

**CONTRIBUTIONS TO CONCEPTION, DESIGN AND
IMPLEMENTATION OF SOME COLLABORATIVE SYSTEMS**
PhD Thesis Review – Mihaela MUNTEAN

The PhD thesis realized by Ms. Mihaela MUNTEAN, named *Contributions to Conception, Design and Implementation of Some Collaborative Systems*, tackle an issue of particular importance for the scientific research in the economic informatics field, concerning the theoretical side but also the practical side, having a particular impact on the development of information society in our country, and preparing in this way the transition to the knowledge based society.

The collaborative systems are one of realistic solutions of the digital economy development, in which the informatics applications are oriented to the common user, without requiring constraints, but a natural human-computer interaction.

The author of the thesis, Ms. Mihaela MUNTEAN, has developed the entire issue into one work, with a graduated approach of the content, so that the thesis is formed into a unitary whole, which is the proof that we are face to face with an experienced scientific researcher who knows how to run a research process after all the requirements, with exigence and maturity.

All the affirmations which are included in the thesis are rigorously substantiated, compared to what exists in the literature, which offers a level of extremely high quality of this thesis developed by Ms. Mihaela MUNTEAN.

The contents of the thesis reveals the author's ability to conceive a balanced structure in which first of all are presented the basic concepts and the arguments which have stated on the basis of whole approach.

The chapter for presenting the results from the research field, entitled *Collaborative systems, tools and technologies*, offers the opportunity to the author of this thesis to bring before the reader a complete synthesis of the elements that operate in the theory and practice of collaborative systems, succeeding in a very special way to obtain a rigorous building, well structured and solid argumented. The details with which operate Ms. Mihaela MUNTEAN provide the proof that he is the scientist who managed to deepen the literature, to entirely understand the specific mechanisms of design and development of collaborative systems, which allowed the development of his own concepts, the introduction of valuable original solutions especially comparing it with what already exists, putting in value the innovation elements achieved in his research work, conducted in the doctoral training.

The chapter presents portal architectures, taking into consideration the relationship that is between digital content and the organizational structure specific of collaborative system. The idea of reusing the components of the enterprise informatics system at the level of the knowledge based portal presents a particular interest by integrating these components into a portal platform. The transfer of digital content gain in this way a new dimension, because all progress in the development of management oriented systems can be found in the structure of such a portal. The author shows on page 38 the advantages brought by the development of integration processes of existing components in the collaborative platform, advantages that aim the communication quality, the decision quality and the behavior quality of performers. The idea of sub-portals reuse is tied strictly to their treatment by the evolution in time to become parts of a whole with high complexity level, with maintenance of consistency degree between available limits, through the inclusion of new components designed to ensure the reuse of components without appearing disparities and quality gaps.

Collaborative technologies considered are designed to refine collaborative communities, to bring them together and to interconnect the parts of a project in which

knowledge management is essential, regardless the defined virtual classes and methods by which is accessed the digital content of the knowledge based portal.

In the chapter *Knowledge management. Tint of existing approaches*, the author of this thesis, Ms. Mihaela MUNTEAN show how the collaborative systems become operational through management, as a process that is developed in a specific life cycle. Are given the specific characteristics of the distributed management in the context of the existence of efficient portal technologies for operating with knowledge.

The knowledge management, for which the author devoted a significant part of the structure of this thesis is addressed in the context of defining a structured digital content with different levels of aggregation, which includes people, processes and technologies. The author of the thesis develops a number of considerations related to the processes of knowledge generation by creating pieces of knowledge, collection pieces, and refining knowledge accumulated.

Issues of knowledge management, knowledge dissemination, and knowledge audit are handled by the author in a new manner, that corresponds to the modern approach of knowledge like elements on which are defined operations, are performed processes and are obtained results, all having a correspondent in the area of digital content. The approach level clearly shows that we have in face a serious researcher in Ms. Mihaela MUNTEAN, who after a profound documentation, manages to achieve new interpretations for the knowledge management and especially to trace the flows specific to the project management when it comes to developing knowledge based portals.

Entering the audit process in this situation will prove the efficiency by the defined objective but mostly by the transfer of credibility which is obtained by carrying out activities specific to any audit process.

