

Using Value-Added Processes to Assess the Value of Information

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초 록

정보의 가치는 크게 고유가치(Intrinsic Value)와 실질가치(Practical Value)로 구별되며, 실질가치는 다시 이용가치(Use Value)와 교환가치(Exchange Value)로 나누어진다. 정보는 그 자체가 갖고 있는 고유한 특성과 이용자들의 정보의 용도에 대한 관점의 차이 때문에 정보의 가치를 객관적으로 평가하기가 힘들다. 이를 해결코자 테일러(Taylor)는 정보의 가치를 평가하는데 있어서 모체가 될 수 있는 정보의 부가가치모델(The value-added Model)을 개발하였다. 이 모델은 정보의 가치를 평가하는데 있어서 평가단위나 평가등급을 적용하지 않고 있다는 단점이 있음에도 불구하고, 정보에 대한 부가가치를 부여하므로써 좀 더 정확한 정보의 가치를 평가할 수 있을 것이다. 이 논문에서는 부가가치모델에 필요한 이론과 과정등을 구체적으로 밝히고, 실제 부가가치모델의 적용을 예를 들어 기술하였다.

ABSTRACT

The spectrum of values stretches from intrinsic value to practical value, consisting of exchange value and use value. Because of its own nature and perspective in assessing information, there are some problems of assessing its value. As a framework of assessing value of information, Taylor developed the value-added model of information. Although the model has shortcomings which do not apply measures and scales to information value, it can be a framework in assessing the value of information.

I. Introduction

"As every library science student knows, no sound theoretical or practical means have been found to establish the value of information for

an individual or an organization. We are profoundly ignorant about the most elementary characteristics of information and its use."¹⁾ This

1) Lytle, Richard H. "Information Resources Management : 1981-1986." *Annual Review of Information Science and Technology*, 21 : 309-336, 1986.

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observation was made about one year ago, by Richard Lytle(1986) in his review of the information resources management literature. Though this may be true, there has not been any lack of attempt to measure the value of information. This paper will describe the different kinds of value associated with information, discuss problems of assessing its value, and present the value-added model of information.

II. Different Kinds of Values

The spectrum of values stretches from intrinsic value to practical values. Intrinsic values are social, emotional, ethical, or spiritual values, such as how much a church is worth to its congregation, and will not be treated here. Practical values are those which economists and organizations can attempt to measure. The two major categories of practical values are exchange value and use value.

The exchange value of information equates it with some other "thing", like dollars. When people ask, "How much is this information worth to you", they are asking the exchange value of the information. They might be referring to the price you are willing to pay and comparing it with the cost of producing the information. If they are willing to include time and effort it takes to receive the information, they are asking about the information's apparent value. In 1982,

Griffiths reviewed the literature associated with measuring the value of information.²⁾ Most of studies measured the exchange value of

information. Specifically, they related the costs of producing the information to the subjective assessment of benefits derived by the individual or the organization. King Research, Inc., for example, compared the costs of generating and accessing information to the savings of using information in the Department of Energy research department. The savings were based on an estimation by scientists of the difference in using "found" information times the number of items found versus generating information by performing original calculations. King Research came up with some dramatic figures on the value of information in the Department of Energy (Carroll and King 1985).³⁾

Use value, also called value-in-use, states that information has no value until it is used. Use value, (or more exactly, potential use value), establishes the conditions whereby information can be exchanged (Repo 1986).⁴⁾ That is to say, without use value there can be no exchange value, since people are not willing to invest in something that does not have potential use. Use value depends on the potential users of information and their environment. For instance, a

2) Griffiths, Jose-Marie. "The Value of Information and Related Systems, Products, and Services." *Annual Review of Information Science and Technology*. 17 : 269-284, 1982.

3) Carroll, Bonnie C. and Donald W. King. "Value of Information." *Drexel Library Quarterly*. 21(3) : 39-60, 1985.

4) Repo, Aatto J. "The Dual Approach to the Value of Information : an Appraisal of Use and Exchange Values." *Information Processing and Management*. 22 : 273-283, 1986.

father of a five-year-old and a mechanical engineering student both need to know how to put a bicycle together, but for different purposes. The father knows that his daughter will be disappointed on Christmas morning if the two-wheeler is not under the tree. The student needs to research the aerodynamic properties of bikes. For the five-year-old, this information has no direct value; she thinks the bike comes from Santa. The information, then, for users in different environments is valued subjectively. How was the information actually used in the organization or environment? How did users perceive its value?

