Groupware Technology for a new Approach to Organization Design Systems

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Abstract

In this report a concept and framework for distributed structural organizational design for workflow management systems in global business is presented. Very few approaches of workflow management address dynamic change in (international) organizational structures. Processes describe the activities which are performed, an enterprise model describes the actors and the structure of the organization.

This report on Groupware-based Organization Design (GroupOrga) analyzes circumstances of today’s organizational design approaches. An innovative approach to organizational design for workflow and office systems will be presented, which is team oriented and groupware based. The report will make clear that structural organizational design requires the complete knowledge about the organization - a requirement that cannot be met by one person. A team-approach supported by groupware will be discussed, as well the architecture and tool-centered implementation aspects of the system.

1 Introduction

Competition is and has been, a force for management exploitation of the full potential of organizational design variables. Conventional design variables have been used for many years and they have served organizations well. As global competition becomes more intense, organizations will have to react more quickly to environmental change and to competitors. A worldwide supply of goods, globalization of the markets and higher expectations of customers put growing pressure on organizations. Application of existing information technology rearranged the factors of competition in a new way: Nadler ([17], S.12) points out that time plays the dominant role in the market.

In the area of Computer Supported Cooperative Work (CSCW) there exist many approaches to overcome this problem. The notions of Business Process Reengineering (BPR) and Workflow Management (WfM) discuss solutions which explicitly focus on the component time and are aimed at reaching essential improvements in reaction to environmental changes. The crucial problem lies in the development of methods for the implementation of standardized and ad-hoc business processes (cp. [19], [20]). However, it is difficult, and in some instances virtually impossible, to convince a traditional organization to adopt new process structures without modifying or dissolving the underlying organizational structure. In order to tackle this problem in today’s Workflow Management Systems (WfMS) (an overview of WfM in [10]), new architectural concepts and technologies for organizational design seem to be inevitable. A new overall concept is necessary for a quick and always adaptable development and description of an organization’s structure. Inventive visions and concrete models for a future method of organizational design are currently only in early conceptual phases. Other approaches in the area of WfM either follow this requirement without separation of workflow and organization ([14]) or do not deal with organization modeling at all.

GroupOrga is an approach, which is technologically based on a groupware platform. It presents an important organizational design component besides WfMS. In some case studies of implementation, GroupOrga has already been tested as the organizational subsystem for a groupware based WfMS called GroupFlow (cp. [20]).

2 Dynamics and globalization in organizations' structures - a challenge for WfMS

Flexible, dynamic change in organizations is an important, yet unsolved problem which appears in office systems, software engineering, manufacturing, and other domains (cp. [7], p. 10). WfMS are designed to offer a multipurpose, structured and flexible way of managing processes. What is dealt with in process-oriented approaches is the ability to freely configure the process models by inserting or deleting process steps (or tasks) and functions. In addition, the operational workflows must immediately use new workflow definitions, which stem from these changes, without a need to do extensive, time-consuming programming in the information system.

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1 GroupFlow is a workflow management system jointly developed by the University of Paderborn and Pavone Informationssysteme GmbH, Paderborn, Germany (http://www.pavone.de/).
Nevertheless, shape and design of business processes should not be affected by the changes, which might take place in the organizational layout and design. McCarthy and Sarin emphasize that this requirement as a mandatory task for WfM is broadly acknowledged (cp. [14]). Hence, while changes in the workflow design are underway, independent changes in the assignment of persons, positions, roles, organizational units or workgroups to the process tasks have to be realized. Li and Lochovsky ([12], p. 195) list seven dynamic modeling requirements, one of which deals with the same need under the term of flexible dynamic binding. There is a need to allow resources and workforce from the organizational model, to be bound to tasks and activities in the workflow in flexible, dynamic ways, as depicted in figure 1.

![Figure 1. Integrated modeling of workflow and organization structure](image1)

Newly designed or changed functions in the business process may require other competencies, responsibilities or authorities, which subsequently necessitates other roles, functions, workgroups or persons to be newly implemented or changed in the organizational model. Li and Lochovsky (ibid.) use the expression flexible and dynamic composition. In their example, organizational units may be composed in various ways and may be generated and demolished at any time.

