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Muntean, Mihaela

West University from Timisoara (Romania), Faculty of Economics and Business Administration, Department of Economic Informatics and Statistics

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# CONSIDERATIONS REGARDING THE AGILE DEVELOPMENT OF PORTALS

Professor Mihaela I. Muntean, Ph.D  
 Faculty of Economics and Business Administration  
 West University of Timisoara, Romania

**Abstract** - Starting with methodologies, methods and techniques used generally in the development of information systems, a personal approach regarding quick development of portals has been introduced. After a strict theoretical foundation the proposal has been applied within a real collaborative knowledge portal development project. We consider the proposed agile development approach (based on the prototype technique enriched with MDA valences) suitable to all kind of information systems. The agile development framework establishes the life-cycle phases of product development taking into account the desired functionalities.

**Keywords** - portal, prototype technique, model driven architecture, agile development.

## I. GENERAL CONSIDERATIONS

For supporting virtual activities and business processes it is necessary to adopt the latest collaborative technologies and information systems that are standing for e-business phenomena, wide open to potential clients and business partners. Collaborative technologies underlie a large variety of tools, systems and IT platforms supporting different projects of common interest, collaborative communities and enterprises. Portals proved their efficiency as infrastructures of these environments, either as a unique portal proposal or one based on a distributed model.

The literature is poor in references concerning portal development approaches, best practises developed by leading organizations and portal designer have in view „to better serve customers, to deliver business intelligence across the organization, to deploy effective knowledge management systems, to ensure the adoption by end users“ [Sullivan, 2003]. Certainly, functionalities like 'content management' 'collaboration', 'personalization' and 'supporting business processes' must be implemented within an enterprise portal initiative. Portals development projects are based on general systems development methodologies [Watson, 1997; Turban, Aronson, 2001; Arlow, Neustadt, 2002; Lungu, Sabău, Velicanu, 2003; Oprea, 1999; Zaharia, Roşca, 2002; Davidescu, 2003; Brândaş, 2007], but must take into account the specificity of these IT platforms [Brosche, 2002; Guruge, 2003; Sullivan, 2003; Collins, 2003].

Some approaches suggest that portal development can underlie on component reuse, standard sub-portals

representing elements that could decisively contribute to optimize the development life-cycles of these systems [Crolene, 2002]. Standard groupware sub-portals<sup>1</sup>, business intelligence sub-portals<sup>2</sup>, or other specific service-oriented sub-portals can be integrated into the unitary schema of a service-oriented community portal. Generally, a groupware/collaborative sub-portal contains elements such as news, weather and map information, as well as discussion groups, team oriented to-do and task lists, and other collaborative tools. Reporting, OLAP Analysis, Data Mining, Dashboards and Scorecards are the BI core components of a business intelligence sub-portal (or portal), all these being grounded on multi-dimensional data/warehousing models.

Rapid portal development can be also achieved by using the prototype technique for the solution deployment [Pienar, 2003]. More and more approaches are model driven [Klepper, Warner, Bast, 2003], the desired portal functionalities being implemented starting with the PIM (Platform Independent Model) model, followed by the PSM (Platform Specific Model) platform and technologies specific model. According to Muntean (2009) the following similitude between a MDA (Model Driven Architecture) approach and a prototype based portal development project can be established.

TABLE 1  
 MDA & PROTOTYPE-BASED DEVELOPMENT

MDA framework	Prototype based development	Outputs of the MDA phases
Analysis	Analysis	PIM portal model, developed in executable UML, which describes in an unitary, integrative approach: <ul style="list-style-type: none"> <li>▪ Portal functionalities:                             <ul style="list-style-type: none"> <li>○ Personalization</li> <li>○ Supporting processes</li> <li>○ Collaboration</li> <li>○ Content/document management</li> </ul> </li> <li>▪ Communities of portal users.</li> </ul>

<sup>1</sup> OsgCorp proposal, 2005 – [www.osgcorb.com](http://www.osgcorb.com)

<sup>2</sup> SpagoBI – BI Free Platform, 2006 – <http://spagobi.objectweb.org>

Design	Prototype design	<p>PSM portal model, which describes the portal architecture taking into account the necessary implementation technologies:</p> <ul style="list-style-type: none"> <li>Services architecture of the platform (CORBA, JAVA, .NET, XMI/XML, etc).</li> <li>IT platform components that support all portal specific activities described in the PIM model (portlet-based integration schema, add-on extensions).</li> <li>Portal prototype.</li> </ul>
Writing program code (coding)	Portal prototype implementation	Source code for the portal. Components code library.
Testing	Prototype testing	Corrected source code
Installation	Portal installation	Installation schema/model

of prototype technique enriched with MDA specific attributes and is based on the following phases:

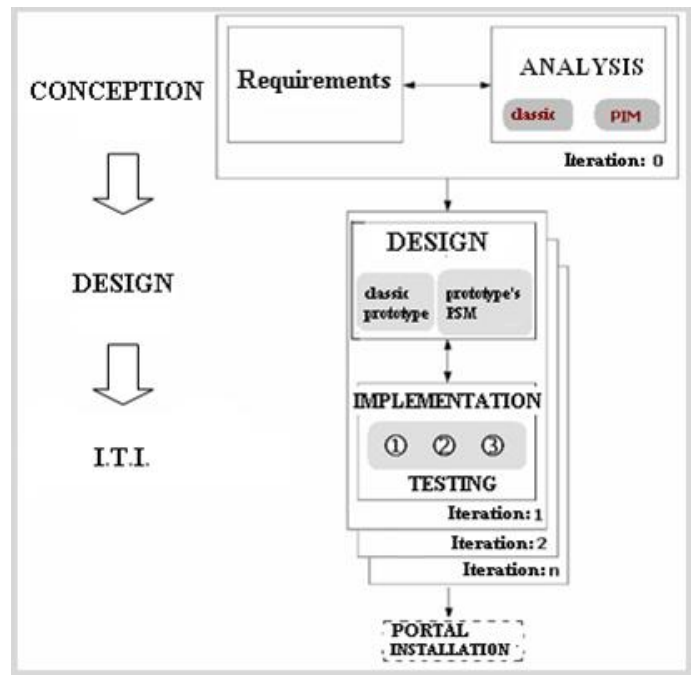


Fig. 1 Agile development<sup>5</sup> of portals

Nowadays, agile development is an umbrella term for a variety of best practices in software/system development. „These methods have proven to be more effective in dealing with changing requirements during the development phases, which always seem to occur. The agile methods emphasize teamwork, customer involvement and the frequent creation of small, working pieces of the total system“<sup>3</sup>. The Agile Alliance define these methodologies as „a group of software development methodologies based on iterative development, where requirements and solutions evolve through collaboration between self-organizing cross-functional teams“<sup>4</sup>, each iteration being like a miniature project of its own.

Taking into account all these preliminary considerations, we propose an agile development framework for developing portal solutions. Within a theoretical approach, we defined agile development in terms specified above, substantiating the life-cycle phases of product development [Muntean, 2009]. In addition, we have a practical initiative concerning a real knowledge portal anchored in an effective development project.

## II. AGILE DEVELOPMENT OF PORTALS

### A. Theoretical Approach

Our agile development framework<sup>5</sup> recommends the use

- **CONCEPTION**: at this level the PIM model elaboration is targeted, according to the requirements of the knowledge based collaborative community; prior, a feasibility study is made in order to justify the efficiency and efficacy of the project, also elaborating a business plan to demonstrate if the project brings a measurable benefit or not; the modeling of the requirements will lead to outlining the functionalities of the portal, of the user communities, all these being represented at a level of PIM model;
- **DESIGN**: targets the elaboration of the PSM model specific for the portal prototype, i.e. the finalization of the architecture of this model, taking into account all details regarding the IT infrastructure, which must sustain the unitary, integrating vision of the PIM model. The building of the PSM model will take into account the future implementation solution of the prototype, by relating the model to a certain IT platform and to certain maintaining technologies;
- **I.T.I (Implementing – Testing - Installation)**: has the goal to implement the portal prototype according to the PSM model, followed by the testing of the prototype. Often, as a result of testing its functionality, the prototype invalidation leads to the revision of the PSM model and aims at correcting

<sup>3</sup> <http://www.answers.com/topic/agile-software-development>

<sup>4</sup> Extreme Programming (XP), Scrum, Agile (Rational) Unified Process Framework (Agile RUP) , Crystal Methods, Feature Driven Development (FDD), Lean Development, Dynamic Systems Development methodology - [http://www.gatherspace.com/static/agile\\_software\\_development.html](http://www.gatherspace.com/static/agile_software_development.html)

<sup>5</sup> Fundamentals regarding agile development - in [Pereiras, Tobias, Grzegorzek, Staab, 2007]

some aspects related to technology and the considered IT platform. Practically, the final version of the portal prototype is obtained by an iterative process which regards the adjustment of the PSM, its implementation and the testing of the prototype solutions for verifying the imposed requirements. The validation of the prototype leads to the portal installation and its transfer to the users that possess the knowledge of the collaborative community [Muntean, 2009].