To expose the original solutions in the issue of design, implementation and use of collaborative systems, Ms. Mihaela MUNTEAN has built the chapter *Portals - infrastructures of knowledge-based collaborative communities*, in which are highlighted valences of collaborative portals. To achieve portals, Ms. Mihaela MUNTEAN has introduced a new approach through, the development through prototypes, which allows obtaining constructions with a very high level of complexity, with complete functions, but at the same time operability at maximum rate, known that the portals like concrete forms of distributed collaborative applications, working in the online manner are generating processes of allocation and resource leveling. In this context, any deficiency in carrying out operations of temporary allocation of resources is accompanied by major risks and automatically lead to a severe reduction of performance indicators of the collaborative system, as a whole.

The author develops also a technique of MDA type for the portals implementation. In the thesis is presented the agile development technique of the portals.

Ms. Mihaela MUNTEAN propose the Knowledge Portal following the use of all theoretical aspects for achieving the functions of content management type, collaboration and personalization. To develop the model are used resources of UML type. The author made in the thesis a complex conceptual approach, bringing on a new plan the project management for the solution development of Knowledge Portal with all the implications involved in such a revolutionary approach as in terms of bases and models with which operates at the level of collaborative system where knowledge is essential.

The considered construction is defined in the context of evolution portals by taking into account:

- personalization and aggregation of digital content;
- integration of external data sources to obtain a complete digital content, coherent, accessible and correct;

- the unitary character of digital content for provide to the business environment comparability and consistency for all the data necessary in the process of decisions background;
- allows the federalization by forming specific architectures which molds on the functional structures of organizations, including by the access rights to the portal resources;
- architecture orientation towards services, so that the conditions that appear allow the shift from one phase to another if and only if are fully met the quality conditions;
- omnipresence in the idea that the access to portal resources is allowed from any point at any time, by giving full details for each defined level of competence associated with each user.

The author was established the collaborative valences of knowledge portal, so by e-mail, chat, forums, conferences, groupware, blogs, wikis and podcasting to obtain all the specific features of the interactions from collaborative systems, for all the actors operating current activities, specialized, following different performance criteria.

To obtain efficient construction, the author of this thesis proposes the prototype development of portals defining the development cycle that includes the phases:

- planning, in which is resized the resources amplitude, the time taking into account the objectives set at the beginning for the evolution of collaborative system, reflected in the digital content;
- analysis of how evolve the collaborative system, which are the flows, restrictions and how the competences correlate with data handled in relation with the aggregation levels;
- design, in which is established the portal structure, the security level of the components, the structures of databases, how to access resources, the quality level of the digital content;
- implementation, considering the particularities of knowledge operation in a distributed manner, and the administration is realized like continuous process;
- testing by taking into account to assure the operational character by fairness, completeness, and especially the reliability, consistency and functionality;
- installation as key time in which the portal as part of the collaborative system begins to operate in real time, at parameters that should not differ significantly from the performance indices of the collaborative system for which was designed and developed the knowledge based portal.

The author has chosen to develop solutions startin with the architecture-based models - MDA, making a complete analysis of solutions regarding the platform independent model - PIM, platform specific model - PSM and the code based model, all as stages of transformation of based models architectures. In the table 4.1 are given clear exit stages of portals development by MDA. The given solution in subheading 4.3.3 regarding the agile development of portals is to establish a new kind of approach for the development cycle stages of a portal, and figure 4.10 synthesizes the contents of the three stages of development cycle. The author has a clear vision on the iterative character for the realization phase.

Checking all the assumptions is done using a construction KNOWLEDGE PORTAL, developed by the author and endowed with those features that make visible progress of stages regarding the agile development. Are clearly seen the differences that are obtained using this solution in comparison with classical methods. The agile development is operational for knowledge based portals, with which operates at the level of collaborative systems. The structure of knowledge base presented in figure 4.13 is closely related to the portal functions associated to collaborative processes, where user authentication takes into account correlations between skills and access levels to resources.

The flexible information flows adapted to users needs which interact in the collaborative system are shown in figure 4.25. In the subheading 4.4.3 the author develops his

own concept on achieving a knowledge based portal like a project, respecting all the requirements of project management. The realistic approach of the whole subject is the condition of realize a portal based on knowledge that is operational in a complex collaborative system.

