IDEA GROUP PUBLISHING

701 E. Chocolate Avenue, Suite 200, Hershey PA 17033, USA
Tel: 717/533-8845; Fax 717/533-8661; URL-http://www.idea-group.com

ITP4624

A Method to Implement a Workflow Management Process: The Case of University "Federico II"

Paolo Maresca, Antonino Mazzeo
Università di Napoli Federico II, Via Claudio 21, Napoli (Italy)
Tel.+39 0817683168, Tel.+39 0817683184, Fax +39 0817683816
Paolo.maresca@unina.it mazzeo@unina.it

ABSTRACT

***The* workflow** *can be defined as the flow and the control of the information that enter to belong to a productive process. The workflow management represents the efficient management and the control flow of information in a process of a firm.*

In this paper the authors show a methodology for the description of the very complex workflow processes of a large university. The process was described in his essential parts, then represented in unified manner using UML (Unified Modeling Language) and was conducted into Workflow and Security Laboratories (WSL) of DIS at University of Naples. The case study of the University Federico II is composed of many offices. In this job, for the sake of the brevity, we will show one of them. The workflow description has involved many employees with a lot of interviews. Currently we are facing with the validation phase and the identification of the unusual and critical processes.

INTRODUCTION

The *workflow* [3,4,20,21,22] can be defined as the flow and the control of the information that enter to belong to a productive process. The workflow management represents the efficient management and the control flow of information in a process of a firm. Every firm possesses a core business and a lot of the business units of the core business are crucial for the growth and for the survival of the firm. Making more efficient the business units processes, the firm reduces his costs improving the product and the service to the client, becoming so more competitive on the market [32,35,39].

The architecture of a company reflects the whole of its objectives and therefore of the own business units. Only that often this complex infrastructure is not documented it is "wired" in the way with which people work in a certain office; this "modus operandi" is learned as a young boy usually does in a Renaissance shop: "the elderly teachs to the more youth." In this process of job when an element abandons the structure near which the person that will replace him works will be trained equally and that is with the technique "what you see is what you learn.". It is needless to say that this architecture of firm is that more exposes him to a series of well documented problems in literature [1,2,10,14,15,17,18], if the objective is that to make a firm more efficient the witticism is: ***"first documents so that then what you have documented can be seen again and used for the management of the workflow***.

A lot of firms manifest the slowness of some of their inside procedures and they look to them with the eyes of the optimization in the sense of speed and efficiency. More one is able, to make better and efficient a business unit and fast the company grows and it holds the competition. ***In short it seems that the competitiveness and the workflow managements are tightly correlated***.[19].

The ***workflow*** has at least three dimensions: the process, the organization (the mens) and the infrastructures (on which it leans the process and the organization). The ***process*** is constituted by activities and subactivities [13,16]. For the various activities it needs to specify the control and data flow. And also it is usual to specify the application programs that process needs to use inside an activity (es. word processor, databases, spreadsheets, etc.). The ***organization*** is constituted by the men that are employed inside the process. For each of them it is necessary to define the role, the level as well as the levels of authorization (if you introduce one) possessed in the informative system. The ***infrastructures*** are the technological substratum of which need is had for implementing the workflow (net, telephone connections, calculating, servers, etc.). In this three dimensions vision safety is an activity distributed and transversal [12] it can be disseminated in everybody the three sights. In other words to have a some meaningful improvement in safety terms the safety engineer and software engineer should work together in an iterative and enhancement activity of dissemination of the safety in the product and in the process rather than to separately try to work in maintenance operation that they would make only to degrade the state of the process (and of the product) [11 ,18]. We try to set another question. Why the workflow management is useful ? There are many motives for which a big firm should equip him with a workflow management [9,14]. I bring someone of it:

1. Make faster the execution of the process
   a. To increase the productivity through the automation
   b. To improve the service to the client reducing the costs of it
2. To make the process more solid so that to pilot it toward a certification of quality (ISO 9000 compliances)

