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# Presentation of organizational information databases information aggregation model based on knowledge strategic management

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#### ABSTRACT

Today, use of techniques such as information aggregation and design of homogenous and integrated systems in the organizations have been turned into critical case. Selection of suitable tools and system for implementation of information aggregation structures and information fetching and access model with emphasis on knowledge management is one of the managerial considerations in usefulness of hidden and unhidden knowledge in the organizations. In order to implement knowledge management based information system, there is need for a systematic and long-term approach, but one can implement some degrees of this system with equipment available in the organizations. In this article, we present a combined model of knowledge management in organizational information databases information aggregation while studying concept of information aggregation and knowledge management with strategic look. What is important is that knowledge management will be used as an important but not main factor. For compiling information database architecture. techniques relating to XML and information saving have been regarded textual. Y7g bIn order to assess and optimize the compiled model, genetic algorithm techniques has been used. In the presented model, four operational modules have been specified on which basis 15 genes have been identified and genes are assessed and optimized with regard to theory of experts and final model was compiled on the basis of final output resulting from optimization.

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# Introduction

Decision about selection of suitable strategy in aggregation, sharing information and reuse of organizational common information is a multivariate decision because many factors should be studied for assessing and selecting strategy. The researches which have been done on Knowledge management strategic planning are limited and disperse. These researches have regarded limited factors interfering in decision making and selection of strategy and one of the knowledge management dimensions has been studied (organizational structure, culture, technology) and other strategic factors have been neglected. With regard to the performed researches (Alavi, Dorothy, 2001), need for utilization of a knowledge management dynamic strategy has been proved but few researches have been done to show if one can perform knowledge management dynamic strategy for the organizations in the fields of (Abou-Zeid, 2002) . Many studies have been done on information aggregation and formation of centralized information database. But the model which is based on knowledge management and gathering information requested by information and organizational systems for (Bukhres, Elmagarmid, 1996) has been rarely observed. Better data management and compilation and execution of strategic organizational goals lead to belief in and attitude to more knowledge sharing (with use of facilitating technologies).

Sometimes, these efforts are effective but they are almost inefficient. The most important questions which are raised (Breitbart, 1990) are as follows: What tools are used for selection of suitable strategy for the organization? How can we create dynamic approach and apply for execution of knowledge management strategy in order to establish aggregated information database? Can we use knowledge management in special processes of the organization? This article tries to understand this aspect of knowledge strategic management and suggest a framework for aggregating inter-organizational identified information and information based on knowledge strategic management which can fetch and aggregate the required information in centralized data storage.

#### **Review of literature**

In this section, we introduce some concepts which should be studied in theoretical review of literature and final model will be based on them.

•Knowledge management: knowledge management is converted to full commercial task and new tools of management for many modern organizations (BeikZadeh, Sovari and Sovari, 2006). Management theorists have helped growth of knowledge management in different aspects and some of them have focused on operational dimensions of knowledge management while some others have emphasized on conceptual subjects. Some thinkers such as Druker and Strasman have emphasized on importance of information growth and express knowledge as organizational sources and Roger has expanded look at knowledge management in information technology transfer in the field of publication and innovation with use of knowledge

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management and Allen has expanded it in MET University (Naseri, Ebdali, Hooshmand, 2005).

•Knowledge strategic management: a set of processes for understanding and applying knowledge strategic resource in the organization. Knowledge management is a structured approach which establishes procedures for identification, assessment, organization, storage and application of knowledge in order to fulfill needs and goals of the organization. Knowledge strategic planning is a part of knowledge management strategic planning which is allocated to assessment and selection of effective management strategy for the organization and its compilation (HaghighiNasab, khosravi, 2010).

Emphasis in this article is on knowledge management with strategic look which relates to the above definition because nature and content of knowledge which can be applied in organizational aggregation system is focus of this article. •knowledge strategic management frameworks:

Many researchers have presented different models in knowledge management. Most models are similar in some concepts and elements constituting models in spite of structural differences. For example, user interface layer which is used for presentation and sharing of knowledge among the persons dealing with knowledge and senior managers of knowledge is available in all raised models. (Seif, Karami, 2004) in table 1, some of the most important models have been mentioned. In order to establish any model, one should pay attention to hierarchy of knowledge management execution as well as key factors of success of failure. Most key factors relating to the organization and its components are defined and specified though one cannot neglect factors effective on tools and component.