This approach is recommended for developing portals for collaborative communities like workgroups, practice communities, even collaborative enterprises. Functionalities like 'content/document management' 'collaboration', 'personalization' and 'supporting business processes' are sustained both by the PIM model and the PSM model with concret implementations within the Three-Tier architecture of the portal.

**B. Practical Aspects Regarding The Project**

According to Agile Alliance, the collected prescriptive characteristics of the above mentioned agile methods/methodologies or frameworks<sup>6</sup> are presented in Table 2. The last column refers the developed portal project, our agile development framework proposal being comparable with the well-known mentioned agile methods.

TABLE 2  
PRESCRIPTIVE CHARACTERISTICS

	XP	Scrum	Crystal	FDD	Agile development framework proposal
Team size	2 - 10	1 - 7	variable	variable	variable
Iteration Length	2 weeks	4 weeks	< 4 month	< 2 weeks	< 4 month
Distributed Support	no	adaptable	yes	adaptable	adaptable
System Criticality	adaptable	adaptable	all types	adaptable	adaptable

With respect to project management approaches [Bibu, Brândaș, 2000; Demeulemester, Herroelen, 2002; Bodea, 2002, 2005; McCollum, Bănescu, 2005] and the theoretical foundation of portal agile development, a real knowledge portal project was initiated.

Task Name	Duration	Start	Finish
<b>I. Concepere — CONCEPTION</b>	10 days	Mon 1/5/09	Fri 1/16/09
1.1 Analiza cerinte	4 days	Mon 1/5/09	Thu 1/8/09
1.2 Elaborare PIM	6 days	Fri 1/9/09	Fri 1/16/09
1.2.1 Elaborarea modelelor specifice functionalitatilor considerate	4 days	Fri 1/9/09	Wed 1/14/09
1.2.2 Integrarea modelelor	2 days	Thu 1/15/09	Fri 1/16/09
<b>II. Proiectare — DESIGN</b>	20 days	Sat 1/17/09	Thu 2/12/09
2.1 Rafinarea modelelor tinandu-se cont de TI	10 days	Sat 1/17/09	Thu 1/29/09
2.2 Elaborarea PSM corespunzator prototipului	10 days	Fri 1/30/09	Thu 2/12/09
<b>III. Realizare — I.T.I</b>	25 days	Fri 2/13/09	Thu 3/19/09
3.1 Implementare prototip	15 days	Fri 2/13/09	Thu 3/5/09
3.2 Testare prototip	5 days	Fri 3/6/09	Thu 3/12/09
3.3 Instalare portal	5 days	Fri 3/13/09	Thu 3/19/09

Fig. 2 Activities planning

The deployed portal sustains the needs of a collaborative knowledge-based community taking into account the scope of the virtual community and the diverse user's requirements especially regarding conversational tools. The life-cycle phases of product development were imposed, at the level of each considered phase, such as: conception, design and I.T.I, the necessary steps were established.

Both PIM and PSM model was described with the help of the UML language<sup>7</sup>, all kind of specific diagrams being developed (Figure 3, Figure 4).

