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ANALYSIS OF CRITERIA FOR ENSURINGINFORMATION SECURITY OF SCIENTIFIC AND EDUCATIONAL RESOURCES

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Abstract. *At present, information and knowledge in the field of science and education are strategic resources. From their formation, renewal, distribution depends not only the scientific and educational spheres, but also the socio-economic development of the country. Therefore, the confidentiality, integrity and accessibility of databases of a scientific and educational nature are an important subject of research. The purpose of this article is to conduct an analysis of methods, criteria for assessing units of scientific information in terms of ensuring information security. Classification of criteria for the evaluation of scientific and educational information (SEI), their systematization, analysis of problem of ensuring the security of information resources are given. Also, the information infrastructure development indicators and projects implemented in the field of information security are outlined. Evaluation of SEI units is carried out by experts who themselves have a weighting factor and are dependent on their qualifications. The results of the research are the basis for the creation of an automated system for ensuring information security in the corporate library system of academic libraries. The corporate network forms an electronic public library, distributes the SEI between resource users. The information security system will ensure the regulation of access to resources.*
Keywords: *information security, information assets, value of information scientific and educational information, digital library, corporate network.*

Introduction

The spread of the Internet caused a sharp increase in the worldwide volume of digital information and the number of users to them. According to IDC (International Data Corporation), if in 2011 the total amount of digital information amounted to 1.8 trillion GB, now its volume for every two years is doubled. The increase in the volume of information with such a speed even further strengthens the requirements for the allocation of reliable information and ensuring their safety. At the same time, the problems of protecting the most valuable scientific, educational and scientific-technical information are most relevant. This is due to the fact that this kind of knowledge has the greatest impact on the development

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not only of science, education, but also of economics and business, and society as a whole.

The object of this research is information resources related to science and education, and from the point of view of information security, an evaluation of the methods of their analysis is accepted as the purpose of the research. When we say scientific and educational information (SEI), we mean libraries, centers of information resources, information relating to patents and inventions in information networks, all kinds of scientific and educational resources subject to licensing.

In some cases, not all information resources are free, some are offered to information users for a fee. Such resources require protection against "hacking", that is, it is necessary to ensure their confidentiality. If the information resource is free, it is still necessary to ensure its integrity. In addition, maybe some resources are only for certain groups of users.

Due to the large number of users of information resources for science and education, a number of requirements are placed on their safety. Therefore, the trusted input of users into the content of information resources is considered to be important, as important is the protection of information resources from their unauthorized access.

In the effective protection of information, it is advisable to choose the means and means of protection corresponding to the value of information. Therefore, from the point of view of information security, the evaluation of SEI analysis, factors affecting the price of information and the task of identifying SEIs are the focus of this article.

There is a lot of modern literature on the evaluation of information assets, on the systematization of SEI, on the security of electronic libraries. First we need to find the answer to the following question: Is it possible to look at SEI as an asset of information? To answer this question, we refer to the following literature: Alex Woodie (2016) points out that you can look at information as an asset and you can change it for money. Chris Higson and Dave Waltho (2009), Antonio Lerro at all (2012), Daniel Moody and Peter Walsh (1999) in their studies point to information as a strategic asset. In fact, if the information for the organization matters, then you can look at it as an asset.

Indeed, large scientific and technical information centers (like Web of Science, Ebsco), scientific and analytical information bases or information resources of digital libraries are of financial importance. From this point of view, the SEI can be viewed as an active information.

Until now, a number of researches on the evaluation of information assets have been carried out. Nicole Laskowski (2014) gives six ways to assess the information assets, these methods are divided into economic and non-economic

categories. In this article we will consider the issue of SEI assessment in terms of non-economic information security.

Daniel Moody and Peter Walsh (1999) mentioned the cost and price of information. If the cost of information depends on its acquisition, preservation and processing, the price is measured by how much it costs for the organization. Thus, it is possible to divide the information and the information service. Wilco Engelsman (2007) divides the cost of information into the cost of using information and the cost of information exchange. And also he shows a close connection of the price of information from the purpose of its use.

If in some literature information is evaluated from an economic point of view, in others it is judged from the point of view of safety. In the works of Chris Higson and Dave Waltho (2009), aimed at the security of information, it is said about coming to the forefront the activity of technical specialists. The organization that adopted this approach limits the number of personnel authorized to get acquainted with this information.

When evaluating an information asset, the time factor is important. The price of some information may decrease over time (for example, dissertations or scientific articles). Therefore, it is possible to divide the strategic and dynamic forms of its evaluation. Daniel Moody and Peter Walsh (1999) argue that information can be important, but the lack of reading skills reduces its price. That is, if you do not use the information, then its evaluation, by itself, can not be high.

Identification and classification of scientific and educational information

Lerro at all (2012) shows the process of evaluating an information asset consisting of its identification, classification and measurement. In this article SEIs are divided into scientific, educational and inventive documents and are structured on the basis of the cognitive model.

In the study of this work, we considered several literatures on the evaluation of information assets. But it was not possible to get acquainted with the literature having sufficient, detailed content on the evaluation of the SEI.

