

Characteristics in Classification of Information Use (IU)

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ABSTRACT

Conventionally, information quality or IQ used in most researches and also in practice as dimensions of characteristics which inherent in valuable information. IQ is characteristic measures based on information production processes. As a result, it may not be a valuable for its users and even for enterprise value. Our approach is to define a new information characteristic based on process of information consumption or usage, called IU as complement to IQ. The characteristics in IU consists of two dimensions ie: (i) conformity on repackaging and (ii) originality on exchange information for users. Parameters for this dimensions acquired using features extraction from IU process in each layer of enterprise management. The paper also describes how to apply the new characteristics practically to provide a higher information values for enterprise.

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1. INTRODUCTION

Over the last two decades since introduced in Delone & McLean IS Success Model (1991), information quality or IQ emerged as a critical concern for most researches and even for practical implementation in enterprises around the world. "The problem of poor IQ has caused various organisational losses, which are pervasive, costly and even disastrous especially making incorrect decisions. Case studies of these IQ problems can be found in a plethora of reports, journals and books. Many of IQ assessment frameworks have been proposed to address these problems (e.g. Pipino et al. 2002, Lee et al. 2002, Heinrich et al. 2009, Kaiser et al. 2007)" (Ge et al., 2011). Although today is not hard to produce and earned of information, refer to Otto 2009 most executives more aware that need focus and effort more optimal to obtain and ensure availability of quality information. However in practice, enterprises are still facing difficulties to provide valuable information, especially for top management.

The constraints in providing valuable information not only caused by difficulties to implement IQ assessment in practice but also even after IQ assessment implemented successfully and carried out improvement to all elements of Information Systems (IS). To solve this real problems we conducted a more in-depth research to re-define the characteristics for information in context of information resources, which also includes a dimensions of IQ already existing. The goal is getting characteristic that directly affect for value of information as primary source of decision-making and also give a direct impact to strategic plan & goals of enterprises. In this paper, we introduce a new characteristics of information that is inherent in usage process of information by users. This characteristics found in classification process at the time of information consumption and give impact for its users, namely Information Use (IU). We also obtained a dimensions in IU characteristics and its application in practical implementation issue.

2. INFORMATION CHARACTERISTICS

English (2009) declared that quality information, in and of itself, is useless and may not be a valuable as business value and enterprise resource.

$$\text{Information} = f(\text{Data} + \text{Definition} + \text{Presentation}) \rightarrow PV \quad (1)$$

We use a formula above as prerequested characteristic for information and only has a potential value (PV) intrinsically. Although in the processes of its formation later the information have another characteristics (conventionally expressed in dimensions of IQ), information is still not provide significant value if it does not give impact. Logical consequence of above statement is that a values affecting to users not merely determined by how information was produced, but more important at the time such information consumed and give impact for its users.

We use analogy was like food for humans. Quality of good food determined surely by a material, how to process, and how to serve it. Chef will trying to make food that can satisfy tastefully for all people. But at the end of the process, a most important in food is the content of nutrients necessary to be absorbed by the body of person who consume it. This means that process of consumes plays a most important role. Of course, in practical implementation is irrational if each information production system must be tailored to a specific needs of its users.

We describes in more detail the concept for value change since form of: data □ informasi □ knowledge □ value, as a model below.

