, pp. 88-93]. The "mixed methodology" was created, among others, in response to a far-reaching polarization of quantitative and qualitative strategy, which turned into the so-called "Paradigmatic wars" fought from the 1970s to the 1990s as a proposal offering their integration and emphasizing the advantages of using different cognitive perspectives simultaneously [Ngulube, Mokwatlo, Ndwandwe, 2009, pp. 105-116]. Currently, "mixed research" is conducted in social sciences (education, psychology, sociology), medical (family medicine, nursing, public health), technical and other [Fidel, 2008, pp. 265-272]. Its growing popularity in the scientific community is evidenced, among others, by: "its own" international journal - "Journal of Mixed Methods Research" (2007–), a large number of publications (3277 records in the universal bibliographic and abstract database SCOPUS by Elsevier), including monographic publications compact and textbooks as well as a relatively high level of sophistication of reflection on its essence, forms, goals, basic principles etc. "[Tashakkori, Creswell, 2007, pp. 3-7]. In turn, the statistical method used in the project Analysis of the functioning of scientific libraries (AFBN), which was also used by the author of this article, allows the analysis of the functioning of the library. Measurements of a library's achievements are aimed at assessing how it meets users' expectations, identifying strengths and weaknesses, and suggesting improvements. For these measurements, a selection and definition of a set of

relevant criteria, indicators and standards is required. The source for calculating the functionality indicators is library statistics and service quality assessment expressed by users. In the second case, it may be data collected during interviews, observations and surveys [Derfert-Wolf, Górski, 2008, pp. 41-65]. It was the data from the results of research carried out using this method that formed the basis for the analysis carried out by the author. Anita Kuźnik, in her article entitled „Metody badań w procesie zarządzania infrastrukturą informacyjną bibliotek naukowych." [Kuźnik, 2019]. Synthetically presented the most important research methods used in research on the information infrastructure of scientific libraries, in particular libraries of universities.

2. ANALYSIS OF INFORMATION INFRASTRUCTURE OF SELECTED MILITARY UNIVERSITY LIBRARIES

As mentioned in the introduction, selected libraries of military universities were analyzed in terms of functional indicators strictly related to their information infrastructure, and data for their construction, obtained from the analyzed libraries. In the case of the Library of the War Studies University (ASzWoj), Polish Naval Academy (AMW) and the Military Univeristy of Land Forces (AWL), the data were made available by the directors of these libraries, with the exception of the Military University of Technology (WAT), which has already provided ready indicators, because this library, as the only one analyzed in the country, participates in the *Functioning Project Scientific Libraries in Poland*.

Below, Table 1 presents the calculated indices for all analyzed libraries of military universities and their absolute values. The last column calculates the arithmetic mean (**m**), which in Table 2 will be taken as the standard from which the distance of individual libraries will be determined.

Table 1. Functionality indicators for the information infrastructure of military libraries in Poland (absolute values)

ON	Indicator	AMW	ASzWoj	WAT	AWL	m
1.	Registered users from their own university as a percentage of potential users	86,8	63	100,0	90,2	85
2.	Library employees as a percentage of total university employees	2,8	8,6	2,4	1,9	3,925
3.	Number of users per library employee	168	165	410	193	234
4.	Library surface per user	1,17	0,62	0,32	0,51	0,655
5.	Number of users per place to work in the library	14	70	61	25	42,5
6.	Number of students per library work place	11	65	54	18	37
7.	Number of users per computer station	64	361	211	270	226,5

