ABSTRACT
The paper presents the knowledge management and business, intelligent concepts in order to analyze enterprise internal and external resources based on the knowledge transfer and capitalization processes. The virtual enterprise business network purposed solution expect to improve small and medium-sized enterprises (SMEs) involvement in new product manufacturing networking efforts in an virtual industrial holding, enable better and faster decision processes and promote the development of the business services. The main goal of the paper is to propose knowledge management solutions to support knowledge applications development at the industrial holding level. An expert system for products identification when the technical characteristics are known will illustrate how this system works. That intends to facilitate and enhance the required knowledge management processes linked with the business process management in knowledge alliances at an industrial holding level.

Keywords: Virtual Enterprise Business Network, Knowledge Management, Knowledge Application, SME’s.

INTRODUCTION
In order to meet dynamic market requirements for their new or existing products/services, companies need to focus on their core competence and in the same time, to join industrial networks established on the concept of virtual enterprise [9]. Small companies, as SME’s, have to re-orient themselves and better valorize their core competence by establishing strategic alliances in virtual industrial holding. This behavior will better satisfy customers’ requirements and needs. In addition, such attitude can grantee their existing and [5]. The concept of virtual enterprise business network (VEBN) can be defined as a dynamic organization developed by the synergetic combination of dissimilar SME’s with different core competencies, thereby establishing a best of everything consortium to perform a given business project and to achieve maximum degree of customer satisfaction [9]. In addition, knowledge has become the most important economical factor for permanent competitive products and services. One important aspect of the knowledge management (KM) concept evolution over the last ten years is to attempt artificial intelligence tools development that support human decision making processes. This will help the organization system designed in order to manage and manipulate knowledge repositories that will support business processes [3], [7]. An industrial holding activity, established by a dynamic and temporary alliance of SMEs, requires a large amount of data, information and knowledge collected from all sources and then transferred them at each level of the consortium [12]. E-enterprises of our days have realized how important is to establish what they know and to be able to exploit their knowledge. Knowledge belong to different places such as databases, knowledge base systems, and peoples’ heads (tacit knowledge) and most of them can be distributed across the digital enterprise or the e-enterprise [8], [11]. In addition, the e-enterprise needs a very good management of the knowledge processes, including knowledge assessment in order to get maximum return or profit. Knowledge management is a topic of growing interest to large organizations, i.e. for SMEs grouped in a dynamic alliance (as virtual enterprise type) for an industrial holding building. In this case, the new developed organization’s activities focused on the knowledge acquisition process (considering different internal and external sources) and the knowledge creation process by valorizing partners’ experiences. A particular interest will be given to the knowledge effective application processes to support and fulfill the organization mission [10].

In this paper, we consider that knowledge is using information (as a consequence data) to generate new ideas compatible with information and knowledge. In this context, we present some research results that are connected with the collaborative infrastructure concept development.

In the paper there will be debate a solution of a virtual enterprise business network that can operate to reduce SMEs...
involvement in networking efforts, enable better and faster decision processes and promote the development of the business services. Knowledge engineering methods provide systemic and complex approaches to support design and build processes of knowledge-based applications (KApps).

In the context of our paper, we consider that there are tools to capture, modeling, validation, verification and maintenance of the knowledge in these kind applications [12]. At the industrial holding strategic level, the knowledge-base applications have to be able to analyze and plan the business processes in terms of the knowledge management activities. In addition to our theoretical researches, an expert system will be presented for the products identification when the technical characteristics are known.

BUSINESS INTELLIGENCE AT THE INDUSTRIAL HOLDING LEVEL

Enterprises marketplace value represent a complex concept that evaluate its business performance from all other actors present on the market; e-services and e-business implementation require e-enterprise re-thinking and re-modeling processes in order to support the efficient use of new network technologies. This approach is linked with the new digital economy or e-economy [4], [12].

Typical approaches in knowledge management are based on concept maps, hypermedia, and object-oriented databases [1], [2]. In this context, artificial intelligence techniques developed for the knowledge acquisition, representation and discovery are seen very important to knowledge management [12]. In addition, at the managerial level, an industrial holding is concerned with identifying and formalizing existing knowledge, acquiring new knowledge for future use, archiving it in the consortium memories and creating particular systems that enable effective and efficient application of the knowledge within the e-enterprise.

Consequently, at the operational level of each e-enterprise professional personnel, who need access to the right knowledge, at the right time, in the right location, are able to use knowledge in everyday practice. The most important tasks of knowledge management is to capture, formalize and capitalize explicit and tacit knowledge of an industrial holding in order to facilitate the access, sharing, and reuse of that information (Figure 1).