![Figure 2. Correlation of structure and process](image2)

Figure 2 shows the correlation between structure and processes, which makes a development towards a process-oriented organizational design desirable. We believe that in the long run the surviving organizations will be those which are able to react accordingly, due to their flexible business processes and organization structures. Therefore part of the answer lies in the study and solution of the dynamic change problem of organizational subsystems in WfMS.

Moreover, competing in a global economy requires an organization that is designed on a global and distributed basis ([4], p. 33ff.). Global strategies today frequently involve cooperation with coalition partners as well as within a firm's own subsidiaries. Encouraged by recent globalization trends, many firms are leveraging new Information Systems (IS) to change their coordination and control systems, workflow and organizational processes. Many global firms lack a clear strategy for aligning their architectures ([6], p. 61ff.). The challenge is to find the organizational structure that best fits their global strategies. However, this structure may change quickly, requiring a facility to adjust to changes accordingly. In addition, today’s global firm must be able to transfer complex structural information to diverse locations in its network. This report presents a technology which may be one component of a global information technology architecture that forms an infrastructure for the coordination needs of a global management team. Innovations in information technology may also greatly cut coordination costs by reducing the time of communicating information and, together with changes in the market structure, may shift competition to a global scope.

3 Traditional forms and problems of organizational design

The traditional, academic approach of organizational design, e.g. [3], [9], [18], [22] (and other literature referenced there), assumes that any necessary change is one person's duty, i.e. an organizer or the head of a department guides or carries out the modifications in organizational design. The following four main attributes prevent from a procedure where the complete organizational potential and know-how for organizational design can be used thoroughly:

(1) Most traditional methods rely on the view of few leading officials. In the case of a professional consultant, the new or changed structure depends on procedure and knowledge of this external person (or a small team). However, organizations are complex social systems of many different members, each with an important and relevant view of the problem.

(2) Very often cookbook like practices suggest that they can be applied everywhere and to similar problems. In general, one will find a number of potential organizational patterns, from which the organizer chooses the one which seems to be appropriate.

(3) Organizational design is understood as the network of formal relations between roles, posts, units and func-
tions. But this view of the formal structure of an organization bears problems. Most organizations do not work in the way they are laid out on paper and their processes follow informal architectures.

(4) Furthermore, a distinction between an organization's structure and the processes in the organization leads to an artificial separation of the social apparatus organization. Such an organizational design focuses on the structures, ignoring procedural questions.

4 Terminology and concepts of team-oriented organizational design

Organizational design is the structural design of an organization. Here the term organization will be used in the sense of the instrumental meaning. The instrumental term of organizational design covers the totality of all regulations for the design of organizational structure and processes: The enterprise has an organization. With the institutional term, an enterprise is an organization (cp. [3], p. 35). However, organizational design is more than the development of patterns for posts, functions and units, which is known as the organizational structure, and can be mostly found in the form of so called organizational charts. Organizational design is also the current description of organizational processes, in particular decision processes, and their definition and differentiation of necessary and used information objects (cp. [17], p. 15). Especially in the practical world, these different forms of organizational design are strongly interwoven, and in order to describe the parts accordingly, different terms will be used to discriminate from each other (cp. section 5.2).

The term design is frequently understood as design-from-scratch. Although this term will be used, it should always be understood as re-design, since hardly any organizational design process will be started in a vacuum with no existing structures. The research field of organizational design addresses the question how change processes are accepted. The authors' approach is based on the assumption that the organizational design process laid out here, can itself contribute to a growing acceptance in the redesign. Another important aspect in literature directs the attention to organizational learning, which observes organizational peculiarities on a macro level (cp. authors in [2]). The GroupOrga approach can be seen as an organizational learning processes on a micro level, since in this concept organizational members are explicitly involved in the design and learning process.

4.1 Attributes of an effective organizational design process

Each of the four problems described in the chapter 3 point to a potential attribute of an effective organizational design process. Such an IS supported approach would be based on multiple, personal perspectives and in order to cover the complexity of the design problem, it should be an evolutionary process. Furthermore, it should take into account informal roles and structures and explicitly include processes in the design.