8.	Number of users per computer station with Internet access	64	361	211	270	226,5
9.	Number of hours (per week) when library services are available	56	48	62	52	54,5
10.	Library expenditure per user in PLN	42,3	77,6	212,6	51,7	96,05
11.	Expenditure on library collections per user in PLN	42,3	66,3	73,5	51,7	58,45
12.	Expenditure on printed books per student in PLN	26,8	43,6	16,8	28,7	28,975
13.	Expenditure on electronic resources per user in PLN	no data	11,3	47,8	19,5	26,2
14.	Cost per visit to the library	3,2	18,5	24,7	12,4	14,7
15.	The cost of using the collections	6,3	10,1	14,6	3,7	8,675
16.	Expenditure on printed Polish and foreign books as a percentage of expenditure on library collections	0,50	61,23	20,33	40,44	30,625
17.	Expenditure on electronic resources as a percentage of expenditure on library collections	no data	17,07	65,07	37,67	39,93
18.	The number of non-electronic library files per user	49	88	26	58	55,25
19.	Number of printed books per user	41	87	25	58	52,75
20.	Number of printed books per student	51	94	28	80	63,25
21.	Number of printed books purchased per user	0,56	0,64	0,27	0,78	0,562
22.	Number of printed books purchased per student	0,70	0,68	0,31	1,07	0,69
23.	Increment of collections (books)	5473	-21262	2293	2609	-2721,75
24.	Increment of collections (printed magazines)	50	no data	176	72	93,33
25.	Harvest increase (other non-electronic collections)	9	no data	135	-786	-214
26.	Number of books printed in free access as a percentage of the total number of books in collections	no data	no data	2	13,96	7,98
27.	Computer-generated printed books as a percentage of the total number of printed books	98	54	30	96	69,5
28.	Book adoption time	no data	no data.	3	6	4,5
29.	Users actively lending as a percentage of registered users	57	48	56	59	55
30.	The number of rentals per registered user	5,2	5,3	3,7	5,6	4,95
31.	The number of rentals per active borrower	9,2	11,1	6,7	9,5	9,125
32.	Number of loans per library employee	865	1167	1554	1393	1244,75

33.	Visits to the library per user	12,9	4,1	8,6	4,1	7,425
34.	Activity of using non-electronic collections (turnover)	0,1	0,1	0,2	0,2	0,15
35.	Completed interlibrary loan orders as a percentage of orders placed	100	100	100	100	100
36.	The number of downloaded documents from licensed electronic magazines and full-text databases per user	0,3	0,5	10,2	1,6	3,15
37.	Number of training hours and classes for users per library employee	1,3	no data	0,4	4,5	2,06
38.	Network and / or interactive services	9	6	9	6	7,5
39.	Employees with higher librarianship education as a percentage of employees in the basic activity	45	66,6	64,7	85	65,325
40.	The number of publications of library employees per employee of the basic activity	0,3	no data	0,6	0,8	0,56
41.	Number of hours of participation in vocational training per library employee	4	no data	11	16	10,33

Source: Own elaboration based on the *Project Analysis of the Operation of Scientific Libraries*

Table 2 calculates the distances from the standard for the analyzed libraries, for which, as already mentioned, the arithmetic mean of all analyzed libraries was adopted.

Table 2. Functionality indicators for the information infrastructure of military libraries in Poland (distance from the standard – arithmetic average m = 100)

ON	**Indicator**	**AMW**	**ASzWoj**	**WAT**	**AWL**	**m = 100**
1.	Registered users from their own university as a percentage of potential users	102,12	74,12	117,65	106,12	100
2.	Library employees as a percentage of total university employees	71,34	219,11	61,15	48,41	100
3.	Number of users per library employee	71,79	70,51	175,21	82,48	100
4.	Library surface per user	178,63	94,66	48,85	77,86	100
5.	Number of users per place to work in the library	32,94	164,71	143,53	58,82	100
6.	Number of students per library work place	29,73	175,68	145,95	48,65	100
7.	Number of users per computer station	28,26	159,38	93,16	119,21	100
8.	Number of users per computer station with Internet access	28,26	159,38	93,16	119,21	100
9.	Number of hours (per week) when library services are available	102,75	88,07	113,76	95,41	100
10.	Library expenditure per user in PLN	44,04	80,79	221,34	53,83	100