•Information aggregation: during 1980, research focused on the distributed model and computation machines but its low effect caused to consider object-oriented model in 90s. This model was necessary for controlling combined data and worked simply on special database and multimedia data. In 2000, new innovation occurred and XML-based model was created. Goal of this model was to remove difference between documents and data and helps put together all information sources whether structured or not (Fogel, David, 2000) in presentation of the related model, XML model was used as basic method for transfer of information and we transfer fetch and refined information to data warehouse with use of textual information compaction techniques (XSLT technique) (Sotriakoa, Zeppou, 2004).

# Foundation of model compilation and Data warehouse system required for aggregation of information

For compiling the model, different types including conceptual, logical, physical or object-oriented model have been used. Conceptual model which is called conceptual data model is a plan including concepts and relations between them. This model describes semantic relations between different parts of an organization and mentions some hypotheses about its nature. Logical model is a data model for a given problem which has been created with regard to capabilities and limitations of a data management technology and depends on technology. Physical model describes how data is stored on physical media. This storage can be done in a centralized and continuous medium or distributed medium, therefore, this model based on objects of a logical structure of information maintenance. The model presented in this article has conceptual structure which will b formed on the basis of the available logical models in each model section and components communication.

Architecture of information storage is the first important subject which can be referred for information and data in

distribution and computation media (Edvinsson ,1997).generally, information identified in computations media which are divided into four types of basic and original data which are common in different systems (such as systemic parameters .etc), metadata of each subsystem which includes process control and even record standards, processing information which is gathered during processing stages from other systems and historical information (Fogel, 2000) . The compiled information storage architecture can support all kinds of the available data. With regard to dispersion of data, data warehouse is the best structure for keeping information. In figure 1, storage and data communication system which is basis of data warehouse creation for the model presented in the article has been shown. Data warehouse system should be total and support the interactional data such as current data which has high interaction in system and old data which has low interactions and application but numerous interactions in systems and static data which has the least frequency in system and support data which ensures information security.



Figure 1: Data storage system

Position of data security in storage system and aggregated information secure access system

In distributed computer media, information of the dynamic data warehouse and static data warehouse is the main issue of data protection (Bukhres, Elmagarmid, 1996). Regarding protection of data in distributed media, it will be important to pay attention to concepts such as information transfer, exit/transfer of data and data support/retrieval. According to figure 1. information is transferred between dynamic data and the past data warehouse and it means that information is being transferred between bases or tables. Information is transferred to static and older data warehouse. One can possess suitable tools for exit/entrance of information with this hypothesis that required knowledge and transaction are provided in database management system. If one can convert information to textual file, entrance and exit process will be better managed and supervised. Information should be transferred between static data warehouse and kept and secured data warehouse and this process can be performed through tools such as copying files for understanding and recognizing work procedure. As mentioned before, data warehouse is regarded as main structure of information maintenance. Therefore, the second action for formulation of aggregation model is compilation of stored data access system. Information access system should be such that system manager and other operators are able to observe and follow information through the available subsystems. Security of system setting file, parameters file with the defined mechanisms, control of operational system security should be implemented with methods of considering system managers (Eiben, et al. 1994). It should have required strategies for data center and core of logical data security to support differences between base

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security control, file system security and the available security mechanism. Dynamicity of the system requires that there should be three factors of operator, operation and operationalzed subject. Security control layer recognizes which process is transferred to what users or systems and how to add query of the required components and other complementary components to the enquiry to write and send queries completely. All of these roles and initializations are temporary and are canceled at the end of enquiry stage and provision of the required service (Chamberlin, 2002). In figure 2, model saved information access system is shown on the basis of the above remarks.



#### Figure 2: Access to information in aggregated stored system The available parameters and compilation of the first model

Parameters required for compilation of model have been considered in five modules. These modules include: input sources module, Knowledge strategic management module, search engine module, or gate of link to other systems, information transfer and storage module in data warehouse and information access module. Fetched data from the data sources which are online and offline are kept in temporary database because this data can be refined, filtered, restored, combined or packed for sending. Therefore, strategic knowledge management module is considered due to importance of data i.e. after information fetch module. At the end of this stage, data should be ready for storage process in data warehouse. The refined data which is in a temporary information database is converted to Xml format. Produced Xml files are converted to a file with Xslt format with use of conversion algorithm and route and transfer map and stored in main data warehouse. Aggregated data can be reused for online analysis required for applied and commercial models. But we should use data cube for more effective use of the stored data with regard to use of data warehouse (Ting, 2005).