To do this we have necessity to face the followings points:

a) to define and to document the process
b) to perform the process of which to the point 1) to the purpose of
   a. to support the people that work inside it,
   b. to fully automatize those activities of the process that don't ask for the human intervention.
c) to administer the workflow

The next paragraph will show the process definition, Documentation and Implementation

1. PROCESS DEFINITION, DOCUMENTATION AND IMPLEMENTATION

Looking more from near an example of business process, that of an office of a great University as the Federico II is, to define and to document a process there are a lot of things that it needs to wonder. But the first thing that we probably wonders us it is: from where to start ? It is often begun hiring an advisor that recommends their what there is to do. Naturally is not the correct movement because no one advisor will be able to understand a process that there is not or that has not been described because is in the head of few people! ***Therefore the first step to implement the workflow is to analyze the processes of business.*** This is what we will do in the next paragraph.

Following a methodology will be illustrated for analyzing the processes of business. It is composed of three phases

1. To identify and to denominate the company business processes
2. To identify the processes of business that don't work
3. To assign a priority to that processes of business that don't work

Copyright © 2003, Idea Group Inc. Copying or distributing in print or electronic forms without written permission of Idea Group Inc. is prohibited.

Tab. I The Federico II Officies

Division/direction	office	New Code	Administration code
D	Segreteria Direzione Amministrativa	2	99006
D	Organi collegiali	3	99008
D	Economato	4	99031
II	Personale docente e ricercatore	29	99104
II	Personale tecnico amministrativo	30	99035
II	Pensioni	31	99049
II	Stipendi	32	99099
III	Affari Generali	33	99028
III	Affari Speciali	34	99095
III	Dottorati ed assegni di ricerca	35	99046
III	Statuto regolamento e documentazione	37	99119
IV	CEDA	38	99027
IV	Pianificazione Strategica	39	99116
IV	Protocollo e Archivio	41	99117
V	Legale	42	99010
V	Contratti	40	99009
V	Patrimonio	43	99034
V	Relazioni Internazionali	44	99118
V	U.C.A.F. (ufficio fiscale)	45	99069
VI	Ragioneria	46	99086
VII	Ufficio Speciale	47	99114
VII	Sicurezza e Protezionistica	48	99111
VII	Ufficio Tecnico Servizi di ingegneria ed architettura	49	99121

1.1 Identification of the Company Business Processes

A good method of business processes identification is suggested by [9]. Their method analyzes the list of the processes to the purpose to assign them a name that expresses their initial and final state.

This method is a good way to begin the first iteration of the business processes identification for a specific application dominion. As it regards the dominion of the University "Federico II", is constituted from offices whose list is brought in Tab. I. Every office is responsible for the carrying out of activity (or processes) to develop which the office has available human resources and technological infrastructures to be conducted. For convenience every process is encoded both to make it distinguishable from others both to synthesize it; for instance the process " 3-0-1" is a process that belongs to the collegial organs (office 3), it doesn't have sub-offices (number 0) and it is particularly the first process in the temporal order to be performed in the office (Preparation of the memo for the Board of directors).

Every process is divided in phases (or subprocesses) also them sequential, every of which is still encoded and is hinged on a number of employees and can produce documents (structured and not, signed and not) at the end of its phase. It is worth to underline how such subprocesses, in the almost totalities of the cases, appear to be simple from the point of view of the inside states in how much they often develop a simple assignment that finishes with the issue of a document. They are the so-called two states (beginning and term) subprocesses. To codify the subprocesses is added a further field for which "X-X-X-X." Then" 3-0-1-1" it represents the first subprocess (Acceptance proposed offices) of the activity " 3-0-1." If an office produces a document of this type there are also listed the following characteristics:

- it is structured or less;
- Its characterization in comparison to the process/subprocesses (I-Input,O-Output, IO- Input and Output);
- The signature typology if, eventually, exists;
- The reachability of other offices (inside or external to the dominion of affiliation of the document).

The characterization of the data that crosses the processes and the subprocesses is very important and it is an essential point for the analysis of the document flow belonging to every application dominion.