The thesis ends with *Conclusions and perspectives* that offer to the author the possibility to present the open character of the problems and the many ways of development stemming from this research, marking once again the importance and value of the results for the new context which the knowledge based society validates to obtain collaborative informatics applications, complex, operational, accurate, complete and especially integrated with which manage the specific risks of distributed operating mode.

To realize this thesis, Ms. Mihaela MUNTEAN has come with a vast bibliografy composed by works of reference in the field of collaborative systems and knowledge management, characterized by actuality, because the greater part consists of works published after 2003. The author, Ms. Mihaela MUNTEAN, gave a great attention to obtaining a balance between foreign literature and the one in our country, knowing the concerns of Romanian researchers in the collaborative systems fiels and in using intelligent agents for the development of complex software applications for extremely dynamic economic sectors. This balance is seen and through the share that the author give to the specialized magazine articles and printed communications in volumes of high prestige conferences which bring together the most valuable professionals in the field of collaborative systems.

The bibliography includes an important number of works developed by the author of this thesis as single author or in collaboration. The author identifies after his research the following aspects:

- the collaborative enterprise tends to become a reality, promoting collaboration as an strategic alternative to the monolithic approach of a business, context in which the entire conception of development in the informatics plan must follow the requirements to ensure transparency, to make decentralized the updates and extract appropriate information of skills levels;

- an organization that is based on communities of practice has real chances of success if and only if the access to the information processed and to the update meet the requirements of collaborative systems, in which the responsibility is imposed, accepted and assured by the way of identifying those who access the resources of information system;

- thanks to real benefits given by the communities of practice, is recommended to expand this in as varied areas of interest;

- orientation towards collaborative business processes requires the identification and configuration of collaborative technologies able to support such processes while adapting them to the dynamic of the processes that take place in organizations, as increase the complexity level form each organization in part;

- integration in portal type IT platforms is the concrete form of existence of the collaborative manner, form which provides all the functions of the organization structured as a collaborative system, dynamically and stable.

The solutions she included in those contracts covered issues regarding the collaborative side of economic systems.

The whole work shows that Ms. Mihaela MUNTEAN is a profound scientist with very valuable results, which know how to run an effective research project, in which the original solutions are compared and evaluated with exigence in order to include them in the thesis. Ms. Mihaela MUNTEAN has published numerous articles, studies, books in the researche field for achieving this PhD thesis, of which notice shall:

- Muntean M., Dănăiață, D., Margea, C., *Managementul cunoștințelor în societatea bazată pe cunoaștere*, Revista de Informatică economică, nr. 2(18)/2001

- Muntean, M. , *Baze de date în sisteme informatice economice*, Editura Mirton, Timisoara, 2002
- Muntean, M. , *Enterprise Portals – The Future Work Environment*, Proceedings of the International Workshop „IE & SI”, Timisoara, 2003
- Muntean, M. – coord., *Collaborative Information Systems in the Global Economy*, Editura Universității de Vest, Timișoara, 2005
- Muntean, M., *Collaboration – A Business Strategy in the Global Economy*, în *Collaborative Information Systems in the Global Economy*, Editura Universității de Vest Timișoara, 2005
- Muntean, M. , *Knowledge Management in Collaborative Environments*, Proceedings of the 2th International Conference on Economics and Management of Networks, Budapest, 2005
- Muntean, M., *Collaborative Business Environment Based on Federated Portals*, Annals of T. Popoviciu Seminar, vol.4, 2006
- Muntean M., Muntean C., *Collaborative Environments - A Framework for Business Intelligence*, WSEAS Transactions on Business and Economics, WSEAS Press, 2006
- Muntean, M. (2006), *Sisteme multi-agent*, Note de curs – UVT
- Muntean, M. (2006), *Some Considerations About a Customer View of Knowledge Management*, Proceedings of the 3rd ETM", Timisoara
- Muntean, M., Brândaș, C., *Knowledge Management in Intercultural Collaborative Environments*, Revista de Informatică economică (supliment 2006), București, 2006
- Muntean, M., Toma, C., *Multi-Agent Security Systems – cap. 12 in cadrul monografiei Informatics Security. Handbook*, Editura ASE, 2006
- Muntean, M., *Business Intelligence and Data Warehousing*, Proceedings of the International Conference on Accounting and Management Information Systems, București, 2007
- Muntean, M., *Business Intelligence Solutions for Gaining Competitive Advantage*, Proceedings of the International Conference „Competitiveness and European Integration”, Cluj-Napoca, 2007
- Muntean, M., *Some Considerations About Portal-Based Collaborative Enterprises*, Revista de Contabilitate si Informatica de Gestiune (supliment nr. 1/ 2007), Bucuresti
- Muntean, M., Brândaș, C., *Business Intelligence Support Systems and Infrastructures*, Revista de Informatică economică, nr.1 /vol. VII, 2007
- Muntean, M., Popovics A. , *Universitatea modernă - organizație bazată pe cunoaștere*, Cap. I în cadrul monografiei Managementul în universitatea modernă (coord. Bodea, C., Andone, I.), 2007
- Muntean, M., Butuza, A., *Activități colaborative de tip e-learning și managementul cunoștințelor*, Cap. XIX în cadrul monografiei Managementul în universitatea modernă (coord. Bodea, C., Andone, I.), 2007
- Muntean, M., *Some Considerations About Collaborative Environments*, Annals of „Tiberiu Popoviciu” Seminar, vol. 6, Cluj-Napoca, 2008
- Muntean, M., Butuza A., Hauer, I., *Supporting Knowledge Management through Technology*, Revista Informatică economica, nr.1-4/2008
- Muntean, M., *Portal-Based Collaborative Environment*, Magatrend Review, Belgrad (sub tipar), 2009
- Muntean, M., *Enterprise Portals & Collaborative Capabilities*, International Conference on Economic Informatics, Bucuresti, 2009