III. Problems in Assessing Information Value

The nature of information is a primary deterrent to easily measuring its value. Unlike physical objects, information is expandable, compressible, substitutable, transportable, diffusive, and sharable, and its original form loses none of its own characteristics when these operations are performed on it (Cleveland 1982).⁵⁾ Because of these characteristics, it is not reasonable to apply the same measures of value to information that one would apply to physical entities. Exchange value applied to physical "things" make sense when the seller no longer owns the thing he has sold. With information, the seller will most likely still possess the information he has transferred to another. In organizations, Wildavsky (1983) contends, "No one... can say what an array of data is worth to them because they do not have

to give up anything to get it nor can they exchange it for anything else."⁶⁾ Wildavsky goes on to say that the nature of information makes MIS systems on one hand supply more information than a manager can ever hope to use, and on the other hand synthesize data into information that potentially has errors.

The second major problem in assessing information is perspective. Does one take the view of the producer or the consumer of the information product? Does one consider the individual or the organizational view? The studies reviewed by Griffiths (1982) reveal this problem clearly.⁷⁾

Each study used a different combination of variables. Some were initiated by producers of information to re-assess the value of their product in the eyes of individual users. Another looked at organizational decisions and traced information use backward. Still another asked researchers to evaluate information from personal and organizations perspectives.

IV. The Value-Added Model

Taylor (1986) developed a model based on the use value of information which includes the user, a categorization of information values, and

5) Cleveland, Harlan. "Information as Resources." *The Futurist*. 16(6) : 34-39, 1982.

6) Wildavsky, Aaron. "Information as an Organizational Problem." *Journal of Management Studies*. 20 : 29-40, 1983.

7) Griffiths, Jose-Marie. "The Value of Information and Related Systems, Products and Services." *Annual Review of Information Science and Technology*. 17 : 269-284, 1982.

the system processes which increase value.⁸⁾ Figure 1 presents the value-added model. The user brings criteria of information use to the model, such as ease of use, quality, time-saving,

cost-saving, noise reduction, and adaptability. The system processes information to accommodate the users' criteria. The result of the processes are values added to the information,

8) Taylor, Robert S. *Value-Added Processes in Information Systems*. Norwood, New Jersey : Ablex. 1986, p. 50.

Fig. 1. The Value-Added Model

USER CRITERIA OF CHOICE	INTERFACE (Values Added)	SYSTEM(Value-added Processes : Examples)
Ease of Use	Browsing Formatting Interfacing I (Mediation) Interfacing II (Orientation) Ordering Physical Accessibility	Alphabetizing Highlighting important terms
Noise Reduction	Access I (Item identification) Access II (Subject description) Access III (Subject summary) Linkage Precision Selectivity	Indexing Vocabulary control Filtering
Quality	Accuracy Comprehensiveness Currency Reliability Validity	Quality control Editing Updating Analyzing and comparing data
Adaptability	Closeness to problem Flexibility Simplicity Stimulatory	Provision of data manipulation capabilities Ranking output for relevance
Time-Saving	Response Speed	Reduction of processing time
Cost-Saving	Cost-saving	Lower-connect-time price

represented in the model by the interface. Using the model, a system analyzing and comparing data contributes to the quality of the information given to the user. If a system highlights important items, it is making the information easier to use by formatting it for the user. Above all, it must be remembered that the crux of Taylor's model is the user. Unless a system accommodates the user, there is no value to the information it produces.

Taylor applied his value-added model to libraries and information services. For each of the potential values, he subjectively evaluated the extent to which a type of library succeeded in adding them. These are presented in Figure 2.⁹⁾ This table shows that where public and college libraries are strong in adding "ease of use" values. While special libraries reduce noise, research libraries improve the quality of information. No type of library is particularly strong in adapting information, only special libraries can claim saving a user's time.

Taylor makes a distinction between Type I (humanities, arts, and social sciences) research libraries and Type II (science and engineering) research libraries. Though he contends that there are differences in the accuracy, currency, and adaptability values added by the type of his assertions. For accuracy, he seems to imply that subject cataloging is more important in a Type I library. For currency, he rightfully alludes to the importance of new materials in scientific research. For adaptability, his major point is that most librarians are schooled in the humanities,

and so can add value in Type I libraries, but not in Type II libraries. Based on Taylor's weak arguments, and the lack of other real difference, it is probably not necessary to separate research libraries by type in Figure 2.

