Understanding and Modelling Flexibility in Administrative Processes

Ralf Klischewski[1], Klaus Lenk[2]

[1] Hamburg University, Department for Informatics, Software Engineering
Vogt-Koelln-Strasse 30, 22527 Hamburg, Germany
klischewski@informatik.uni-hamburg.de
http://swt-www.informatik.uni-hamburg.de

[2] Oldenburg University, Department of Economics and Law, Public Administration
26111 Oldenburg, Germany
lenk@uni-oldenburg.de
http://www.uni-oldenburg.de/verwaltungswissenschaft/

Abstract. Aiming to provide a platform for collaboration across agencies and to design appropriate IT support for the variety of administrative processes and decision making, concepts need to go beyond current approaches in business process modelling as well as workflow and record management. Drawing on these approaches, we suggest to focus on the unique tasks and activities of each actor involved and to present the relation of each individual contribution to the overall process as something tangible in order to support flexibility in the execution of administrative processes.

1 The Challenge to Support Administrative Processes

Electronic government is increasingly drawing attention to the need of reorganising many business processes within the public sector. In order to select appropriate forms of IT support for these processes, it is necessary to get a clear picture of their nature and of the purposes which they serve. Business processes in the public sector cover a wide range of tasks and of work arrangements. Whilst some of them can be fully automated, others rely on human agency and professional knowledge and require flexibility to a large extent. Unleashing the full enabling potential of IT for modernising the public sector requires a wider approach which presupposes a thorough familiarity with the "business" of the public sector and the characteristics of non-standardised work processes.

In this paper we re-examine approaches to understanding and modelling administrative processes and try to highlight the unique involvement of actors in administrative processes. The human element stands central in this approach, and we are looking for ways of modelling business processes which draw on the full range of the enabling potential of IT. We will propose a relational actor-oriented approach to modelling

administrative processes and decision making across agencies, thus paving the way for a more appropriate IT support for public administration.

1.1 Characteristics of Administrative Processes

The characteristics of business processes in the public sector have much to do with the fact that most of the work there requires professional knowledge and experience. Mass-production of a type which can be fully automated does exist, but its scope is limited to simple processes of registering information, accounting and calculating. Of much greater importance are processes in which individual cases are dealt with, in more or less direct contact with the stakeholders. Legal rules and the explicit and implicit knowledge of administrators play an important role in such processes [4].

It is therefore adequate to say that the bulk of administrative processes in fields like assessing claims, granting licenses etc., is situated on a continuum which has on its one end fully standardised "production processes", and unstructured decision processes on the other. For processes of policy making, of legislating and of rendering justice, it is obvious that they depart to a large extent from the assumed model of production processes on which standard software in the private business sector is predicated. The same holds true for many processes occurring at the operative level of administrative agencies. Examples of such weakly structured decision processes include the granting of a license, assessing social benefit claims, issuing building permits, etc. When such processes start it is often not clear how long they will take, how much information is needed, and whether negotiations between the various agencies involved in the processes will take place.

Unfortunately, most computerised information systems in the public sector are still based on an understanding which takes well-structured and fully standardised processes as its starting point. These processes are recurrent in the private sector, e.g. in the field of accounting. Since many standardised processes can also be found in the public sector, e.g. in the fields of financial and personnel management, standard ERP (Enterprise Resource Planning) software such as SAP's R/3 is also making its way into institutions of the public sector. But besides such processes of an auxiliary nature, much of the work of public administration is characterised by primary processes at the operative level in which claims are processed, decisions made, and services rendered.

It is important to state that decision making in public administration occurs not only at the level of organisational management or policy, but is characteristic of its operative work. The officials in charge must remain flexible as to the workflow at stake. They must be able to ask for information, to ask a colleague for help, or to organise a meeting and insert the outcome of this meeting into the sequential work process.

1.2 The Quest for Flexibility

The options for standardising processes involving decision-making on individual cases or negotiations are very limited. Determination of some typical steps, which such processes should follow, may decrease service quality, effectiveness and efficiency.

There are at least four reasons (which are not confined to the public sector) why more flexibility should be built into the execution of business processes where human agents collaborate using software of different types:

1. **Support of professional work:** from the perspective of an individual worker, an IT-supported workflow crosses a "workbench" which supports his or her work in all aspects, not confined to the work process to be acted upon. The official as a knowledge worker draws on many resources. He or she is used to invoke office tools, search for additional information, and uses platforms for collaboration with teams or groups, either on a steady basis or ad hoc. The interface between the flow of a process and the resources which this knowledge worker marshals can be construed as a situation where, according to the situated requirements of an ongoing process, he or she formulates demands toward the supportive environment which are met by "satisfiers" either available locally or brought in from elsewhere [5].
2. **Client's concern:** the occurrence of "service encounters" where an agent providing a service (or mediating it e.g. in a one-stop front office) is confronted with individual customer requirements flowing from a wide variety of life situations. These are difficult to specify in advance. Standardised service models should not preclude behaviour which caters to special wishes or needs of the customer. Rather, such models should serve as a resource, providing orientation in processes of service delivery which are adequate for a given situation [2].
3. **Unpredictable decision making processes:** decision-making is an important characteristics of its operative work in public administration. The officials in charge must be able to involve additional actors in decision making and to change the course of the process at stake.
4. **Limitations of cross-organisational feasibility:** actors co-operating across organisational borders have less or no possibility to discuss and commonly decide on details of their case-based collaboration during execution time. They frequently make assumptions or draw on commitments on what other agencies can contribute to the process execution. And it might turn out that actors in charge cannot act as planned and therefore must be able find other ways according to their available means and resources.