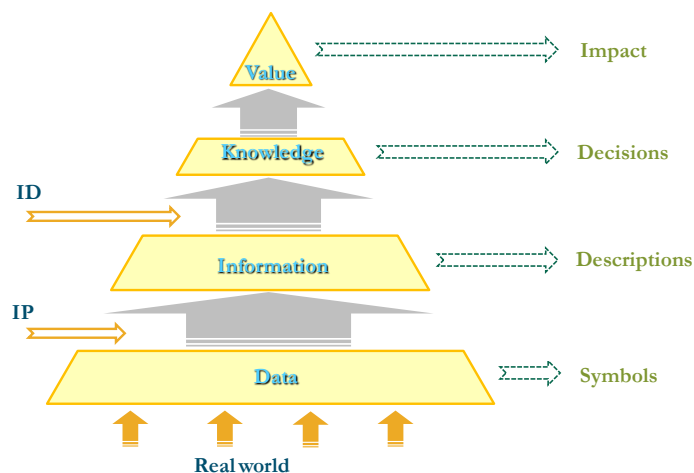


Figure 1. Model for value change

Under the explanations and analogies above, we propose to separate firmly a phase of Information Production (IP) and Information Delivery (ID). The value of information generated in IP phase (IPv) is focused on efforts to maximum extent possible to meet the needs for all users. While the value of information in ID phase (IDv) is more focusing on specific needs and interests of each user. There are at least two processes in ID phase, ie: (i) dissemination as a process related to conveyor of information value from IP and (ii) process of information consumption or usage related to characteristics of IU that we examined. Concept of phase separation above can explain Garvin statement (1993) that quality of information in a pragmatic and practical for its users, only perceived from three aspects, ie: content, time, and format. By our concept, right content is a final result from IP phase, right format associated with IU characteristic in ID phase, while the right time affects a both phases. We propose new characteristics on IU as a complement of IQ was known previous.

3. CHARACTERSITIC OF INFORMATION USE

Choo (2008) introduced the concept of Information Use (IU) as one of processes in information cycle. IU becomes a hermeneutic process of inquiry, in which understanding is realized through

interpretation to information by users. We modify the Choo's model to show the process cycle of information management that can be seen in following figure.

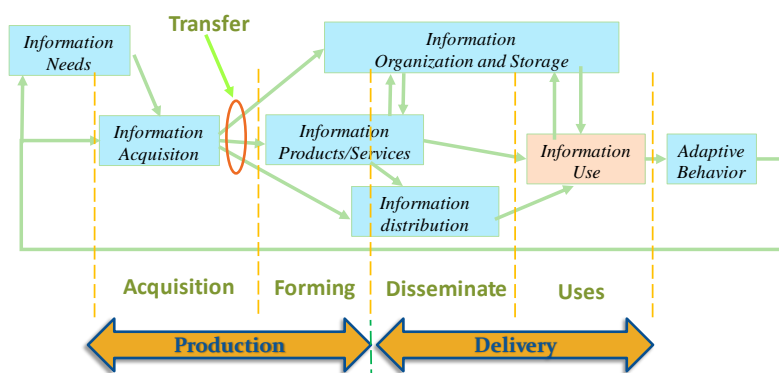


Figure 2. Information Management Cycle (modified from Choo 2002)

Provide a statement that what is expected, as stated in the "Introduction" chapter can ultimately result in "Results and Discussion" chapter, so there is compatibility. Moreover, it can also be added the prospect of the development of research results and application prospects of further studies into the next (based on result and discussion).

"Information use occurs when the individual selects and processes information which leads to a change in the individual's state of knowledge or capacity to act. The information that is eventually used is a very small subset of the total information that is encountered. (Choo-2002)". We use a Choo's study above as initial analysis for defining new characteristics of information on IU which is closely related to its consumption process.

Further, a value created from information consumption by users is Knowledge, which is in enterprise management context is Decision to determine action. Choo also said that user becomes essential factor in hermeneutics process, which is in decision making they have a first-hand understanding from information needs that emerged. Knowledge is the value added to information by people who have the experience and acumen to understand its real potential (English 2009).

$$\text{Knowledge} = f(\text{People} + \text{Information} + \text{Significance}) \quad (2)$$

Knowledge value can be defined as deformation (form and value) from information (as a source) with addition of certain value components or characteristics. In this context, we introduce term of Epistemic properties in IU, as relation of value between information consumed with knowledge invention. Epistemic become a benchmark for selects and processes a small subset of the total information that is encountered to become a knowledge. In other words, Epistemic become characteristic value of information that relates with aspects of Significance in English's formula above (or dimension of Relevance by Wang) with Value Added (or Knowledge). Quoting from English about degree of information usefulness as Pragmatic information quality, then we redefined as a measure of how well an information presented enable for user accomplishing its business objectives, which may differ from one another.

We will use this Pragmatic quality as a basic measure of conformity for categorical value of Epistemic properties as one of information characteristic on IU. Whereas the first-hand understanding from information needs, approached as originality aspect of information that will be consumed by users. Thereby we can declare an argument that information which is more fit or conform and more original for its users has a higher value as source of knowledge that is high value also.

4. ANALYSIS FOR VALUE OF INFORMATION USE

4.1. Dimensions

To analyze the usefulness of information characteristics on IU then we further study on process of information consumption related to knowledge creation for information users. Adopting from Choo, then we remodelling the phases of knowledge creation based on the utility of information as shown above. To analyze

the usefulness of information characteristics on IU then we further study on process of information consumption related to knowledge creation for information users. Adopting from Choo, then we remodelling the phases of knowledge creation based on the utility of information as shown below.