Usually, from the point of view of information security, the price of information, if its security is violated, is measured by the value of the loss incurred. K. Turkhanovskaya and Yu. Orlova in their works (2016) in determining the cost of information, relying on the degree of loss incurred for confidentiality, integrity and the possibility of using information, share losses at a higher, medium and low level. But in the proposed model, without entering the time parameter, it is impossible to determine the price of information effectively. Y. Maliy and V. Alexandrov (2015) write about the absence of a universal methodology for assessing the information asset and the need for its determination by experts.

I. Mashkin also (2009) in his works, the information assets are divided into higher, middle and low categories.

In the proposed SEI estimation model, in the interval [1.10], numerical, α, β, γ expert coefficients on the confidentiality, integrity and availability of the information resource are introduced first. Also taken into account are indicators such as the initial cost *BC* (Basic coast) consisting of acquisition or production costs, reproduction, preservation of the information resource and the frequency of use of information in the time interval *T*. Proceeding from the foregoing, the cognitive model identifying, structuring and determining the degree of importance of SEI can be described in the following form:

Table 1 **Cognitive model identifying, structuring and determining the degree of importance of SEI**

№	**Type of resource**					
№ Resource elements	***Name of resource***	***BC***	***ECC***	***ECI***	***ECA***	***AP***
1	***Scientific information***					
1.1	Monograph	c_1^1	α_1^1	β_1^1	γ_1^1	a_1^1
1.2	Scientific paper	c_2^1	α_2^1	β_2^1	γ_2^1	a_2^1
1.3	Tezis	c_3^1	α_3^1	β_3^1	γ_3^1	a_3^1
. . .		$c_{n_1}^1$	$\alpha_{n_1}^1$	$\beta_{n_1}^1$	$\gamma_{n_1}^1$	$a_{n_1}^1$
2	***Educational information***					
2.1	Textbook	c_1^2	α_1^2	β_1^2	γ_1^2	a_1^2
2.2	Lecturenote	c_2^2	α_2^2	β_2^2	γ_2^2	a_2^2
2.3	Training materials	c_3^2	α_3^2	β_3^2	γ_3^2	a_3^2
. . .		$c_{n_2}^2$	$\alpha_{n_2}^2$	$\beta_{n_2}^2$	$\gamma_{n_2}^2$	$a_{n_2}^2$
3	***License documents***					
3.1	Invention	c_1^3	α_1^3	β_1^3	γ_1^3	a_1^3
3.2	Useful model	c_2^3	α_2^3	β_2^3	γ_2^3	a_2^3
3.3	Industrial designs	c_3^3	α_3^3	β_3^3	γ_3^3	a_3^3
. . .		$c_{n_3}^3$	$\alpha_{n_1}^3$	$\beta_{n_1}^3$	$\gamma_{n_1}^3$	$a_{n_3}^3$

Here,

BC – Basic Coast, acquisition or production costs of information;
ECC – the expert coefficient for confidentiality;
ECI – the expert coefficient for integrity;
ECA – the expert coefficient for availability;
AP – Access periodicity.

Information Asset Valuation

The level of importance of the LI (Level of importance) information is equal to the average arithmetic value of the expert coefficient set for confidentiality, integrity and availability of information. I.e:

$$LI_i = \frac{\alpha_i + \beta_i + \gamma_i}{3}$$

Therefore, the price of information in general terms, from the point of view of security SP (Security Price), is calculated by the following formula:

$$SP_i = \frac{LI_i * AP_i * BC_i}{T}$$

If we consider the number of all SEIs equal to: $n = n_1 + n_2 + n_3$, then the total price of the price of considered SEI will be equal to the following:

$$S = \sum_{i=1}^{n_1} SP_i + \sum_{i=1}^{n_2} SP_i + \sum_{i=1}^{n_3} SP_i = \sum_{i=1}^{n} SP_i$$

The value of α, β, γ are set by the expert commission. It should be noted that it is necessary to ensure the level of availability of scientific and educational resources. That is, most of the information does not have a high level of confidentiality. For example, electronic catalogs require not confidentiality but integrity and accessibility of information. But, at the same time there are data with high confidentiality, such as paid resources or personal data of the user. Based on the above, you can estimate the cost of resources of a certain type, or concerning a certain department.

Conclusion

Thus, the result of the analysis of the issue of ensuring the information security of scientific and educational resources shows worthy of the significance of these data and requires protection from unauthorized access. Effective protection of information from scientific and educational resources depends to a large extent on the methods and means of protection in accordance with the value of resources. Present time, there are many ways and methods of protecting information, such as software, technical, cryptographic, etc. But at the same time, the evaluation of scientific and educational resources from the point of view of information protection is still not fully understood. In fact, the evaluation of the protection of information resources provides an opportunity for information owners to seriously pay attention to issues related to the protection of information,

allocate funds or save costs. Despite the low level of efficiency, the proposed model of protection of scientific and educational resources can be used in identifications, classifications and revealing the importance of information resources in scientific and educational corporate information networks and in library networks.

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