V. Addressing the Problems of Assessing Value

By its nature, the value-added model takes into account the characteristics of information. The fact that information is compressible or transportable, for example, is an integral component for the model. The essence of serving the user means taking advantage of the characteristics of information to add value to it. Libraries and information centers have wrestled with the characteristics of information for years. Electronic information producers are struggling with these issues now, in the forms of copyright and information repackaging. Managers often prefer or simply must see aggregates of information in order to make decisions.

The value-added model also treats the perspective problem. The value of the information system is directly tied to the users' criteria for it. Thus, a system which does not provide information in a useable form does not have as much value as one that does. For individual and organizational users of MIS systems, the value-added model, honestly applied, can reveal just what values the MIS is not adding, and can

9) Ibid., p.96.

Fig. 2. Values Added by Library Type

Value Added	Academic			Public	Special
	Research		College		
	Type I	Type II			
Ease of Use	2	2	3	3	2
Browsing	1	1	3	3	1
Formatting	3	2	3	3	4
Interfacing	1	1	4	3	1
Ordering	1	1	1	2	1
Physical Access	4	4	4	4	4
Noise Reduction					
Access I	2	1	2	2	2
Access II	1	1	1	1	2
Access III	0	0	0	0	2
Linkage	0	0	0	0	2
Precision	1	0	0	0	1
Selectivity	1	1	3	3	3
Quality					
Accuracy	3	1	1	1	1
Comprehensiveness	3	3	0	0	0
Currency	1	3	2	2	3
Reliability	2	2	1	2	2
Validity	0	0	0	0	1
Adaptability					
Closeness to Problem	2	0	1	0	3
Flexibility	0	0	0	0	0
Simplicity	0	0	1	1	1
Stimulatory	1	0	1	3	1
Time Saving	1	1	0	0	3
Cost Saving	0	0	0	0	1

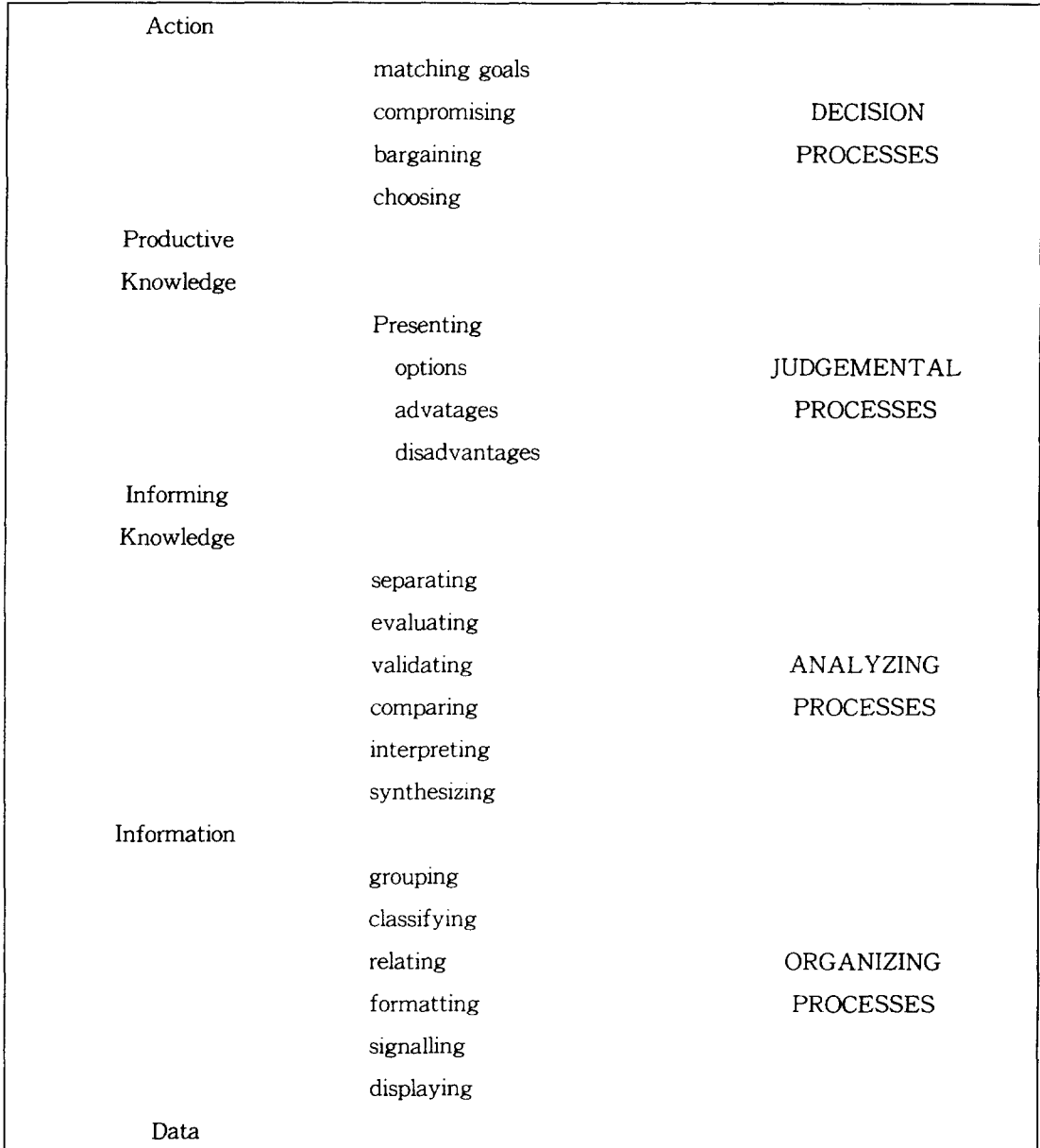
provide a framework for its improvement.