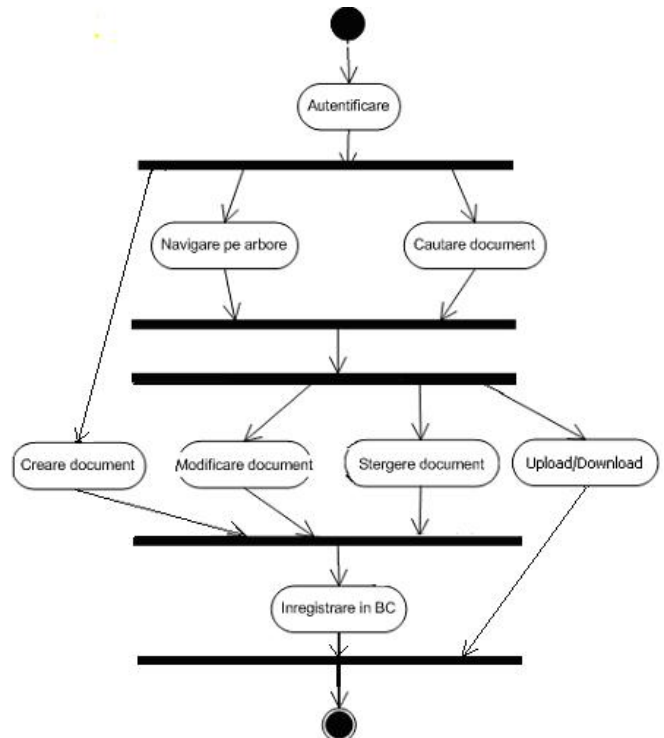


Fig. 3 PIM. 'Document management' functionality – Activity diagram

<sup>6</sup> <http://www.otssolutions.com>

<sup>7</sup> UML v. 2.0

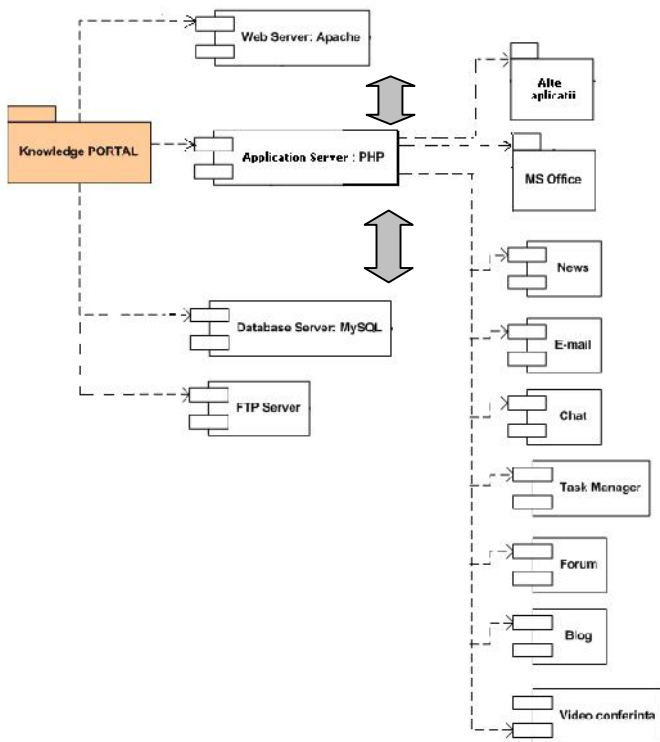


Fig. 4 PSM. Component diagram

The advantage of using UML modeling language is obvious [Arlow, Neustadt, 2002], and in portal development approaches consolidates the agile development desiderata.

A correct approach, based on functionalities, of the portal development process, has a decisive role in the finality of the desired project. The PIM model, obtained from the integration of the different conceptual models that correspond to the considered functionalities, will be transposed, taking into account technologies and IT platforms, into the portal PSM model. Usually, a PSM iterative refinement is necessary according to the imposed implementation corrections (adjustment of technological aspect). Finally, we consider that, the proposed theoretical approach can be applied for rapid development of all kind of information systems.

### C. User Satisfaction

User satisfaction is generally regarded as one of the most important measures of information systems/tools success. There has been considerable research devoted to establishing a standard user satisfaction instrument since the 1980s (e.g. Ives, 1983; Bailey and Pearson, 1983; Baroudi, 1986; Benson, 1983; Doll, Torkzadeh, 1988). Layout, information/knowledge content, easy of use, convenience of access, timeliness, efficiency, communication and security are indicators for measuring user satisfaction [Tojib, Sugianto, Sendjaya, 2004].

- Layout: the design of the interface and display of the

information/knowledge; what is needed is a scalable, flexible interface through which users can efficiently interact with the service-oriented resources.

- Information/knowledge content: the relevancy, accuracy, currency and reliability of information/knowledge presented to each community member based on his/her role in the collaborative environment.

The knowledge base (Figure 5) of the developed portal unifies different information/knowledge contents: documents (created with MS Office applications), knowledge disseminated through collaborative tools (e-mail, chat, community forum and blog, video conference), news and information/knowledge created with other applications.



Fig. 5 Portal knowledge base

- Easy of use: the portal is perceived to be user friendly; this includes ease of navigation (Figure 6), training issue, feels of being in control and learnability.