Multiple personal perspectives - Organizations are made of many members, each having their own personal view of the organizational circumstances and problems. A new approach has to involve every contributing member in the design process. This also includes parties which significantly influence the events in the organization, such as stockholders, labor union members, consultants, government, suppliers and customers.

Evolutionary approach - Organizations vary greatly in their structures. The approach must be qualified enough to be able to modify to any circumstances whenever necessary in an evolutionary advance.

Informal organizational roles and structures - The concept should concentrate on the formalization of informal roles and structures. With this, new informal roles will emerge, they will have to prove their legitimacy and will thereby slowly work out to become formalized. The formalization of such structural elements is a gradual process. The group design process is based on the explicit description of how informal elements relate to other informal and formal elements.

Explicit orientation towards processes - In this new approach, processes will be explicitly involved in the design, since they are the ultimate factors for the efficiency of an organization and thereby processes are the main focus of a redesign attempt.

4.2 Organizational design as team-based process

In order to follow the requirements of flexible and innovative WfMS as sketched in chapter 2, it is less a question of "Why organizational design?" but rather "Why and how organizational design as a group approach?". Four additional motives for structural design in WfMS as a team process will be discussed:

Complex problem - The number of complex activities in an organization is extremely high and the understanding of these activities requires the expertise of all people who are involved. A single person can hardly grasp the huge number of transactions in detail. It can be assumed that the persons who are actually performing the work are those who have the information on peculiarities about the organization ([9], p. 22 or [6], p. 63). However, this should not conclude, that the role of one organizer should now be replaced by a group of organizers. The advance proposed here is more far-reaching and allows everybody within an organization to assists in the design process.

Members of an organization have personal interest in problem solution - Everybody is in some way a mem-
number of an organization. If organizations do not meet the personal conceptions, their members find ways to change the organization or to disassociate themselves from it. For many people, taking part of a successful organization also means taking pride in personal self-satisfaction. It seems to be sensible to involve people with strong interests in the organization’s success in the design of organizational structures to produce qualitatively high solutions.

Organizational design as a never-ending process with changing performers - Very often design is referred to as “a thing”, but this is misleading. Organizational design is not a sporadic matter, but rather a process, one that will never be completed. Every organization is faced with the challenge of having to continuously adopt to new environmental requirements in order to reach newly defined goals.

In this case it is the responsibility of each member of the organization to continuously contribute to the redesign. Therefore, it is a "dynamic and on-line" process, which allows for continuous design in order to fulfill ever-changing requirements.

Spreading of networked computers - Current trends in IS show that main-frame architectures are no longer up-to-date and that the era of networked personal computers in client-server architectures sets new standards. By the concept of computer supported cooperative work and modern groupware platforms, workplace potentials will be utilized in order to coordinate members in distributed project teams and workgroups. The notion of CSCW has to be thought about in the context of cooperative structural design.

5 IS supporting a vision of organizational design

The vision of this approach for IS-supported team based design processes is to develop organizations which are self-organizing systems. Such a process is a conscious, permanent problem solving and planning process, which develops further into a constantly changing organizational design.

Figure 3 shows such a perpetual organization and structuring process. New structural islands develop inside the existing, current organization (①). Over time these informal islands will be formalized and develop into fixed and durable structures in an alternatively structured environment (②). While the new structures grow and strengthen themselves (③), some existing structures dissolve (④) - in this state it becomes difficult to distinguish the old from the new (⑤). Some of the old structures will gradually break up into islands in the new organizational design (⑥), but not all existing structures will necessarily change. It is more likely that some structures will remain stable, while others finally dissolve completely (state ① in a new cycle).

Figure 3. Team-based process for design

Besides realizing chapter 4's conceptual reflections into a new method for organizational design, the GroupOrga approach comprises a number of prototype implementations. The technology to support this process is a computer assisted groupware environment, which allows the participants to clarify their roles, skills and interactions with others. This can be done via various user interfaces, some of which will be presented here.

5.1 Enterprise model, organization repository and design tools as elements of WfMS

The necessary considerations for a team based organizational design are an integrated enterprise information management model, computer based organizational tools ([16], [23]) and organization repositories or organization databases. Due to an analysis of the potential of structural design tools ([13]), there are only a few computer based methods to generate alternative organizational structures for workflow or office systems.