11.	Expenditure on library collections per user in PLN	72,37	113,43	125,75	88,45	100
12.	Expenditure on printed books per student in PLN	92,49	150,47	57,98	99,05	100
13.	Expenditure on electronic resources per user in PLN	-	43,13	182,44	74,43	100
14.	Cost per visit to the library	21,77	125,85	168,03	84,35	100
15.	The cost of using the collections	72,62	116,43	168,30	42,65	100
16.	Expenditure on printed Polish and foreign books as a percentage of expenditure on library collections	1,63	199,93	66,38	132,05	100
17.	Expenditure on electronic resources as a percentage of expenditure on library collections	-	42,72	162,96	94,34	100
18.	The number of non-electronic library files per user	88,69	159,28	47,06	104,98	100
19.	Number of printed books per user	77,73	164,93	47,39	109,95	100
20.	Number of printed books per student	80,63	148,62	44,27	126,48	100
21.	Number of printed books purchased per user	99,64	113,88	48,04	138,79	100
22.	Number of printed books purchased per student	101,45	98,55	44,93	155,07	100
23.	Increment of collections (books)	-201,08	781,19	-84,25	-95,86	100
24.	Increment of collections (printed magazines)	53,57	-	188,58	77,15	100
25.	Harvest increase (other non-electronic collections)	-4,21	-	-63,08	-	100
26.	Number of books printed in free access as a percentage of the total number of books in collections	-	-	25,06	174,94	100
27.	Computer-generated printed books as a percentage of the total number of printed books	141,01	77,70	43,17	138,13	100
28.	Book adoption time	-	-	66,67	133,33	100
29.	Users actively lending as a percentage of registered users	103,64	87,27	101,82	107,27	100
30.	The number of rentals per registered user	105,05	107,07	74,75	113,13	100
31.	The number of rentals per active borrower	100,82	121,64	73,42	104,11	100
32.	Number of loans per library employee	69,49	93,75	124,84	111,91	100
33.	Visits to the library per user	173,74	55,22	115,82	55,22	100
34.	Activity of using non-electronic collections (turnover)	66,67	66,67	133,33	133,33	100
35.	Completed interlibrary loan orders as a percentage of orders placed	100,00	100,00	100,00	100,00	100

36.	The number of downloaded documents from licensed electronic magazines and full-text databases per user	9,52	15,87	323,81	50,79	100
37.	Number of training hours and classes for users per library employee	63,11	-	19,42	218,45	100
38.	Network and / or interactive services	120,00	80,00	120,00	80,00	100
39.	Employees with higher librarianship education as a percentage of employees in the basic activity	68,89	101,95	99,04	130,12	100
40.	The number of publications of library employees per employee of the basic activity	53,57	-	107,14	142,86	100
41.	Number of hours of participation in vocational training per library employee	38,72	-	106,49	154,89	100

Source: Own elaboration

3. MEASUREMENT OF INFLUENCE OF INFORMATION INFRASTRUCTURE ON THE FUNCTIONALITY OF SELECTED MILITARY LIBRARIES

Measurement of the impact of information infrastructure on the functionality of the analyzed military libraries allowed to indicate which specific factors caused a given library to rank in a given place in the ranking of the analyzed libraries. The ranking made it possible to indicate the desired investment directions as well as remedial actions in specific areas of its information infrastructure (summary). The following scale of interpretation of the strength of the impact of individual indicators on the functionality of information infrastructure (according to the weights assigned to them) was adopted: Very strong impact – weight 0.3; Strong impact – weight 0.25; Medium impact – weight 0.2; Weak impact – 0.15 weight and Very weak impact – 0.1 weight. Table 3, last row presents a synthetic summary of functionality indicators related to the information infrastructure of military libraries in Poland calculated by the weighted average method according to accepted weights.