In this case we define a processes of Knowledge Invention in 3 level as follow:

- 1) Level 1 is stage of exploring an object or material (ie information), which consists of repackaging and exchange,
- 2) Level 2 is stage of creating to generate a new knowledge,
- 3) Level 3 is stage of acting as its follow-up.

Level 1 above is used as definition for process of information consumption. Thereby, dimensions for characteristics on IU that have been obtained previously defined in Exploring phase above, so that we can make following construction:

- 1) Epistemic properties (→ conformity) in repackaging process
- 2) First-hand understanding factor (→ originality) in exchange process

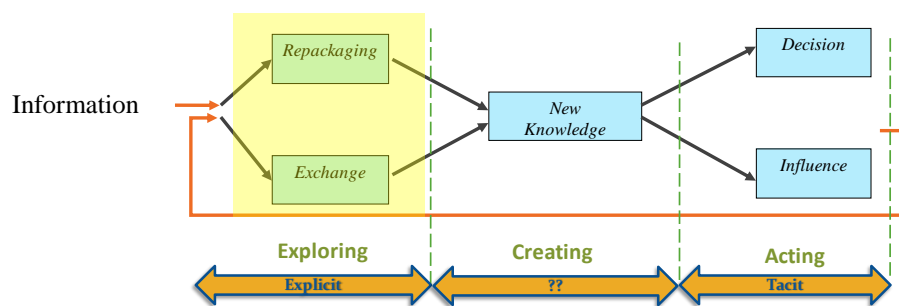


Figure 3. Model for Phases of Knowledge Invention

4.2. Parameters

To explore a dimensions of new characteristics that have been defined above, we conduct a further study on information format has high Epistemic properties within enterprise. From observation, we find that fitness of information format as a benchmark of Conformity dimensions in enterprise has uniformity due to highly influenced by similarity of interests from its users. Conformity dimension was approached with similarity of requirement for class of information in each management layer.

Our approach is to find such similarities in properties of information from a perspective of information usage based on management layer within enterprise. We observe a categorical value in weighting for value of information in three layers: 1) operational, 2) tactical, and 3) strategic, in terms of impact within enterprise. Classification of information correlated to these 3-layer, generating a feature extraction of information usage that common within enterprise, shown in following table.

Table 1. Feature of Information in Management Layer

	Operational	Tactical	Strategic
Function	Data Entry	Monitoring	Decision
Source	Internal → daily, each unit	Internal + other unit → Business Process	Internal & External
Scope	Local	Enterprise	Global
Review	Routine	Periodical	Temporarily
Information Periode	Short → daily~monthly	Medium → monthly~yearly	Long → multi-year
Illustration	Detail → log file	Principal → pointers	Brief / Resume
Event-related	Past	Present	Future
Form	Report	Summary/ Recapitulation	%/Graphic/ Diagram

We select 4 feature from list obtained above as parameters of Conformity dimension on IU characteristic, ie: function, completeness, event-related, and form. 4 Other features used to be a prerequisite aspects of its access. Meanwhile, aspect of first-hand understanding in hermeneutic process as benchmark of dimension of Originality also gives consequence that information received 'directly' has a higher value than if such process through a tiered stage involving another 'parties'. Number of tiers that traversed and

information traceability to original source was used as parameters of Originality dimension on IU characteristic.

4.2. Implementation of IU Characteristics

Characteristics of information use can be used to improve a value of information resources. Improvement can be made by applying these dimensions of IU characteristic as a benchmarks to the system of information network owned by enterprise. This approach is to empower optimally, the forms and value of information that has been available previously to become a source of knowledge that has a high conformity and originality for decision makers within enterprise. Parameters of dimension on IU characteristics applied as a rule-based algorithm in the presentation of information, with previously setting of business rules that apply to such enterprise.

Implementation of rule-based algorithm can be done by inserting or integrating these algorithms on Executive IS (EIS) which may have been owned by enterprise as a tool for tactical level managers and their executives. Implementation can also used to providing a system of information access for executives by taking or getting a valuable information generated by information production systems in the operational layer, though does not have a specific SIE for them. In context of such access systems, information management solutions rather than on advanced development of IS that have high performance, but in terms of organizing become well organized for various types and sources of information that has been available.