Since organizational design for workflow management requires flexible shaping of organizational structures, it should follow examples in analogy to software engineering, where engineering knowledge could be used for the organizational design process. The growing complexity of necessary enterprise models to be covered and their permanent redesign in the course of stronger competition necessitates the utilization of computer based organization tools with growing importance: A traditionally compiled description of all units and posts in an organization, might already be outdated at the time of completion. If only conventional methods are used, distributing and updating organization charts and organization handbooks is very strenuous.

A central issue of the method presented here is the structured description of organizational elements and their relations. Distributed, groupware based IS support the management of enterprise models in the team and the supply of organizational information to every desktop. Modifications in business processes and structural elements can thereby be facilitated tremendously. A
correct picture of the organization will only evolve, if the organization's members on the middle hierarchy levels, which in fact are already involved in the informal design process, gain competence through appropriate architectures in order to take part in the design process.

5.2 Enterprise Information Management Model

The *GroupOrga* Enterprise Information Management Model (GEIMM) can be described by a meta-model depicted in figure 4. Similar models with two or three components can be found with [1], [7], [25].

According to Slovin and Di Nunno "all models are wrong, but some models are useful" ([26], p. 47). A useful enterprise model, which can be employed for computer based workflow design and processing, has to be capable of describing the information flow of an organization (process model) and allow the modeling of used resources and active agents like people, roles or other organizational elements (infrastructure model). Moreover, it describes the manipulated information objects (information model). The center of this model is the task which serves as the connecting link of the three models. Due to this model's focus on workflow management and office support, the tasks to be carried out are understood as the processes' central components. Starting with this element, the other entities of the infrastructure, the process and the information model are linked by their organizational context. Some selected entities and relations of GEIMM will be demonstrated here.

![Figure 4. The GroupOrga Enterprise Information Management Model](image)

**Elements of the process model:** The process model describes "how" and "when" the tasks within an organization are accomplished. Complex business processes comprise varied process steps and activities which are linked by manifold forwarding rules. A business process model in the *GroupOrga* Enterprise Model is a template for an actively carried out workflow. Each business process describes the succession of one or more connected and recurring tasks, as well comprises several sub-processes to make a complex process. The tasks which build a complex business process are connected with each other through sequential or parallel flow-control links.

Tasks characterize the work of persons or software agents within a process. Each task is a component of a complex process and is made from at least one activity. While carrying out a task, one or more information objects will be created, used or modified. Besides the tasks, which are carried out manually, computerized tasks can exist, which will not be supervised by a person but through the workflow system. Rules and descriptions on how tasks have to be carried out are given by basic primitives for directed graphs made up from task nodes and flow control links. These graphs describe how information objects are routed along previously specified paths. Within the *GroupOrga* Enterprise Model sequential, parallel and conditional flow control elements can be implemented.

**Elements of the infrastructure model:** The infrastructure model as yet another part of the Enterprise Model describes on the whole the people, who are carrying out their tasks at different locations, from different posts or in different workgroups. Furthermore, it represents the relations and communication channels which exist between the people and the resources which are necessary to fulfill the tasks. In order to design relations, e.g. role assignment, resource allocation or membership to a unit, important entities of the GEIMM are (sub-)unit, role, workgroup, software agent, resource and person.

For a design which allows for a powerful, yet flexible structure, the concept of groups should be named first. Group structures enable one to cope with the requirement for bigger flexibility, satisfaction of personal needs, higher motivation of co-workers, reduced supervision and more. This potential of groups, combined with the opportunities of today's IS gives the chance to fundamentally alter the infrastructure of organizations. The first use of group structures has been found in the field of CA-technologies mainly in the production sector, for example through the employment of manufacturing circles. In the field of workflow management almost all organizational functions can be transferred to group structures via computers. If business processes in WfMS are meant to be modeled after, it is beneficial to combine predefined and standardized workflows with the open structure of groups and teams (cp. [19]).

Generally, the structure of organizations is closely connected with the concept of organizational charts. Although, as a rule, these organizational charts do not give any information on how relations in organizations are set up in reality and what the informal power structure looks like, almost every infrastructure tool supports this concept. Therefore, a comprehensive Enterprise Model should support the underlying concept of units and posts.