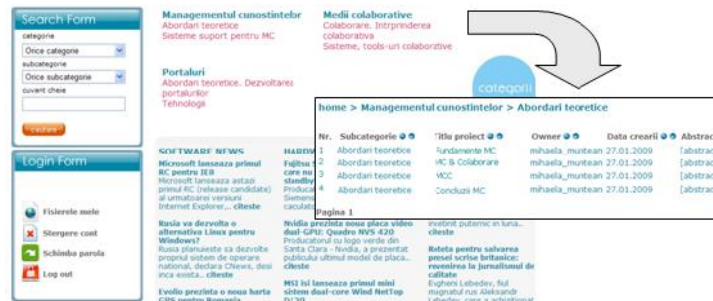


Fig. 6 Navigation on the documents' taxonomy tree

- Convenience of access: the ability of the portal to be accessed anytime and anywhere by the community members.
- Timeliness: the ability of the portal to deliver requested information/knowledge in a reasonable response time.
- Efficiency: the ability of the portal to assist users in performing their tasks better and faster.
- Communication/Collaboration: the portal can mediate interaction (i.e. information/knowledge sharing and collaboration) between the community members.

As indicated in Figure 4, the portal 'collaboration' functionality is implemented with the help of some

collaborative tools, which are sustaining on demand collaboration anytime/anywhere.

- Security: secure access to all applications and portal facilities (Figure 7).

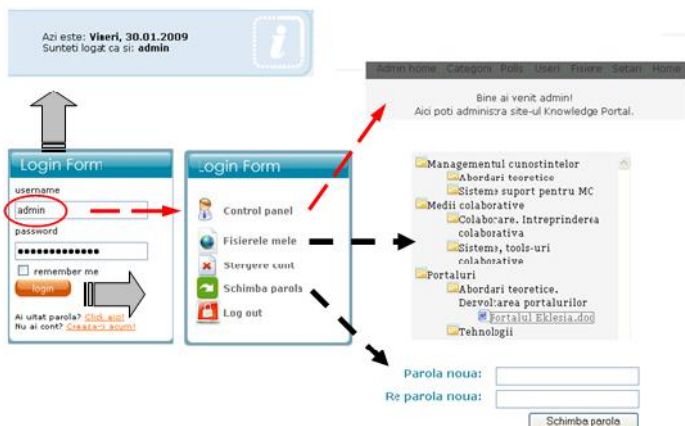


Fig. 7 User authentication

The success of the developed portal is determined by the extent to which it satisfies the users' requirements. It is always a challenge to choose the suitable technologies and IT platforms to transform the PIM model into the PSM model of the future portal and after that to implement the prototype.

### III. CONCLUSIONS

At the end of 2008, Forrester Research Inc. surveyed business environment inquiring about companies' opening towards adopting new IT collaborative platforms: a trend was obvious, more than 50% heading to collaborative technologies. We propose the adoption of portal platforms at the level of collaborative communities/environments and focus our attention on the agile development of these systems.

„Agile software development represents a conceptual framework for undertaking software engineering project<sup>8</sup> or „Agile methods generally promote a disciplined project management process that encourages frequent inspection and adaptation, a leadership philosophy that encourages teamwork, self-organization and accountability, a set of engineering best practices intended to allow for rapid delivery of high-quality software, and a business approach that aligns development with customer needs and company goals<sup>9</sup> are two suggestive definitions picked out from the domain literature.

Analyzing the references regarding some portal development approaches, we identify the recommendation to

<sup>8</sup> <http://www.otssolutions.com>

<sup>9</sup> [http://en.wikipedia.org/wiki/Agile\\_software\\_development](http://en.wikipedia.org/wiki/Agile_software_development)

appeal to the prototype technique or to respect the MDA philosophy.

Under these circumstances, the proposed agile development demarche represents a natural theoretical approach. Based on phases like CONCEPTION – DESIGN – I.T.I, as indicated in figure 1, the portal functionalities implementation is sustained both by the PIM and PSM model.

The selection of a method for a specific project must be careful, taking into consideration many different aspects/factors. Agility is necessary when it comes to user satisfaction, the proposed agile development of portals managed to deliver a better final solution, faster and cheaper.

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Currently, professor **Mihaela I. Muntean** is the chair of the Business Information Systems and Statistics Department at the West University of Timișoara and an IT independent consultant.

With a background in Computer Science and a Ph.D. obtained both in Technical Sciences and in Economic Sciences (Economic Informatics), professor Mihaela I. Muntean focused her research activity on topics like information technology, knowledge management, business intelligence, business information systems.

Over 70 papers in indexed reviews and conference proceedings and the involvement with success in 7 multi-annual national research grants/ projects are sustaining her contributions in the research fields mentioned above.