1.2 Identification and Priorities Assignment for the to the Process that don't Work and their Improvement

After to have identified the processes of business it is necessary to identify those that don't work for esteeming them through objective criterions. The objective criterions are often factors of quality of process and/or of product [5,6,7] that is necessary that the processes in operation possesses. Criteria could be: Quality, Accuracy, Cost, Speed, Customer Satisfaction, Flexibility, etc. After to have identified that processes of business that don't work, probably the first question that sets us is: from which process we start for the improvement ? From the moment that all the processes belong to the category of those that need improvement they are all ***candidates*** to the improvement but only one of these will come **"selected**". *The selection happens through some factors of quality chosen by the management of the firm on the base of the objectives that is established.*

Fig. 1 G/Q/M Paradigm to Select the Process that doesn't Work

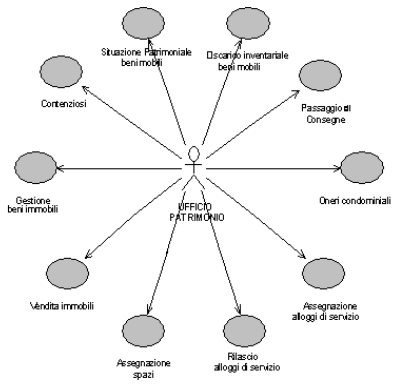
The qualities factors have to come down from the strategic objectives of the firm through a paradigm of quantification of the objectives that is denominated Goal/Question/Metric (GQM) [8]. This paradigm doesn't furnish a specific collection of objectives but rather a structure to define the objectives and refines it in specific quantifiable questions about the software process and product. Such questions help to pick up the data that serve for the attainment of the objectives places. The quantification of the objectives should be mapped, therefore, in a set of data which can be disseminated in the product and in the process. The data collected should be validated in function of their accuracy and the results interpreted in the respect of the objectives. For this reason that for the harvest and the evaluation of such data often are also necessary tools for the objective metric evaluation.

In the fig.1 is shown the tree of the paradigm GQM in which we specify three goals. Goal1: Critical factors; **Question1**: Which processes of business are critical for your company **Question 2:** What is the quality of the product ? **Question3**: Which is the speed of the release of the product ?
These processes of business are all critical factors to which it owes a priority of intervention to be in partnership. **Goal2:** Strategical factors **Question4**: Which processes of business are critical for the future of the company and which are strategic ? Naturally for the process that are essential to the future direction of the firm it needs to assign greater priority. To observe that there can be question common to more objectives as understands for the question 1 of the goals 1 and 2 in (fig. 1) **Goal3**: Factors of Core Business, **Question5**: Which processes of business to the core business of the firm ? **Question6**: Which processes improve the core business of the firm ?

For the processes that increase the core business they should have a priority in comparison to the others.

The tree of fig.1 turns him into the document xml named *BusinesProcessImprovement.xml*. Such document can be used for different purposes (harvest of the data, validation of the data, metrics, identification priority, documentation of the processes, etc.).

Fig. 2 The Main Use Case Diagram of the Patrimony Office



Copyright © 2003, Idea Group Inc. Copying or distributing in print or electronic forms without written permission of Idea Group Inc. is prohibited.

Tab II Patrimony Office: Activities and Destination

	Activities	Destination
1	**Situazione patrimoniale beni mobili**	**Ufficio Ragioneria (n°-46)**
2	**Discarico inventariale beni mobili**	**Strutture dell'Amministrazione (n°-2)**
3	**Passaggio ci consegne**	**Strutture dell'Amministrazione (n°-2)**
4	**Oneri condominiali**	**Ufficio Economato (n°-4)**
5	**Assegnazione alloggi di servizio**	**Personale con qualifica di custode**
6	**Rilascio alloggi di servizio**	**Personale con qualifica di custode**
7	**Assegnazione Spazi**	**Strutture dell'Amministrazione (n°-2)**
8	**Vendita immobili**	**Soggetti o Enti interessati all'acquisto**
9	**Gestione beni immobili**	**Enti, Ufficio Ragioneria, Ufficio Legale (n°-42)**
10	**Contenziosi**	**Soggetti Enti esterni all'Amministrazione**