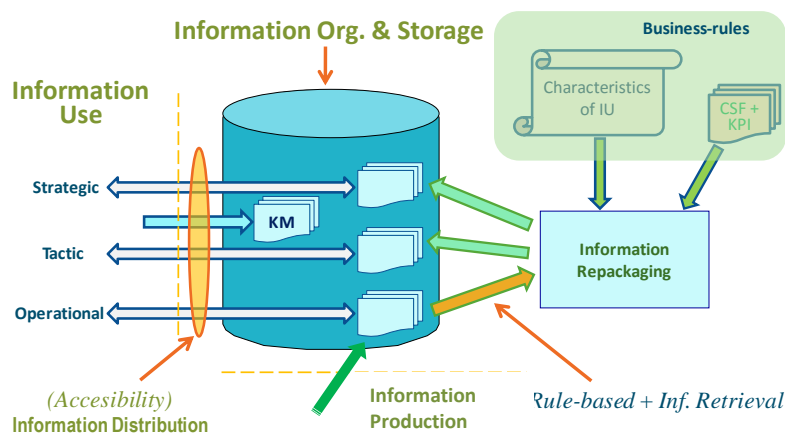


Figure 4. Schema of Improvement for Information Resource

5. CASE STUDY AND VALIDATION

Next we conducted a case study to evaluate practical implementation of IU characteristic through validation to application of this new characteristics. Case studies was selected in one local Indonesian Government office because its accordance to this typical issues, ie: large enterprise, dispersed data and operational information, recapitulation and reporting systems which is more manually, many kinds of critical information in semi-structured form, and inadequate system for Organizing and Storing.

Experiments carried out by implementing and testing its application as a part of access system to information in stage of documents integration in one of local Indonesian Government office. Many documents of working report will be summarized into performance report on government activities. Performance Accountability Reports of Government Agency (Laporan Akuntabilitas Kinerja Instansi Pemerintah - LAKIP) that generated at this stage and some related documents (RPJMD, RKPD, RENSTRA, RKT) used as information sources including some information or documents from Critical Success Factors (CSF), Key Performance Indicator (KPI), and other important documents. By using this approach, although enterprise does not have information resources that well-organized but all decision makers can pick up a valuable information directly from information sources mentioned above which generated by operational layer.

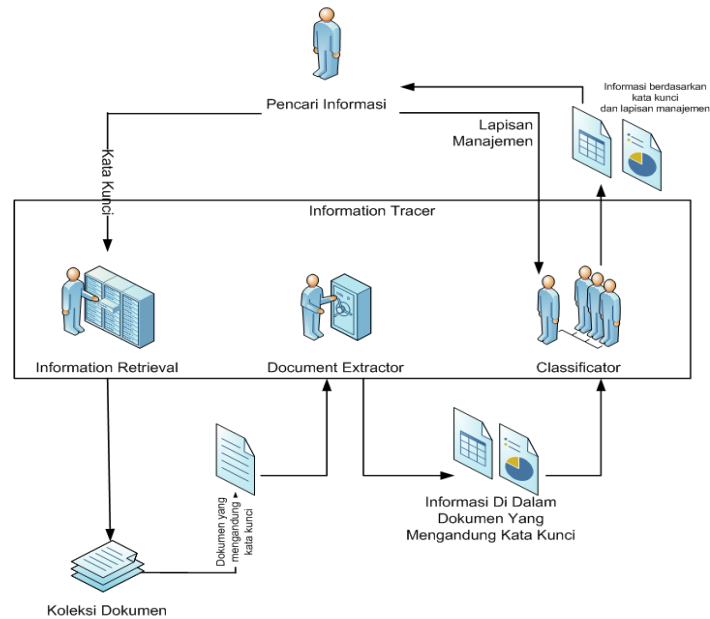


Figure 6. Schema for Application in Repackaging process of Information

<pre> public void showdocuments(JList list_is_result,String query){ ListModel.clear(); File indexDir=this.indeksfile; File dataDir=this.dokumenfile; DocumentSearcher searcher=new DocumentSearcher(); try{ searcher.searchIndex(indexDir,query,hits); } catch(Exception E){ System.out.println("ERROR: "+E.toString()); } String temp_pencarian=""; int count=0; for(int i=0; i<searcher.hasil.size();i++){ String alamat_dokumen=searcher.hasil.get(i).toString(); temp_pencarian=temp_pencarian.concat((i+1)+". "+alamat_dokumen+"\n"); ListModel.add(i, alamat_dokumen); count++; } } </pre>	<pre> public void tampilkan_taktis(DocumentSearcher DS, String Keywords){ try{ while(filefound.hasNext()){ ... for(int in=0;in<res.size();in++){ Integer res_temp[]=new Integer[2]; res_temp[0]=res.get(in)[0]; res_temp[1]=res.get(in)[1]; System.out.println("Indeks ke:- "+res_temp[0]+" tabel ke-"+res_temp[1]); List <kontentabel> getkonten=DE.getallcontentinarow(res_temp[0], DE.isitabel, res_temp[1]); List <kontentabel> headercheck=DE.getallcontentinarow(1, DE.isitabel, res_temp[1]); List <String> kolomcek=new ArrayList <String>(); for(int cek=0;cek<headercheck.size();cek++){ kolomcek.add(headercheck.get(cek).GetIsi()); System.out.println(kolomcek.get(cek)); } } } } } </pre>
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Figure 7. Reformat section of information in Repackaging Application