Table 3. List of functionality indicators regarding the information infrastructure of military libraries in Poland (weighted average)

ON	Indicator	AMW	ASzWoj	WAT	AWL	weight
1.	Registered users from their own university as a percentage of potential users	102,12	74,12	117,65	106,12	0,2
2.	Library employees as a percentage of total university employees	71,34	219,11	61,15	48,41	0,1
3.	Number of users per library employee	71,79	70,51	175,21	82,48	0,25

4.	Library surface per user	178,63	94,66	48,85	77,86	0,2
5.	Number of users per place to work in the library	32,94	164,71	143,53	58,82	0,3
6.	Number of students per library work place	29,73	175,68	145,95	48,65	0,3
7.	Number of users per computer station	64	361	211	270	0,3
8.	Number of users per computer station with Internet access	64	361	211	270	0,3
9.	Number of hours (per week) when library services are available	102,75	88,07	113,76	95,41	0,25
10.	Library expenditure per user in PLN	44,04	80,79	221,34	53,83	0,3
11.	Expenditure on library collections per user in PLN	72,37	113,43	125,75	88,45	0,3
12.	Expenditure on printed books per student in PLN	92,49	150,47	57,98	99,05	0,25
13.	Expenditure on electronic resources per user in PLN	-	43,13	182,44	74,43	0,3
14.	Cost per visit to the library	21,77	125,85	168,03	84,35	0,3
15.	The cost of using the collections	72,62	116,43	168,30	42,65	0,3
16.	Expenditure on printed Polish and foreign books as a percentage of expenditure on library collections	1,63	199,93	66,38	132,05	0,25
17.	Expenditure on electronic resources as a percentage of expenditure on library collections	-	42,72	162,96	94,34	0,3
18.	The number of non-electronic library files per user	88,69	159,28	47,06	104,98	0,2
19.	Number of printed books per user	77,73	164,93	47,39	109,95	0,25
20.	Number of printed books per student	80,63	148,62	44,27	126,48	0,25
21.	Number of printed books purchased per user	99,64	113,88	48,04	138,79	0,25
22.	Number of printed books purchased per student	101,45	98,55	44,93	155,07	0,25
23.	Increment of collections (books)	- 201,08	781,19	- 84,25	- 95,86	0,15
24.	Increment of collections (printed magazines)	53,57	-	188,58	77,15	0,15
25.	Harvest increase (other non-electronic collections)	-4,21	-	-63,08	-	0,15
26.	Number of books printed in free access as a percentage of the total number of books in collections	-	-	25,06	174,94	0,25
27.	Computer-generated printed books as a percentage of the total number of printed books	141,01	77,70	43,17	138,13	0,25
28.	Book adoption time	-	-	66,67	133,33	0,2

29.	Users actively lending as a percentage of registered users	103,64	87,27	101,82	107,27	0,25
30.	The number of rentals per registered user	105,05	107,07	74,75	113,13	0,25
31.	The number of rentals per active borrower	100,82	121,64	73,42	104,11	0,2
32.	Number of loans per library employee	69,49	93,75	124,84	111,91	0,25
33.	Visits to the library per user	173,74	55,22	115,82	55,22	0,2
34.	Activity of using non-electronic collections (turnover)	66,67	66,67	133,33	133,33	0,25
35.	Completed interlibrary loan orders as a percentage of orders placed	100,00	100,00	100,00	100,00	0,2
36.	The number of downloaded documents from licensed electronic magazines and full-text databases per user	9,52	15,87	323,81	50,79	0,3
37.	Number of training hours and classes for users per library employee	63,11	-	19,42	218,45	0,3
38.	Network and / or interactive services	120,00	80,00	120,00	80,00	0,3
39.	Employees with higher librarianship education as a percentage of employees in the basic activity	68,89	101,95	99,04	130,12	0,25
40.	The number of publications of library employees per employee of the basic activity	53,57	-	107,14	142,86	0,25
41.	Number of hours of participation in vocational training per library employee	38,72	-	106,49	154,89	0,25
	Weighted average for all indicators	17,03	34,02	28,52	26,96	-

Source: Own elaboration

4. RESULTS OF THE ANALYSIS CARRIED OUT

The synthetic summary of functionality indicators for information infrastructure presented in the last row of Table 3 is also a ranking of the analyzed military libraries in Poland in this respect. As can be seen from the table above, the highest in the ranking is the Library of the War Studies University (34.02), the second position, less than 3.5 percentage points, was the Library of the Military University of Technology (28.52), the third in the Library of the Military University of Land Forces at a distance of just over 1.5 percentage points (26.96) from the WAT library and just over 7 from the ASzWoj library, while at the last Library of the Polish Naval Academy, which clearly stands out from the other analyzed libraries (17.03), which is nearly 10 percentage points further than AWL, almost 17 from ASzWoj and over 11.5 from AWL.