2. THE DOCUMENTATION OF A COMPLEX WORKFLOW PROCESS

We have two problems to resolve in the description of the workflow of a complex system. The first one is that to understand inside a process of business as to identify univocally the elements that constitute it and as a process that describes the workflow of an office is related to that of the other offices. The second is to choose the correct level of abstraction from which to start to describe the process. Probably the simplest way to define the level of abstraction taller for the description of the workflow of the University Federico II is that to give a recursive definition of process: **The University Federico II is an empty process or it is constituted by the process of the office X connected to the process of University Federico II**.

This type of approach allows meanwhile to describe a complex reality for repeated and improved steps of the process of an office without worrying about what it happens elsewhere.

2.1 A Case Study: An Office of Federico II University

The case study illustrated in this paper is the ***Patrimony office*** of the university "Federico II", its number ***is 43*** and its Administration Code *is n°-99034.* The problem has been faced through the description of the process using the language *UML* [23]. The use case, activities, sequence, collaboration and state diagrams have been adopted. Before observing the fruit of such job some informative data on the office Patrimony are brought.

Fig. 3 Situation Property Mobile Good

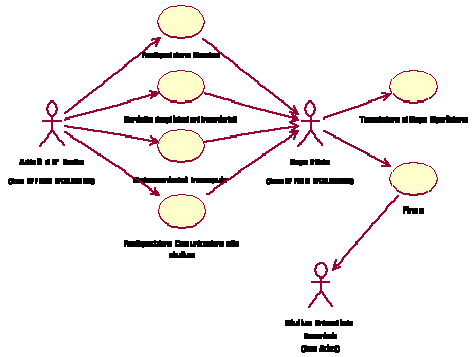


Fig. 4 Diagram of General Collaboration

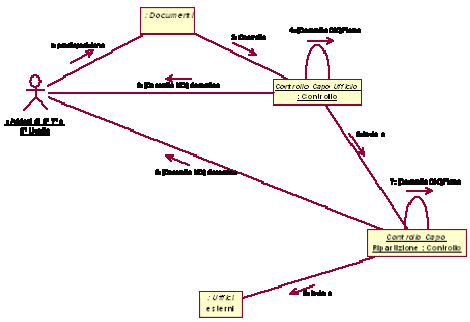
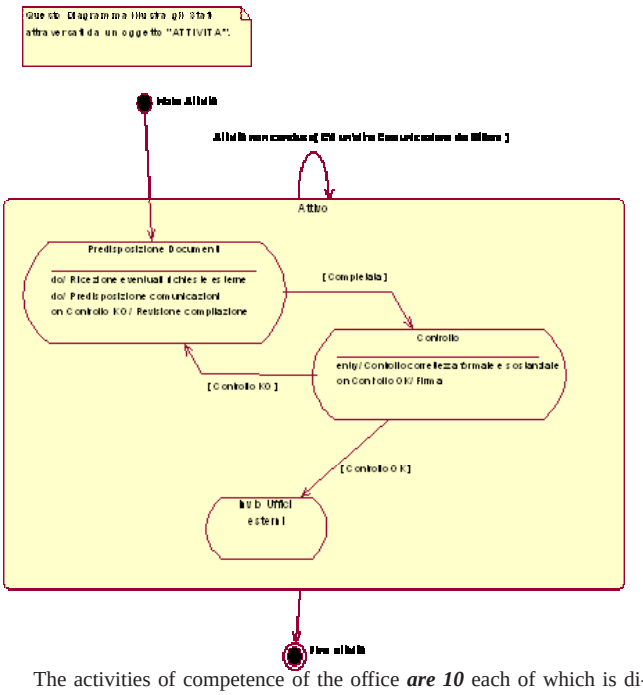


Fig. 5 General Diagram of the States



The activities of competence of the office ***are 10*** each of which is divided in phases and each activity have a destination. We bring the summary table in tab. II.