As another element of the infrastructure model, the role, offers a powerful and flexible way to get away from
the constrained concepts of unit, person and post. The role concept in workflow management is still far from a precise definition (an overview of different approaches and definitions for the role concept can be found in [11], the aspect of organizational roles covers [8]). In the infrastructure model sketched here, the concept of a role serves as a means to aggregate posts with similar or equal competencies and thereby to define organizational functions. Thus, a role covers a number of performers with common tasks. Each role holder cannot be assigned only one role, but a number of roles, the "role set".

**Elements of the information model:** The information model covers the relations between the information objects, such as reports, documents or forms, these are then processed in the WfMS and are manipulated and edited within the processes. The term document object in the Enterprise Model, which is taken from the underlying groupware platform, represents all workflow and office documentation with their particular characteristics. Data types which are also used in conventional database systems, such as string, character or numerical data, are necessary but no longer sufficient if management of today’s business processes is concerned. Further semi-structured information objects, which can be found in reports, letters, texts, annotations, memos, graphs or in oral communication, are currently discussed. The GroupOrga Enterprise Model supports compound document objects, which can for example consist of free text, structured fields, tables, graphs, video or speech objects.

5.3 The importance of organization repositories

In the case when the organizational data, as described in the proceeding section, is programmed directly into the workflow in a WfMS (hardcoded), as is the case in most WfMS, there is hardly any chance to react quickly to environmental changes as it has been delineated in the introduction. One possible concept is a separated infrastructure layer which will be integrated into any WfMS. As a first step, the organizational elements should be modeled with a process oriented view in order to be addressable from the runtime workflow system. As a second step, it will be necessary to implement a separated and encapsulated layer for independent reuse from any workflow or office application. Through this encapsulated but integrately usable organizational layer, business processes will be flexibly changeable and editable, without being tied to rigid and formal infrastructures or having to do extensive programming.

Currently, many incompatible and tool specific "directories" can be found, which are usually designed for an individual application. Bound to specific locations, the data is very often redundant and is ordinarily administered by few different persons. This approach prevents from an effective management of organizational information as demanded previously. Remedy can be brought through standardized organization databases, which are designed for organization-wide use. An organization’s know-how is spread over many posts, roles and persons. Simultaneously to the employment of workflow management, the necessity for short-term implementation of roles or workgroups for particular tasks grows. In the scenario of these ad-hoc workflows, an organization database or repository serves as a "navigator" through the large number of existing functions and skills of an organization in order to quickly generate the best resource allocation possible.

Figure 5 shows the GroupOrga repository with the navigation tools in its current German language prototype implementation.

![GroupOrga Organization Repository](image)

Organizational data needs to be imported into productive IS without great effort. The architecture in the following chapter allows for such an integration of workflow system and organizational repository. An idealistic situation would be reached with an organizational database for various applications, as it becomes conceivable with the extension of standards, such as the X.500 directory description ([24]).

5.4 An organizational design tool - the GroupOrga OrganizationModeler

In order to represent the organizational structure, graphical on-screen illustrations are often more intuitive than the mere definition of it in any sort of programming language. Thus, we have developed an enduser environment which transforms the abstract definitions of entities and their relations into a visual illustration.
The groupware platform used in this environment does not have any graphical user interface available, which is one reason why we have supplemented the graphical tool shown in figure 6. For each entity from the data model a dialogue-window for setting the respective attributes is made available.

![Figure 6. OrganizationModeler user interface](image)

More importantly, we were forced to develop our own tool, since existing devices for graphical organizational design do not support important features, such as API connectivity and distributed modeling; additionally, they rely on rather meager data models without innovative entities such as roles, workgroup, skills or know-how. The Action Technology WFMS ([15]), for example, does not provide any organization modelling capability at all. The organization modeler assigns functionality to each object and thereby supports interactive linking of entities. Relations can be specified through a listed approach or through mouse-driven actions with ease-of-use and intuitiveness as two main design principles. After having designed the necessary organizational relations and structures, the model will be stored in the background database and if necessary be replicated into the network. Naturally, all security options provided by the underlying groupware platform remain existent, and modification can only be made to those parts of the model with adequate access rights. In the conceptualization phase we attached great importance to a clear representation in order to reach everybody in an organization for an independent and participative process, i.e. not only potential IT experts.