The strength of the impact of individual indicators on the functionality of information infrastructure presented in the form of weights allows to indicate the most important factors affecting the discussed state of affairs. Below, for each library analyzed, are the interpretations of the indicators, which may indicate the factors that determined this ranking.

1. Library of the War Studies University (34.02)

The number of non-electronic library collections per user in ASzWoj is almost 60% higher than in other analyzed libraries. In this case, the number of non-electronic collections is proportional to the number of users, and interest in this type of collections does not decrease, which has a positive impact on the provision of services by the library. Therefore, this factor has a positive impact on the functionality of the information infrastructure.

Another factor may be the number of printed books per user - it is nearly 65% higher than in other libraries. A large number of books printed in AszWoj testifies to a very rich collection. In this situation, the number of printed books is adequate to the number of users, thanks to which users do not have to look for other sources of access to the books sought, which certainly increases interest in the library's collections. Therefore, the factor has a positive impact on the functionality of the information infrastructure.

Also, the number of rentals per active borrower in AszWoj is nearly 22% higher than in other libraries. Such a high number of loans among active Library users indicates that readers are eager to use library services, which in turn indicates their high quality. It can therefore be concluded that readers highly appreciate the functionality of the AszWoj Library. Also, you factor together has a positive impact on the functionality of the information infrastructure.

Expenditure on printed Polish and foreign books as a percentage of expenditure on library collections is nearly 100% higher than in other analyzed libraries, which means that these expenses rank high among other collections. Therefore, the factor has a positive impact on the functionality of the information infrastructure.

The number of users per library employee is nearly 30% lower in ASzWoj than in other libraries. A small number of users per library employee proves that the number of library employees is adequate to the number of users (library employees are not burdened with a very large number of readers). Therefore, the factor has a positive impact on the functionality of the information infrastructure.

On the other hand, the number of users per work place in the library underestimates the position of ASzWoj - it is almost 65% higher than in other libraries. This proves that the number of places to work is not sufficient, and this can negatively affect the quality of services (readers' satisfaction), and thus the low functionality of the library. Therefore, this factor has a negative impact on the functionality of the information infrastructure.

Similarly, the increase in collections (in the form of a book), which is negative and whose rapid depletion negatively affects the condition and development of the entire information infrastructure. This factor also has a negative impact on the functionality of the information infrastructure.

2. Library of the Military University of Technology (28.52)

The high position of the WAT library could have been influenced by the number of hours (per week) in which library services are available - it is nearly 14% higher than in other libraries. The WAT library has the highest rate in this case, the number of hours is 62. Accessibility is extremely important, because the extended time gives greater opportunities to use library services, it is very important for users who, after having finished classes or work, want to work longer in the library. Therefore, this factor has a positive impact on the functionality of the information infrastructure.

Also library expenses per user in PLN, which are over 21% higher here than in other libraries. Expenses in the WAT library are the highest among the analyzed libraries, which proves its very high functionality, as it directly affects the quality of services rendered. Therefore, the factor has a positive impact on the functionality of the information infrastructure.

Expenditure on electronic resources per user in PLN, in WAT, is also 82% higher than in other libraries. In the case of this indicator, the WAT Library exceeds all analyzed libraries, expenditure on electronic resources is the highest here. The higher this type of expenses per user, the higher the quality of services, and thus the higher functionality of the library. Especially in the situation when new fields of study are emerging at the university, the needs of users are growing dynamically. The very interest of users in databases (mainly open access) and all platforms on which books and magazines are made available in electronic form is also very important. This factor also has a positive impact on the functionality of the information infrastructure.