How example of static description of the system we show the UML [23,24] main use case diagram brought in fig.2. It is necessary to underline that besides the main diagrams exist other use case diagrams that constitutes the static sight of the system from other points of view and therefore from some or all the actors involved in the process. Particularly that diagrams are interesting that show all the use cases for an assigned actor. In the fig. 3 are for instance shown an activity of the system denominated "situation property mobile good" as seen by an employee of 6.o level and by his manager.

Other diagrams of the interesting use cases are those that show the use cases implemented during an iteration of the process of iterative enhancement, still that diagrams are important that shows a use case and all of its relationships. Naturally, accompanied to the static description, a dynamic sight of the system it is also necessary.

As it regards the dynamic sight of the process two of them are the meaningful diagrams respectively brought in Fig. 4 and Fig. 5. Particularly in the Fig. 4 are brought the diagram of collaboration among all the use case. In it the simplicity of the process of the office is deduced. In the fig.6 are shown a sight of detail that concerns every process instead: its states diagram. Every activity of the tab. II follows the diagram of the states of Fig. 5 The following step would be that to identify the processes and the subprocess of the office ***43*** that don't work and to assign a priority to these on the base of objective criterions as described in precedence. Nevertheless this is not the objective of this paper that has the purpose to describe only the process.

CONCLUSIONS

In this paper we have shown a methodology for the description and maintenance of the business processes. The methodology has been applied to all the offices of a large university. The documentation has been represented by means of UML diagrams and the picked data of the process was validated.

As future development we have the aims to face with simulation of the processes described in order to discover "critical processes" that will be tested in a "clean room". The clean room testing could serve us to identify the process variables that could be modified in order to improve it. Successively the same critical process could be tested in a real case and the result could be correlated with the 'clean room' results. The methodology adopted is currently under experimentation in the workflow and security laboratories at DIS of University Federico II and has involved all the offices and many employees of the same university.

Copyright © 2003, Idea Group Inc. Copying or distributing in print or electronic forms without written permission of Idea Group Inc. is prohibited.

BIBLIOGRAPHY

[1] Frank Leymann, Dieter Roller, Production Workflow: Concept and Techniques, New Jersey, Prentice Hall PTR, 1999.

[2] Frank Leymann, Dieter Roller, Workflow-based Applications, IBM System Journal 36, n. 1, pp. 102-123, 1997.

[3] Workflow Management Coalition. Workflow Management Coalition - The Workflow Reference Model. Document No. TC00-1003, Issue 1.1, 19-Jan-95.

[4] Rob Allen, Workflow: An Introduction, Open Image System Inc., http://www.wfmc.org, 1999.

[5] FCD 9126-1.2, Information Technology-Software product quality - Part 1: Quality model, ISO/IEC JTC1/SC7 n. 1949,1998.

[6] WD 9126-4, Software Engineering- Product quality - Part 4: Quality In Use Metrics, ISO/IEC JTC1/SC7 n. 2208, 1999.

[7] WD 9126-3 – Information Technology – Software Quality Characteristics and Metrics – Part 3 : Internal Metrics, ISO/IEC JTC1/SC7 n. 1713, 1997.

[8] H. D. Rombach, V. Basili, Quantitative Assessment of Maintenance: An Industrial Case Study, 1987, IEEE.

[9] Michael Hammer, James Champy Reengineering the Corporation - A Manifesto for Business Revolution. Nicholas Brealey Publishing, London, 1993.

[10] Wil van der Aalst, Jorg Desel, Andreas Oberweis Business Process Management: Models Techniques and Empirical Studies Lecture Notes in Computer Science 1806, Spinger-Verlag, 2000.

[11] W.M.P. van der Aalst and S. Jablonski. Dealing with Workflow Change: Identification of issues and solutions International Journal of Computer Systems, Science, and Engineering, 15(5):267-276, 2000.

[12] A. Bernstein How can Cooperative Work Tools Support Dynamic Group Processes? Bridging the Specificity Frontier. CSCW'00, December 2-6, 2000, Philadelphia.