Table 1 shows that the target group of this organizational design process are all members of the organization, i.e. it ranges from people who only want to get informed to those who actively and regularly participate in the design. All four types of information retrieval may be supported by the GroupOrga OrganizationModeler.

<table>
<thead>
<tr>
<th>“Push-button” information needs</th>
<th>Occasional changes or adaptations</th>
<th>Regular departmental design and planning</th>
<th>Regular design, planning, analysis, reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>end-user</td>
<td>administrator</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.5 Access to organizational information in international business environments

Quite recently the presentation of organizational information shown in figure 5 has been enlarged by its integration into the World Wide Web (WWW). The underlying groupware platform allows to easily, yet securely publish any database into the WWW with the complete functionality available to the external user as well. A publication of information about an organization's assets, skills and know-how fosters the idea of a global market where core competencies and main skills are offered by means of IT, and potential partnerships in global business would come into being for short periods, complete the joint task and dissolve afterwards just to rise again in a new structure with changed partners.

![Figure 7. GroupOrga OrganizationViewer](image)

After we have implemented the organization repository as part of the WWW, we are also looking at a graphical representation of organizational structures in the WWW similar to what can be offered by the GroupOrga
organization modeler. Figure 7 shows an early implementation of our GroupOrga organization viewer implemented as Java applet. While we are aiming at a Java modeler, this viewer currently displays (rather than edits) all organizational information available in a GroupOrga organization repository which may be accessible from any WWW server. Complying with access rights defined in the organization repository, structural information about an organization can easily be provided to worldwide partners, to field workers or sales representatives working on global markets.

6 GroupOrga architecture and distributed organizational design process

Figure 8 shows the proposed overall architecture of GroupOrga with the actual control and management of workflows to the right, reaching from groupware-based workflow management ([19]) to team-based workgroup-computing platforms in the area of office systems (cp. [21]). On the left side the aspect of the underlying organizational model which is managed by a variety of contributors instead of one person (cp. [23]) is covered. Tools for the administration of structural data and their transformation into the respective WfMS are provided (cp. sections 5.4 and 5.5). Altogether, a possible architecture for such an assisting platform consists of mutually consistent information bases for the structural or organizational data and for the workflow runtime system, which manages and controls the processes.

The underlying groupware platform gives the technical option to delegate administrative tasks in the organizational design process (and the respective responsibility) to anyone involved in the organization.

6.1 Administration of organizational data

The problems outlined in chapter 4, which are brought about by traditional design, can be tackled with an integrated concept for a powerful organizational design. In this concept all elements and rules for the structural information (such as units, roles, posts, workgroups, persons etc.) are kept in the repository outlined in section 5.3 (left in figure 8). The integration of this repository into any WfMS allows for an immediate and updated use of any structural element in the workflows.

Such an environment has to be based on a comprehensive enterprise information management model such as the GEIMM. First, all relevant structural elements and their relations have to be designed on the basis of this model. Afterwards, the heads and colleagues of the units, workgroups, or roles can put this organizational information into concrete forms depending on various situations and cases. The activation of different types of organizational setup can be made conditional on the realization of different workflows, and the employees can get an updated view at any time.

![Figure 8. Schematic GroupOrga architecture](image)

Since the organizational design can be decentralized in this approach of flexible WfMS, its underlying design platform has to administer and constantly check access and security rights. These previously defined rules can then automatically be transferred into the respective WfMS and can be used to control the workflow.

6.2 Transfer of organizational data to the Workflow Management System

Via previously mentioned interfaces, workflow modeling and organization modeling are linked to each other: work has to be done by members of an organization. This integration is done through organizational policies describing who has to perform which work. The WfMS requests this information about competence and usability of organizational elements from the organization repository. The data of the single elements (units, roles, workgroups, positions, persons etc.) are defined in the organization repository, and the workflow management runtime system can request the necessary information at real-time event-driven from the organization repository. Hence, an organizational policy relates processes to elements of the organization structure (cp. figure 1).