The increase in collections (other non-electronic collections) is more than 163% higher in WAT than in other analyzed libraries. Similar to the previous analyzed indicators, the Library is superior to the others, the increase is the highest. Such a high increase in collections in the form of other non-electronic collections positively indicates the development of information infrastructure, and thus its functionality.

The number of downloaded documents from licensed electronic magazines and full-text databases per user is here about 223% higher than in other analyzed libraries. The WAT library boasts the largest number of downloaded documents. This indicator shows how much interest is in electronic collections, and its high value indicates a well-developed modern information infrastructure, and therefore the high functionality of this library.

However, expenditure on printed books per student in PLN underestimates WAT - they are over 42% lower than in other analyzed libraries. In this situation, the WAT Library is the worst among the analyzed libraries, despite the fact that the process of digitizing library collections is still progressing. When expenditure on printed books per student increases, the quality of services rendered increases, and thus the functionality of the library. In the case of the WAT Library, its functionality may decrease. Thus, this factor has a negative impact on the functionality of the information infrastructure.

Similarly, the cost of using collections, which is 68% higher than in other analyzed libraries. In the case of the WAT Library, the cost of using the collection is the highest, which may mean that the planned expenses were not fully reflected in the actual use of its services. Such a high cost shows that the library does not manage its budget well enough, so the factor has a negative impact on the functionality of its information infrastructure.

Also, the number of printed books per student is over 55% lower than in other analyzed libraries. The number of printed books per student in the WAT Library is the lowest, which may indicate that the number of printed books is inadequate to the number of students, and this may have a negative impact on the quality of services provided by the library. As a consequence, students can look for other sources of access to the books they are looking for, so the factor has a negative impact on the functionality of its information infrastructure.

Also, computer-generated printed books as a percentage of the total number of printed books are nearly 57% lower than in other analyzed libraries. The WAT library in this field is the worst. In a situation where a library has a significant part of its collections already developed by computer, this proves the library's care for the development of information infrastructure, as it facilitates access to the book collection. The indicator shows at what stage of "cataloging" each library is. Of course, eventually all printed books available in the library should be computer-developed. Developed books are visible in the library system, and each user can immediately book the desired title. In the WAT Library, the number of printed books is almost 57% lower than in other libraries, which proves the lower availability of titles sought by users, and thus negatively about the quality of services rendered. Therefore, the indicator has a negative impact on the functionality of this library.

Finally, the number of hours of training and didactic classes for users per library employee is here as much as 80.58% lower than in other analyzed libraries. Such a small number of trainings for users, which in the WAT Library is only 0.4, may indicate that the library has insufficient interest in retaining active readers. It is possible that the library does not have adequate resources to conduct this type of class. Therefore, this factor has a negative impact on the functionality of the library's information infrastructure.

3. Library of the Military University of Land Forces (26.96)

The first factor that placed AWL in the third position in the ranking of information infrastructure functionality could have been influenced by the number of purchased printed books per user, which is nearly 40% higher here than in other libraries. The number of purchased books printed in the AWL Library is the highest, 0.78. Such a result indicates a rich collection. In this situation, the number of purchased printed books is adequate to the number of users, which has a positive impact on the quality of services provided by the library. Consequently, users will not look for other sources of access to the books they are looking for, because the AWL Library fully satisfies their reading needs. Interest in books printed in this library should not fall, so this factor has a positive impact on the functionality of the information infrastructure.

Also the number of books printed in free access as a percentage of the total number of books in collections is in AWL nearly 75% higher than in other libraries. Also in the case of this indicator, the AWL Library exceeds the other analyzed libraries. A high percentage of books printed in free access has a very positive impact not only on increasing readers' interest, but also on the quality of services rendered. Thanks to free access in the AWL Library, users have direct access to the shelves, they can "independently" view a copy before renting it, which certainly makes it easier for them to use the library's services. Therefore, this factor has a positive impact on the functionality of the information infrastructure.