VI. Shortcoming of the Value-Added Model

Early in his work, Taylor presents a value-

added spectrum (Figure 3).¹⁰ Presumably, information becomes more valuable as it rises in the spectrum. A system which presents options is more valuable than a system which groups data. Taylor states that the spectrum is trans-

Fig. 3. The Value-Added Spectrum



lated into the 23 values in his model. On closer examination, though, it is clear that the values in his model only reach as far as informing knowledge, and so do not cover judgemental and decision processes. As such, the value-added model has only limited applicability to organizational use of information applied to judgements and decisions. As Taylor says, “:Systems, as presently conceived, ... have very little to do with real decision concerns and processes.”¹¹⁾

The value-added model does not attempt to apply measures or scales to information value. Though the framework is clear, the assessment of an information system is not. Is a system which high in adding quality, but low in noise reduction better than one that is not? Should a system be compared to a previous incarnation or to other similar systems? Because the model does not measure the value of information, the organizational problems of information (too much information, biased or incorrect information) still remain. For example, there is no way to capture the irrelevant or incorrect information and compare it to the relevant and correct information being provided. If indeed potential use value establishes the criteria by which information can be exchanged (Repo 1986), then the value-added model does not address those criteria.¹²⁾

Be that as it may, Taylor's model does provide a useful framework for thinking about the value of information. In fact, Phillips used it to construct a thesaurus adding the values of “dictionary enrichment” and “propositional networking” to it. The model structures the dimensions of

value by the users' criteria of choice. It directly relates the processes in information systems to user criteria and it gives us a chance to build a theory for the value of information.

VII. Conclusions

Measuring the value of information has been controversial among information scientists. The spectrum of values stretches from intrinsic value to practical value. Intrinsic values are social, emotional, or spiritual values. Practical values are those economists can attempt to measure. Major categories of practical values are exchange value and use value, also called, value-in-use. There are some problems in assessing the value of information due to its own nature and perspective. Taylor developed the value-added model to reduce assessing problems of the value of information and applied it to different kinds of libraries. He found that special libraries are strong in adding “ease of use”, and research libraries reduce “noise”. The model has shortcomings which do not apply measures and scales to the value of information. In spite of shortcomings of the model, it can be used as a framework in assessing information value.

10) Taylor, Robert S. *Value-Added Processes in Information Systems*. Norwood, New Jersey : Ablex, 1986, p. 6.

11) *Ibid.*, p.110.

12) Repo, Aatto J. “The Dual Approach to the Value of Information : an Appraisal of Use and Exchange Values.” *Information Processing and Management*. 22 : 373-383, 1986.

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