The choice of a correct solution depends on the type of consortium, its needs and its culture, and must take into account the organization's people and technology. In addition, the product development process has become an intensive process of knowledge application and it consists of a process of transformation of information [12].

Knowledge increasing process in a particular e-enterprise defined for an efficient knowledge management system of the intellectual capital are described in [4], [12] together with a methodology consists of ten steps: obtains and uses, learn and contribute, evaluates, sustain, support, exchange, combination, transfer, recovery and discharge. This methodological approach is based on the e-platform of UPB-PREMINV lab (settled at Politehnica University of Bucharest) that was designed to support KApps using internal and external knowledge resources during the product development process and business intelligence strategies implementation. The knowledge capitalization and enterprise knowledge transfer based case study is a part of a research project implying a SME’s & UPB-PREMINV Research Centre partnership. The aim of this solution is to establish the methodological steps for outsourcing and integrating industrial partners into a virtual enterprise business network.

VIRTUAL ENTERPRISE BUSINESS NETWORK SUPPORT FOR A KM SYSTEM

A KM system implies a knowledge-support infrastructure and designs for knowledge-support architecture based on the new information and communication technologies – ICT.
The overlap with information infrastructures is large, since most of the potential components extend the human ability to store and access information, thereby aiding the human process of creating and applying knowledge.

The KBS and related artificial intelligence advances for storing rules and patterns are also important in this system [6]. One solution is a Virtual enterprise business network (VEBN). The VEBN is the act of decentralizing an operation for the greater good of the industrial holding and it can be implemented and managed utilizing internal resources or outsourced. The proposed general architecture (Figure 3) for a VEBN [9] is using Internet technologies or a provider network for an industrial holding, with SME’s components, geographically dispersed [6]. A VEBN for an industrial holding is necessary to combine temporary a group of SME’s regardless of their geographical position but such a manner that it flows together and to provide the best performance.

A general requirement for an infrastructure support is than the SMEs grouped in an industrial holding must be able to inter-operate and exchange information’s and knowledge in real time so that they can work as a single integrated unit, although keeping their independence/autonomy. In particular, we are developing in these e-platform methods to improve the comparability of knowledge. This can potentially lead to an exponential increase in the number of questions answerable by a collective knowledge base.

KNOWLEDGE APPLICATIONS AT THE SMES LEVEL IN AN INDUSTRIAL HOLDING - CASE STUDY

Comprehensive solutions to knowledge problems, knowledge-based (expert) systems (KBS) serve as building components of a diverse knowledge management infrastructure. The development of KBS technology involves knowledge engineering as well as normal software engineering practices [12]. To turn that stored data into valuable information, e-enterprises are now questing knowledge applications (KApps). The business advantage in having KApps, lies in the ability to analyze large amounts of data from any business model and to determine the personalized preferences of all potentially customers, than rich them with relevant information, wherever they may be [12]. This class of applications allows companies not only to collect but also, to analyze date, information and knowledge in order to developed better supplier and customer relationships. With the presented case study, we emphasized on how a knowledge base can be built in the enterprise as part of an expert system to support a department activity.

During the manufacturing process development, one of the main activities is to choose (decision-making process) a product based on a particular project conditions/restrictions, assembly conditions, or other data sheets requested characteristics. To support this activity is necessary to have a library, database, knowledge base from which employees can extract timely information [12].

In the presented case study, there is analyzed this activity and a knowledge application is elaborated to choose a product when the technical characteristics are known [12]. For the knowledge base development (Figure 4 shows the METER.KBS interrogation interface), there have been consider an enterprise that have, among others, as activity domain the water systems design, assembly and service. Water meters are devices used for the water consumption measurements (Figure 5) even for domestic or industrial purposes. Common types of water meter are multi jet, single jet, turbine, electromagnetic, ultrasonic etc. For the case study, there have been considered a number of water meters class elements (e.g. cold and hot water meter) available in the enterprise warehouse and, after that, the elements main technical characteristics, destination characteristics etc. were defined.
virtual business processes development in an industrial holding formed by a temporary and dynamic alliance of SMEs. This application could be oriented on the main SMEs knowledge resources used during the product development processes by considering the support of a VBN for an industrial holding. In this case, we emphasized on how a knowledge base can be built in the enterprise as part of an expert system to support a department activity. The presented case study is an expert system used to support knowledge applications development at the enterprise level for products identification when the technical characteristics are known. The validation of the presented solution meant to establish work level in collaborative infrastructures and is related to knowledge bases used at the small and medium size enterprises level in an industrial holding.

The main purposes of the research activities were to integrate the knowledge management processes from university to industrial partners in a proposed collaborative e-platform that can support industrial services and product design collaboration. 

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REFERENCES