It is noted the constant concern of the author to disseminate its research results in more varied forms, from publishing in the form of articles, to including in the master courses the

most important original solutions obtained. Also, should be noted its ability to form research teams and to work effectively within them and to ensure a high quality management.

Contributions of the author aims to:

- *collaborative environments* through the substantiation of the concept of business strategy in the global economy with particular emphasis on value management, analyzing the factors that contribute to strengthening the collaborative communities; she started the approach regarding modeling of collaborative communities in virtual plan with the help of multi-agent systems, she realized the modeling of collaborative behavior of virtual enterprises using collaborative systems;

- *collaborative tools and technologies* through formulation of defining elements for the informatics systems based on software agents, collaborative tools of conversational tools type and portal-type systems; reiterates the original points of view on the conception, design and implementation of systems of this type; the development of multi-agent collaborative systems takes place under specific methodologies, approaches based on the models proving their effectiveness in practice; the development of collaborative tools will simplify through the open-source market, with solutions to support the realization of systems which operate online without interruptions, anywhere and anytime; the portals development methodologies respects general development methodologies of collaborative systems; the development of portals is based on the reuse of components, standard sub-portals representing elements which contribute decisively to optimize the life cycle of this specific process; the author considers that this solution is a future research direction for strengthen the conception, design and realization of portal systems; recommend the use of the IT portal platform, integrating multi-agent systems, collaborative tools, enterprise applications;

- *knowledge management* where the author proposed a model for the MC lifecycle of a collaborative organization corresponding to the functions for knowledge generation knowledge management / storage, knowledge dissemination and knowledge auditing with the support of the portal of knowledge, both in an approach of single portal type, and in a distributed approach; has been consolidated the definition of customer knowledge, the management of this knowledge being supported by an infrastructure of portal type; was focused on the value management, analyzing the factors that help to strengthen such communities; in the thesis is addressed the modeling of collaborative virtual communities using multi-agent systems and collaborative behavior modeling of virtual enterprises;

The collaborative portal represent the proposal agile development using the prototype technique enriched with specific MDA values for the phases of conception, design and implementation, phases for which the author of the thesis defines specific tasks, the necessary of resources and results that lead to implementation in a new vision of collaborative operational systems.

Collaborative environments, including both small working groups, and interest communities, for purpose or action, and ending with the collaborative enterprises, have on the base the knowledge. Between collaboration and knowledge management there is a strong interdependence to place collaborative communities in the space of competitive solutions.

Systems, collaborative tools and technologies are designed to support work teams, communities and collaborative enterprises through accessing the resources offered by the IT portal platform like solutions of collaborative processes infrastructure.

This doctoral thesis is constituted as a genuine example of scientific endeavor undertaken by a exigent specialist, endowed with special qualities to get the solutions to select from these the most important and to find appropriate and persuasive ways of presentation.

Prof. Marian STOICA, PhD
Economic Informatics Department, ASE