[13] Sergio C. Bandinelli, Alfonso Fuggetta, Carlo Ghezzi Software Process Evolution in the SPADE Environment. IEEE Transactions of Software Engineering, Vol 19, No, 12. December 1993.

[14] The Butler Group. Workflow: Integrating the Enterprise, 1996, Butler Report.

[15] F. Casati, S Ceri, B. Pernici, G. Pozzi. Workflow Evolution. Proceedings of the 15th ER'96 international Conference, Oct 7-10, Cottbus, Germany, Springer Verlag Lecture Notes in Computer Science, 1996.

[16] Davenport Thomas Process Innovation: Reengineering work through Information Technology. 1993, Harvard Business.

[17] C. A. Ellis, L. Keddara A Workflow Change is a Workflow. W van der Aalst et al. (Eds.) Business Process Management, LNCS 1806, pp.16-29, 2000.

[18] Michael Hammer Reengineering Work: Don't Automate, Obliterate. Harvard Business Review, July August 1990.

[19] Gerrit K. Janssens, Jan Verelst, Bart Weyn. Techniques for Modelling Workflows and Their Support of Reuse. Business Process Management - Models, Techniques and Empirical Studies. Lecture Notes in Computer Science 1806. Wil van der Aslst, Jorg Desel, Andreas Oberweis (Editors) Springer Verlag. 2000.

[20] Workflow Management Coalition. The Workflow Management Coalition Terminology and Glossary. Document No WFMC-TC-1011. Issue 2.0. Jun 1996.

[21] Workflow Management Coalition. (1999) The Workflow Management Coalition Specifications – Terminology and Glossary Document No. WFMC-TC-1011, Feb-1999, 3.0

[22] Workflow Management Coalition. The Workflow Management Coalition Interface 1: Process Definition. Interchange Process Model. Document No WFMC-TC1016-P Oct 1999.

[23] I. Jacobson, G. Booch, J. Rambaugh, *The Unified Modeling Language*, user Guide, 1999

[24] I. Jacobson, G. Booch, J. Rambaugh, *The Unified Software Development Process*, 1999.

Copyright © 2003, Idea Group Inc. Copying or distributing in print or electronic forms without written permission of Idea Group Inc. is prohibited.

0 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:
www.igi-global.com/proceeding-paper/method-implement-workflow-management-process/32191

Related Content

The Role of Figurative Language in Knowledge Management
Magdalena Bielenia-Grajewska (2015). *Encyclopedia of Information Science and Technology, Third Edition (pp. 4728-4735).*
www.irma-international.org/chapter/the-role-of-figurative-language-in-knowledge-management/112915

Challenges and Opportunities of VLC Application in Intelligent Transportation Systems
Aleksandra Kostic-Ljubisavljevicand Branka Mikavica (2021). *Encyclopedia of Information Science and Technology, Fifth Edition (pp. 1051-1064).*
www.irma-international.org/chapter/challenges-and-opportunities-of-vlc-application-in-intelligent-transportation-systems/260248

Metaheuristic Algorithms for Detect Communities in Social Networks: A Comparative Analysis Study
Aboul Ella Hassanienand Ramadan Babers (2018). *International Journal of Rough Sets and Data Analysis (pp. 25-45).*
www.irma-international.org/article/metaheuristic-algorithms-for-detect-communities-in-social-networks-a-comparative-analysis-study/197379

Tools, Pedagogical Models, and Best Practices for Digital Storytelling
Jari Multisiltaand Hannele Niemi (2018). *Encyclopedia of Information Science and Technology, Fourth Edition (pp. 2641-2650).*
www.irma-international.org/chapter/tools-pedagogical-models-and-best-practices-for-digital-storytelling/183974

Synopsis Data Structures for XML Databases
Alfredo Cuzzocrea (2015). *Encyclopedia of Information Science and Technology, Third Edition (pp. 1906-1913).*
www.irma-international.org/chapter/synopsis-data-structures-for-xml-databases/112595