ENTERPRISE INFORMATION SYSTEMS INTEGRATION
Proposal of an Approach based on User Profile and Needs Analysis

Boulesnane Sabrina and Bouzidi Laïd

SICOMOR- IAE, University Jean Moulin- Lyon 3, 6, cours Albert Thomas 69008, Lyon, France

Abstract: The advent of Web technologies has influenced the development and the use of Information System (IS) in organization. On the social level, the new technologies massive integration affects the actor's linguistic practices. One of the challenges which should be surmounted by organizations is the formulation of information needs. We propose in this paper a mediation approach allowing various users to create a favourable context to an "exact" expression and interpretation of their information needs. This approach represents a competitive resource to these organizations, situated in an uncertain and changing business world.

1 INTRODUCTION: RESEARCH CONTEXT

The integration and the use of ICT and IS are key elements and necessary for Small or Medium Enterprises (SME) development (Reix, 2004).

The "modern" management is characterized by the optimal exploitation of enterprise information resources. What guaranteed to these organizations not only the acquisition and the conservation of its economic competitiveness but especially assures its survival and development (Laudon & Laudon 2006). In this intensive innovation context, Consulting Companies assists them to integrate and develop ICT and information systems strategy. SME are confronted in this context to problems of users' information needs interpretation.

1.1 Problem Description

ICT field is very complex, dynamic and in perpetual evolution and information used in order to identify needs are more and more difficult to be determined. Furthermore, users profiles implicated in the process are heterogeneous and different. This situation makes the needs interpretation by Consulting Companies difficult to be clarified and analyzed.

1.2 Hypothesis

Our main hypothesis is to consider that the problem of informational needs' formulation and interpretation is due to: the human actor's variation and the profile's heterogeneity; the diversity of their socioprofessional environment; the complexity of technological context. In order to study this problem and to clarify our hypothesis, we propose a new conceptual approach which gives us the global basis to our analysis. We finish by a presentation of a system assisting consulting actors in their costumer needs' interpretation.

2 CONCEPTUAL METHODOLOGY

This analyze must be focused on a theoretical approach allowing us to understand and have a global overview of SME's technological environment and essentially on their needs' formulation and interpretation. Our research is based on a methodology, called "three-dimensional approach", used for designing and auditing IS. This methodology is centred on human factors' analysis (Bouzidi, 2001). Developed in the research framework of SICOMOR team *(Système d'Information COmmunicants Management et*

ORganisation), this approach is used to determine and to specify: the ICT role within an activity (activity dimension); the human factors' place (human dimension); the new technologies' integration (technological dimension).

After this general presentation of the conceptual approach, we propose to give more details about the different levels of analysis.

2.1 Activity Dimension: The Impact of Professional Environment

Activity dimension analyzes the various and the main functions of the activity studies. It identifies the information flow exchanging between actors and gives a general overview of the costumer needs interpretation' problems. Because SME integrating ICT and IS comes from different domains (industry, tourism, transport…), the activity dimension analyzes the characteristics of the various environments: costumers enterprise and Consulting Companies. The activity dimension gives special attention to three major levels.

The First level concerns the relation between organisational characteristics of companies and the information needs' formulation. This "organizational level" describes the global environment of companies. We focused here on the socioeconomical environment and essentially on the place giving to the client's information needs.

Secondly, a "functional level" identifies the various functions assured in a Consulting Companies' context. The most important functions in our study are: information needs' formulation and interpretation, recommendation and implementation of the solutions. We attach a particular importance to the place of actors needs' satisfaction.

Finally, a "temporal level" describes the role of management information needs and knowledge capitalization in this context. In effect, the rapid evolution of ICT and IS fields requires that companies capitalize knowledge to guarantee a customer's satisfaction.

Activity dimension assemble the organizational information needs. The different information will be then consolidated by the human dimension and be exploited optimally by the technological dimension.

2.2 Human Dimension: Identification of User's Profile

The research paradigms' evolution in Information Science allows more and more the implication of real user's information needs and its social environment. The "user-centred approach" situates the users of IS in the center of the studies (Chaudiron & Ihajadene, 2002).

The three-dimensional approach is based on user-centred paradigm. In effect, understanding the actor's information behaviour is indispensable to identify their profiles. The human dimension gives necessary information to analyze the characteristics of actors who intervene in the activity both at:
- The IS conception level (consultant actors),
- The IS exploitation level (customer actors).

On the one hand, this comprehension starts with the individual characteristics' identification which we called "endogenous parameters". The most important parameters giving us human information behaviour's comprehension are: the training profile, the professional profile (competence and performance). On the other hand, considering actors just in an individual perspective is insufficient if we want to have a global vision of their information behaviour. It seems necessary to describe very precisely the characteristics of their social environment: it's what we qualify as "exogenous parameters" (Boulesnane & Bouzidi, 2006 a).

The endogenous and exogenous parameters allow us to define the human actor's characteristics but also to understand the origin of the formulation and the interpretation needs' problems.

In a pragmatic study, realised between 2003 & 2005 in a context of Consulting Companies, we identify a set of endogenous parameters such as: the training profile, the "speciality" and the domains of expertness, the technological knowledge. Organized around contextual and social criteria, the exogenous parameters can be resumed by: the function and the roles assumed in the organization, the costumer company's qualification in terms of ICT and IS and the socioeconomical environment.

The list we identify is not detailed and exhaustive; the quality of every parameter depends largely on the actors certainly but also on the nature of the real company needs in terms of ICT integration and IS conception (Boulesnane & Bouzidi 2006 b).

The human dimension can allow consultant actors to identify the customer's profiles and to anticipate their information behaviour and needs formulation.