It is important to design a dynamic search engine as access gate for other systems and users and even to achieve national total system in the model but the important issue in this field is to which part of the model gate linking to other applied programs and software systems or even other information systems. With regard to unknown location, this subject will be dealt with in optimization of model. In figure 3, information aggregation model of strategic knowledge management based organizational information databases have been shown on the basis of identified parameters for each module.

#### **Research method**

Methodology, answering the research questions, survey and information gathering are based on the study and questionnaire. The first stage of this research relates to recognition and pilot

study and dimensions and components of knowledge strategic management models were extracted and information was aggregated. In the next stage, the primary model was compiled on the basis of the recognized parameters. Five

modules were identified in compilation of the model. After compilation of the model, stage of model assessment and optimization was performed. In assessment and optimization stage, genetic algorithm techniques were used and the most important reason was high capability of this algorithm in optimization (Wright, et al., 2003). 15 genes were specified as assessed and optimized parameters and the model was optimized on the basis of cost-value model acquired from the optimal experts (table 2). Genetic algorithm for solving each problem produces a large set of possible solutions and assesses each one of them with use of fitting function. Then, some of the best solutions which cause to produce next generation new solutions are selected. During consecutive generations, searching space evolved in a direction which reaches desirable solution. In case of correct selection of parameters, this method can be very effective.

#### Data incompatibilities in information aggregation

Incompatibility is important in aggregation because if there is no correct relationship between data tables and databases, incorrect data will be created and authenticity and incompatibility of the aggregated data will be reduced. In study on incompatibilities in the model, three models of semantic, syntactic and structural incompatibility will be studied (Drucker, 1998).

In semantic heterogeneity, dimensions of data ranking, data value and identification of data were studied and data language and model and query language were studied. In structural heterogeneity, some cases such as incompatibility in all types of structures, structural evolution, and structural models and data compaction were studied and a strategy was compiled in order to exit from each one of the above dimensions.

Information aggregation framework has combination of all incompatibility dimensions. Suggestion in this article is that XQUERY techniques should be used. With use of XML and techniques available in XQUERY, many incompatibilities in data processing have been removed (Syswerda, 1989).

One of the most important points for use of this method is that one should make decision in the first step how the general data model is (for example, semi-structured or object oriented), then data was fetched and converted to XML format. Process of conversion to XML format may cause to create incompatibilities in XML data sources; therefore, XQUERY is used (for definition of data models in transfer and conversion of data) and predictable incompatibilities are predicted on XML model available in destination sources and are minimized.

## Assessment and optimization of primary model

In the presented model (figure 3), four modules have been assessed and studied in terms of authenticity which include two modules of input data sources, one module relating to strategic knowledge management and one module relating to search engine. In each one of the modules, we study genes on the basis of chromosome strain in each one of the modules on the basis of genes experts' theory and activate effective or more effective genes.

Therefore, limitation in these modules is extent of activity. In each module, there have been some effective parameters in which final value and cost are calculated on the basis of effect and weight of each one of them. At first, we produce a primary population including 100 chromosomes randomly and we consider them as the first generation chromosomes. For each chromosome available in the first generation, we calculate fitness rate through fitness function. This fitness function is defined as:

# Finding

Figure 4 shows different executions of genetic algorithm during 50 data generations. All executions though started with primary values have ended to fixed chromosome. This fixed chromosome is as follows:

#### 1 0 0 1 0 0 0 1 0 0 0 1 0 1 1 1 0 0

This chromosome is adjusted with primary genes table, number one shows genes which remain in the model and number zero indicates genes which are excluded in optimization. As shown in table 4(fitness function ), in order to prevent from numerous ways and different technologies of information entry in the first module, we considered the optimization algorithm in such a manner that the most optimal method in information entry was kept on line and other models of information entry will not be considered.

In execution of the first module which has been considered in the algorithm, OLTP model remains and OLAP and MOLAP are excluded. In the second module which information entry parameters have been studied in information sources off line and we considered the best option during optimization process and excluded other methods. Result of chromosome shows that metadata value has the highest optimization value among the available components and other components are excluded. For selection of search engine, the goal is to select the best location for linking to search engine of other systems and three locations were considered (strategic knowledge module, temporary information database, data warehouse) and goal of optimization was to select a location for link as the best location.