In addition, the number of training hours and classes for users per library employee in AWL is up to 118% higher than in other libraries. The AWL library excels in the number of trainings and didactic classes for users per employee - the index is 4.5 - the highest among the analyzed libraries, which indicates the library's interest in maintaining active readers. It also has adequate resources to conduct such activities. The high interest in this type of services proves its high functionality.

Also the number of employees with higher library education as a percentage of employees in basic activity is 30% higher at AWL than in other libraries. Thanks to the large number of employees with higher education in librarianship, the functionality of the library increases, as employees with appropriate education and substantive preparation have a direct impact on the quality of services rendered, and therefore on the high functionality of this library.

The number of publications of library employees per basic employee in AWL is almost 43% higher than in other analyzed libraries and amounts to 0.8. Such a high score informs how many employees are developing scientifically by publishing their work. The increasing value of the indicator will increase the functionality of the library, as developing employees will provide a higher quality of service.

The number of hours of participation in vocational training per library employee in AWL is nearly 55% higher than in other libraries. Also for this indicator, the AWL Library exceeds the other analyzed libraries. Employees who take part in training improve their qualifications and skills, which positively affects both the functionality of the library and the quality of its services. The growing number of hours of participation in vocational training per library employee will increase its functionality.

The cost of using the collections in AWL is over 57% lower than in other analyzed libraries and in the AWL Library is only 3.7. The cost of using the collection indicates how expenditure on the functioning of the library translates into the actual use of library services. Although the AWL library planned its expenses a little "exaggerated", it can be stated that it manages its budget properly, as unused funds can be used for other unforeseen situations. Therefore, this factor has a positive impact on the functionality of the information infrastructure.

The increase in sets (other non-electronic sets) in the AWL Library slightly underestimates the position of AWL - the result is negative and amounts to 786, which indicates a departure from this form of sets. The indicator shows how the number of such collections is increasing, and thanks to it it can be concluded that a given library is enriched by these collections, which can have a positive impact on the increase in interest in its services. In the case of the AWL Library, the increase in this type of collection is negative, and therefore it can be concluded that the collections in this form are rapidly decreasing, which may have a negative impact on the quality of services provided by the library, and thus the functionality of its information infrastructure.

The time to adopt a book in the AWL library is the highest – 6 days – this indicator also underestimates the AWL position. Generally, the longer the adoption time of the book, the worse it is for users, as the time for using the collections increases. This can negatively affect the quality of services provided by the library, and thus badly on the functionality of its information infrastructure.

4. Library of the Polish Naval Academy (17.03)

The weak position of AMW is slightly increased by the number of students per work place in the library, which is 29.73 average for all analyzed libraries. In the AMW Library, the number of work places (is 11) is adequate to the number of students, which has a positive effect on the quality of its services (increased interest of students), and thus positively on the functionality of the library. Therefore, the indicator has a positive impact on the functionality of the information infrastructure.

Similarly, the increase in collections (in the form of books), which is the largest among all analyzed libraries. In the AMW Library, a very high increase in collections (books) positively indicates the development of the library's infor-

mation infrastructure. This indicator shows how the number of books increases, thanks to it it can be concluded that the AMW Library is enriched with new collections the fastest, which has a very positive impact on the increase of interest in its services, and thus the increase in its functionality. Therefore, the indicator has a positive impact on the functionality of the information infrastructure.

Also computer-generated printed books as a percentage of the total number of printed books is 41% higher than in all analyzed libraries. A very large number of computer-generated printed books as a percentage of the total number of printed books (98%) testifies to the AMW Library's care for the development of information infrastructure, as it facilitates access to the book collection. The developed books appear in the library system, and each of the readers can immediately book the desired title. Such a high number of developed books also indicates the work efficiency of the Collection Development Department, which introduces books to the library system, which also has a direct impact on the functionality of the library's information infrastructure.