Almost all of information or report documents which will be organized as source in this experiment, only available in form of semi-structured information that has been stored. So it can be used also to evaluate these characteristic are independent to production process (in IP phase) or system whose generates such information source. Conformity dimension was used to carried out a repackaging process of information from source documents, to be retrieved, rearranged and presented in different formats appropriated for users in tactical and strategic layers. Built a simple application that implements 4 extracted features described above as parameters of rule-based algorithm.

Evaluation for characteristic of Originality carried by delivering and presenting directly output of this repackaging process as information in a different format to appropriate users type (Exchange process). Assessment for this case study was conducted by triangulation method, ie: systems functional, expert

judgment, and panel of users to validate the influence and practical usefulness of these new characteristics on IU.

Experiments have been done proves that these four features as characteristic parameters on IU classification was able to produces information in a different format (functional). Validation to results of repackaging assessed by experts and panel of users on tactical and strategic layer carried out by comparing information from the source with the results. Validation shows that experts was agree about content contained in these two types of information are the same meaning and no value is lost or degraded, although the format is different from the source. Majority of panel also agreed that information generated from repackaging (format) is more fit with their needs and interests and capable to accelerate hermeneutic process to information content.

6. EVALUATION

Validation results of our experiment above shows that information not only has characteristic value "can be understood" (as dimensions Understandability on IQ or Presentation in TIQM), but has values of epistemic characteristic in classification of IU process which can be more related with interests from its users to knowledge creation. Although information content has the same meaning (as potential value) but with different presentation or format it will give a different effect in its hermeneutic process. Higher epistemic value (at dimensions of Conformity) contained in certain format of information and similar comprehension for information content for all users (because it uses standard CSFs and KPIs within the enterprise) makes the information from repackaging results has a higher value for its user, because it becomes easier to understand and create new knowledge (Hakim 2012, Roslaeni 2013). Whereas dimension of Originality provide assurance to users in hermeneutic process in which value of information is not degraded by 'others', either devices or humans. It also provides assurance and flexibility for decision makers to digging back information that might be considered important or necessary but disguised so that it can be lost or ignored caused by processes which may be lead to its degradation.

Characteristics of Conformity and Originality will be useful in context of providing directly a high-quality information as sources of decision making for top managements in enterprise. More higher value in both of these characteristics will lead to higher value of information because it can provide a higher business value for its users. It means also provides benefits to enterprise as ability to improve a quality of information resources.

At present, availability of information for strategic layer usually served by an executive information system (EIS) and BI. Weaknesses of the such information systems in addition to high technical requirements in design but rather due to system sensitivity factor to the lack of available quality information sources from operational layer. Solutions of information repackaging proposed can be a complement and alternative solution to provide a quality information in context to meet the needs and interest for tactical and strategic layer in enterprise.

Providing information by applying characteristics on IU does not rely on completeness of information sources thus have an advantage such as a flexibility in the availability of information. Information sources that used is semi-structured form of information and does not depend at all with a systems that produces such information sources, prove that new characteristics on IU can be applied separately with production processes of information.

7. CONCLUSION

This study proves that new characteristics of information gained in classification of IU is indeed separate with characteristics that are in IP phase. Also shows that dimension of IU characteristics is able to function as a parameter of algorithm to produce higher quality information, in terms of high compliance with users interest. Therefore, it is possible to create a simple applications of repackaging such as the example above as a practical solution to providing a system of information access for executives.

By doing the well-organized for value of information in IU stage, ie Repackaging and Exchange processes will give a more effective impact to strategic interests of enterprise by produce valuable information for their leaders to support a good decision making. Availability of information value which more fitness, useful, and timely for tactical and strategic layer will improve asset value of enterprise information resource.

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