In this architecture both the workflow system as well as the organizational design environment will be used from different users on various platforms and operating systems (cp. figure 8). Therefore, a workflow management or office system from the start must be designed in a distributed way. A groupware platform like Lotus Notes, which serves as the technical base for this GroupOrga implementation, supports these manifold requirements and allows for an unproblematic and configurable distributed software environment. Like the distribution of
workflow tasks changes from one process to another and can shift during runtime, the distribution of organizational elements can also vary over time. Similarly, like for workflow management, with the use of groupware no centralized component will be necessary.

6.3 An example case for organization modeling

GroupOrga is currently used within the workflow system GroupFlow. While GroupOrga presents the organizational structure, GroupFlow models process aspects of organization in form of workflows. The following example case presented in this concluding section does not reflect a real world case. However, by means of various tests, the GroupOrga prototype has been implemented and discussed in some innovative organizations already.

In the current enterprise model of GroupOrga, eight basic elements make up the organizational structure: agent, role, position, unit, workgroup, competence, skill/know-how, resource. Various relation types exist: role plays, supervises agent, is member of unit, is manager of unit, is member of workgroup, is manager of workgroup, has know-how, has position, substitutes agent, etc., to name only a few. Hence the agents, i.e. real employees, may be related to roles, they may supervise other agents, they have competencies or they are members of a unit. Agents may also relate to a group by being a member or a manager of it. For example, a workflow would require that only those members of an organization can perform a certain task, that show specific properties. In this case, an organizational skill would name the properties instead of the names of people possessing them. Such a list could define secretaries.

So far, any of these specifications and definitions may be modeled by all employees involved, independently from the workflow modeling. The membership of agents to units is defined and modeled by the manager of the unit, rather than by an external organizational designer or consultant who does not have sufficient information about internal unit structures. Similarly, an employee updates the records about his skills and know-how, since he himself keeps track of trainings and seminars he attended. A task-force or project group uses GroupOrga to define membership and to document who is playing which role within their group, instead of consulting a non-member to do this specification in the organization’s database.

While this organization modeling has taken place in the GroupOrga organization repository, references between the two modeling areas have to be established later. This implies that for each workflow references have to be established indicating who is completing which task. References are described by dashed lines in figure 1.

An often utilized example is that of a Travel Expenses workflow. Everybody with the role employee might be allowed to start such a workflow. The reimbursement might take place through the manager of that employee. In this case a more complex resolution of several relations has to take place, which cannot be expressed by simply pointing at a specific agent or role. In this example ManagerOf(UnitOf(Employee)) would become necessary, where Employee denotes the specific agent who started the workflow. In order to allow for such nested designations, GroupOrga uses a build in organizational query language. In the end an agent who is_member_of the accounts department would do the administrative work and possibly archive the process.

7 Conclusion

In this paper we have introduced the GroupOrga concept and framework for distributed, dynamic organizational design processes. It provides a user-friendly and flexible framework for the specification and execution of organization structure elements for WfMS. Advantageous graphic interfaces and the comprehensive enterprise system presents the organizational structure, which is also discussed in some innovative organizations already. While this organization modeling has taken place in the workflow, everybody with the role employee might be allowed to start such a workflow. The reimbursement might take place through the manager of that employee. In this case a more complex resolution of several relations has to take place, which cannot be expressed by simply pointing at a specific agent or role. In this example ManagerOf(UnitOf(Employee)) would become necessary, where Employee denotes the specific agent who started the workflow. In order to allow for such nested designations, GroupOrga uses a build in organizational query language. In the end an agent who is_member_of the accounts department would do the administrative work and possibly archive the process.

This concept does not mainly depend on its theoretical cornerstone, but rather on the practical effectiveness. Due to the fact that this framework for higher flexibility of organizational structures is still in its prototypical phase we cannot yet present extensive empirical data. However, the practical relevance of a comprehensive organizational model rates higher than an empirical description of the current detailed problems in the field. Considering today’s gap between the theoretical description and the practical implementation of IS, this procedure seems to be justifiable. Nevertheless, it should be stressed that the rational organization has its limits which cannot be expressed by rules and formulas. IS can only be implemented meaningfully, if topics are considered which can be formalized to a certain degree. In the field of organizational design IS is only an instrument, but one which can improve the conditions, if it is available not only to one organizer, but to many people via the means of groupware technology.

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References