2.3 Technological Dimension

The role of technological dimension is to analyze the human actor's problems in a Consulting and Advice context. The objective is to give to their necessary

information to optimize their activity. This dimension defines the fundamental technological elements and the basis of an approach helping them in terms of needs' formulation and interpretations.

This dimension is based on various levels:

- A functional level identifying the main functions realized by this technological helping approach and describing also performances and limits of its adaptability and use.
- An organizational level describing the necessary material and human resources to adapt and facilitate ICT and IS integration.
- An operational level determines the pertinence of a human actor's assistance in their activity. As well as it's accentuate the importance of an accompanying phase changes during the integration of new technologies.

2.4 The Interaction between Dimensions

The three-dimensional approach represents simultaneously a theoretical and pragmatic frame. We can determine the various angles of view to understand the needs' formulation and interpretation problems. Every dimension gives us necessary information and knowledge in use to clarify the principal axis of our study. The complementarily and the interaction between these elements (activity, human and technological dimensions) clarify the fundamental basis of our analysis and the solution's proposal.

The three-dimensional approach helps us certainly to understand our problem. It offers a global framework and allows us to represent and to formulate our research study. However, we think that it's necessary to specify here that our case study has a linguistic origin. In effect, the needs' formulation and interpretation are largely based on linguistic expressions. An important part of our approach will be focused on the identification of user's profile and their information referential.

The approach we propose in the following section is the result of a practical study realised between 2003 & 2005 in a context of ICT and IS integration. The mediation approach is based on linguistic and technological information and essentially on actors referential's convergence. We present here the main conclusion which allows us to elaborate this information mediation's approach.

3 THE APPROACH OF INFORMATION MEDIATION

We observe in this practical study some situations where a "not specialist" customer uses a "multiple expression" to identify their information needs. This category of actors, who are not specialized in new technologies and IS fields, tends to use some terms in a non appropriated context. This situation creates difficulties in terms of needs' identification and interpretation.

3.1 The Data Collection Method

The first analysis phase consisted to constitute a list of terms used by the "not specialist" customers. This list is established by the analyze of documents giving by Consulting Companies. These documents resume customer needs' formulation. The lists of vocabulary contain around fifty concepts and expressions, we cite: *Database, Database Management Systems, Data mining, Data Werhouse, Expert System, ICT, Information System, Knowledge Base, Decision Support System, Informatics System.*

In the second phase, a linguistic analysis identifies some semantic relationships which we consider as "contextual relations". Even if the approach is based on language analysis, we were interested more by the pragmatic level. In effect, we observed that human actors make confusion between concepts: they tend to associate some terms with a second interpretation level which we call "contextual synonymy".

This analysis allows us to become conscious that the users substitute the terms according to: technological context (technological dimension), their profile in terms of expertness in New Technologies and IS field (Human dimension), their company category (Activity dimension).

The corpus treatment allows us to collect groups of terms characterized by identical semantic relations. In order to organize and to structure these concepts and the relations between them, we use the graph theory. Our objective is to have a synthetic view about the different terms and the contextual relations related them. We give in the following figure an extract of the graph and the conceptual relations.
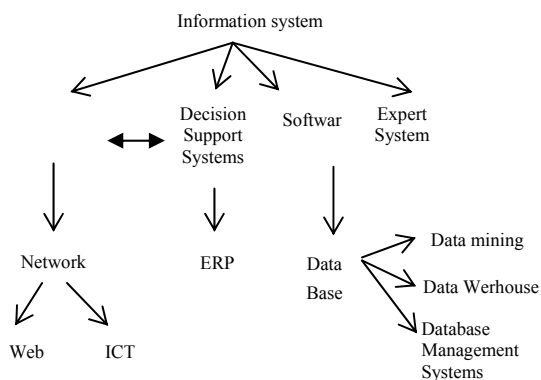
Figure 1: Concepts & contextual relations.

The concepts representation in this way allows Consulting Companies to investigate the various confusion case created by their costumers.

3.2 Global Strategies: Progression in the Analysis

The various confusion cases are constituted by a set of "term candidates" which determine what we call an "interval of confusion". This interval represents the subgraph constituted by the various concepts commuting with the confusion term. If the terms are in a direct commutation with this last one, the interval is qualified as "immediate interval". On the contrary, if the subgraph is composed by terms in an indirect commutation: the interval is "indirect".

The immediate interval exploitation allows starting the information research and the information needs' analysis. This first level contains the terms candidates immediately in commutation with the confusion term. The transition to the indirect interval is possible only if users wants to refine their research and needs analysis.

Furthermore, the approach assisting consulting actors in their activity depends certainly on tools of information representation and exploitation, but the human expert represents the ultimate decision-maker who oriented the information use. In effect, the approach is based on heuristics method. The fundamental objective of this method is not to guarantee the most efficacious way but to assist the user by the proposition of potential ways which he can follow to resolve his problem. These ways are constituted by the various intervals (immediate and indirect). The user dispose of several ways and he can progressively contract these ways to refine the costumer's information needs.

The approach of information mediation offers to the user, according to the customer profile, terms and concepts which concerns the confusion cases. The development of this interface gives to the user rapid and pertinent answers.

4 CONCLUSIONS

The main research goal of the reflection presented in this paper is to analyze the users' information needs in a Consulting Companies. This activity is composed by different populations which are characterized by a variety of their information referential. The relevance and quality of the approach we propose in this context depends not only on indexing tools and information acquisitions but also on the user, on its profile and on its information seeking methods.

At present, we envisage to refine our system by:
- An improvement of user's classification (endogenous and exogenous parameters),
- A corpus analysis' extension,
- A technological prototype which valid our hypothesis based essentially on the actor referential convergence.

This knowledge capitalization tool assists Consulting Companies in the analysis of users' information needs.

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