Result of execution shows that if search engine is linked to knowledge strategic management module, it will have the highest value added in the model. Another module which is studied in optimization is assessment and optimization of parameters relating to fetching and storage of information in layer relating to strategic knowledge management. Result of chromosome shows that the considered parameters have equal rate. Some main functions have been predicted for effect of data in the model of which the most important ones are data analysis, data reengineering and knowledge creation. Among the available parameters, packaging obtained the least value in model optimization which we may not consider with regard to nature of this process because this process is observed in communication between modules.



Figure 4: Fitness output of four modules besides each other Conclusion

In the present article, we presented a framework in the field of knowledge strategic management –based organizational information systems information aggregation (Naseri, Ebdali, Hooshmand, 2005) after review of literature and concepts (Agarwal, Keller, Wiederhold, Saraswat, 1995). For this reason, one can regard it as national model for organizational information aggregation. In order to compile a model, we study different executive dimensions in the model and study cases

relating to data sources in two online and offline levels, knowledge strategic management, conversion and transfer of data to xml format and access to information and suggested the primary model on the basis of type of communication and interactional levels between modules. (Seif, et al.2006). The presented model can be regarded as new research and model because it includes a combination of technical and instrumental techniques of knowledge management. In order to study authenticity and optimize model, genetic algorithm techniques were used. The most important reasons for selection of this algorithm were comprehensiveness and its capabilities to optimize and conditions available in the model in terms of parameters. Value-cost values of each parameter were obtained from the experts and entered model assessment and fitness function. Results obtained from algorithm show priority of the model and correct selection of the assessed genes. Use of techniques such as micro benchmark can be regarded as future researches subjects on the basis of this model (Davenport, Jarvenpaaa, Beers, 1998). Interaction which is ability of different systems to understand each other or operations with each other can be regarded as another suggested subject through which organizations and units in different levels can cooperate with each other.

In order for the organizations to interact with each other, it is necessary to identify interaction level in the organizations. Result of assessment and optimization of the primary model and corrections in it is observed in the final model of organizational information aggregation based on knowledge strategic management.

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Alireza Poor- Ebrahimi et al./ Elixir Mgmt. Arts 43 (2012) 6810-6815 Table 1: strategic knowledge management models

8	7	6	5	4	3	2	1	/ Model Stages
				Apply	Publish	Save	Create	Hicks
						Linking knowledge	Knowledge production	Marc&Mece Ltoje
	Culture building	Exchange /communication	Spend	Exchange in general level	Expansion/sharing	Entrap	Creation	APQC
					Share	Organize	Find	AMS
		Application on the basis of goals	Share	analyze	Analyze	Create	Acquire	Anderson Consulting
				Analyze	Use	Publish	Obtain	Di Bella&Nevis
					Saving	Transfer and exploit	Learning	Marquqet 's
				Apply	Publication	Gathering and conversion	Creation of source	Wiig
				Useful combined knowledge	Knowledge distribution	Keeping available and new knowledge	Creation of new knowledge	Spek &Spijkernet
					Transfer	Capture , representation or agency	Creation , learning , combination	Ruggles
	Creating	Publishing	Applying	Organizing	Agreement/conversion	Gather	Identification	O'Del
		Assess	Apply	Share	Save	Develop	Determine	Weggeman
		Undo	Gather/save	Create	Share	Need recognition	∘coordinate	UTI
			Assess	Apply	Learn	Organize	Control	Le manageur
	Use	Make adjustment	Share	Organize	Gather	Diagnose	Create	APOQ
			Share	Save	Make framework	Control	Create	Keep&Daly &ham
		Create	Understand	Establish relationship with others	Classify	Specify	Create	Green Wood
					Transfer	Encode and organize	Produce	Davenport& Prusak
				Use	Transfer	Fixing Maintaining	Create	Newman &Conard
				Use	Show	Create	Control	Hjelmeruik &Kirkemo
	Assess کنید	Save	Use	Publish	Develop	Specify	Target	Promote
	Creating commerce	Application	Publication	Saving	Selection	Capture	Identification	Beek man
		Manifesting	Production	Use	Internalization	Selection	Acquisition	Holsapple &Jashi
	Assessment	Sharing	Maintenance /deletion	Creation	Learning	Application	Finding	Bukowitz & Willams
			Transfer	Establishment	Publication	Acquisition	Identification	Pawlowsky
Assessment	Maintenance	Use	Sharing	Development	Acquisition	Identification	Determination of knowledge	Probst &Raub
				Internalization	Link	Externalization	Socialization	Nonaka&Ta Keuchi