Also, network and / or interactive services at AMW, which is 20% more than in other libraries, are developed and widely available, which directly affects the quality of services rendered, and thus the functionality of this library. Therefore, the indicator has a positive impact on the functionality of the information infrastructure.

The weak result of AMW was primarily affected by library expenses per user in PLN, which is about 56% less than other libraries. With such low expenditure of the AMW Library, it can be stated that they were insufficient in relation to the needs of readers and their numbers, which may have a negative impact on the quality of services rendered. Therefore, the indicator negatively affects the functionality of the information infrastructure.

Also the number of downloaded documents from licensed electronic magazines and full-text databases per user in the AMW library is over 90.48% lower than in other analyzed libraries. The AMW Library performs the worst in this indicator. The indicator shows the actual use of electronic collections by readers. Its low score may indicate a low interest in electronic collections, and this may in turn indicate a poorly developed information infrastructure, which in turn negatively affects the functionality of this library.

Employees with higher library education as a percentage of employees in basic activity, which is 31.11% less than in other analyzed libraries. A small number of employees with higher education in librarianship at the AMW Library may reduce the functionality of the library, as employees with education other than librarianship and substantive preparation may have a direct impact on the quality of services rendered. The functionality of the AMW library may be reduced as a result. Therefore, the indicator negatively affects the functionality of the information infrastructure.

Also the number of publications of library employees per employee of the basic activity is 46.43% lower than in other libraries. The indicator informs how many employees are developing scientifically by publishing their work. At AMW, the number of publications of library employees per basic employee is the lowest, which, in consequence, is the library's functionality.

Also the number of hours of participation in vocational training per library employee is here 61.28% lower than in other analyzed libraries. This indicator shows whether employees participating in the training improve their qualifications and skills, which directly affects both the functionality of the library and the quality of its services. In the case of the AMW Library, the number of these hours is small – only 4 hours. The smaller the number of hours of participation in vocational training per library employee, the less its functionality.

SUMMARY

Based on the conclusions of the analysis, specific directions of actions can be proposed for each of the analyzed libraries to optimize the management of their information infrastructure.

In the ASzWoj library, activities related to controlling its non-electronic collections, printed books, number of loans, expenditure on printed books and the number of users should be continued. Personnel policy should also be continued, maintaining the number of employees at the current level, adequate to the number of users. On the other hand, it is recommended to increase the number of places to work in the library for stationary customers by acquiring additional usable space and increasing the dynamics of book collections by investing in new items.

In the WAT library, activities related to organizing the availability of library services, planning library expenses, controlling the growth of collections and marketing of virtual services, i.e. sharing documents from licensed electronic journals and full-text databases, should be continued. However, expenditure on printed books should increase, while at the same time it would be better to plan and control the costs of using collections and buying books. It would also be better to plan and control work on computer-generated printed books. The management of the WAT library should also take better care of training and didactic classes for clients of their services (users).

In the AWL library, you should continue your efforts to plan and control the purchase of printed books, including the so-called free access, as well as in the field of planning and organizing training and classes - both for employees and library users. Personnel policy is also properly conducted - both in terms of recruitment and motivating library employees to scientific development. Also, the low cost of using library collections is evidence of proper budgeting. However,

actions should be taken that would increase the dynamics of harvest growth (other non-electronic collections), and above all in the matter of reducing the so-called adopting the book. This could be done by, for example, reorganizing the work of the Collection and Development Department.

In the AMW library, activities related to the organization of the library space intended as a place to work, investment in collections (in the form of books), computer development of printed books, as well as the provision of network and / or interactive services should be continued. Instead, better plan overall library expenditure and control virtual marketing issues so that the number of downloaded documents from licensed electronic magazines and full-text databases increases. On the other hand, in terms of human resources, it would definitely be better to take care of the recruitment process so that the majority of them would have a higher library education. Motivating employees for professional development also leaves much to be desired - they should be encouraged to publish as well as participate in professional training.

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