2 Modelling for Flexibility in Administrative Processes

Understanding the particular problems of different types of business processes in the public sector is a prerequisite for developing an adequate modelling approach. As pointed out above, many of the business processes in the public sector must not be predefined. We need to understand the details of how the actors involved bring in their expertise and how they collaborate and participate in decision making throughout the processes in order to choose or develop a modelling approach, which allows the design of appropriate IT support without losing sight of human agency and discretion in performing knowledge work, as well as of the collaborative aspect of such work.

approach	**business process reengineering (BPR)**	**workflow management (WFM)**	**record management (RM)**
original focus	business processes with the aim of reengineering, often based on event-process-chains (e.g. ARIS), usage of reference models for different domains	automatic management of data objects (e.g. documents) "flowing" through the work organisation while relating work items, work capacity and IT applications during run-time	processing administrative documents, i.e. creating, sharing (managing access authorisation), manipulating, registration/archive, retrieval etc.
current research	e-commerce	inter-organisational WFM	inter-organisational RM, semantic web
support for admin. processes	enables identification and overview of core processes of the organisations at stake in the process of modelling, actors are not taken as human agents working in a situated environment, but as attributes of process elements does not address workplace perspective, collaboration or flexibility (e.g. for officials the daily work is not triggered by "events")	adequate support of well-structured and standardised routine processes inclusion of independent subprocesses (e.g. across organisational boundaries) and other flexibility issues (e.g. exception handling) come increasingly into focus no support of officials or agencies in their way to organise or redirect processes according to situated needs	standardised IT support for record management throughout the organisation – but not beyond creates a more or less flexible collaboration environment, but no support for process management poor support for officials or agencies in their way to organise or redirect processes according to situated needs (e.g. to make adequate annotations)

Tab. 1. Major modelling approaches used to support processes in the public sector

Up to now, modelling of administrative processes is based on approaches known from business process reengineering, workflow management and/or record management. Those approaches and the current research in this areas do not focus on administrative processes. However, they do offer some support, but fall short of providing the flexibility required (see table 1).

2.1 Focussing on Actors and Relations within Processes

All of these approaches above can be applied successfully in public administration. But as they are inherently limited in supporting flexibility required for collaboration, we need to look for and/or develop modelling approaches which acknowledge the broad range of human work practices and take into account the understanding of human agency within administrative processes. Combining modelling practices from collaborative computing and process modelling (as in workflow and re-engineering methodologies), we try to identify the *unique involvement of actors* in administrative

processes and present the *relation of each individual contribution to the overall process* as something tangible within the situated execution of processes and of related decision making. Focussing on actors and relations during modelling and IT implementation allows (even while a particular administrative process is ongoing) the official in charge to decide whom and what kind of contribution to enrol into the process.

From that point of view, the interconnection of process elements can be regarded as a form of individual contracting, framed by standards providing process patterns and rules for contracting. We radically depart from the assumption of a hierarchical world (in which process re-engineering is still caught). Instead of predefined processes being imposed and implemented from above, we assume contracting relationships – not only between external customers and an agency or an agent, but also within a process in which the results of each step performed should serve the next step of process execution. The actor in charge of this next step is thus considered as an internal customer. Such a contract model closely corresponds to the philosophy of New Public Management. One of its tenets is replacing hierarchical relationships with performance contracts, according to the principles of Management by Objectives. It is also related to a view which assigns tasks to units or agents not in a hierarchical way but by means of contracts, thus allowing for a wider range of institutional arrangements than classical administrative thinking.

2.2 Modelling Admin Points and Process Patterns

To support contracting and collaboration between officials / agencies as well as design of appropriate IT support, we suggest to model relational and actor oriented process patterns based on a repertoire of "admin points". The approach is a domain specific enlargement of serviceflow modelling ([1], [6]) which has been developed to model

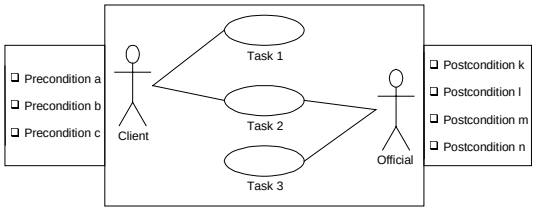

Fig. 1. Abstracted model of an admin point with three tasks (involving an official and a client, e.g. a citizen) and its pre- and postconditions

service processes in the field of tension between given standards and case-based reasoning. Within serviceflow modelling, the series of service points (denoted as a list) serves as the process plan or schedule (looking ahead) as well as the process history (looking back). Each of those points include a (UML-) specification of actors carrying out certain tasks/activities as well as the pre- and postconditions at each point (see abstracted model in figure 1) for "contracting" within process execution.

In principle, each of those points can be defined as needed. However, for communication and co-operation within domain specific processes and across organisational

borders, it is most helpful to share a modelling “language”, i.e. a common repertoire of premodelled admin points (see figure 2) in which each of these points are specified in terms of tasks/activities to be carried out, based on lists of pre- and postconditions.

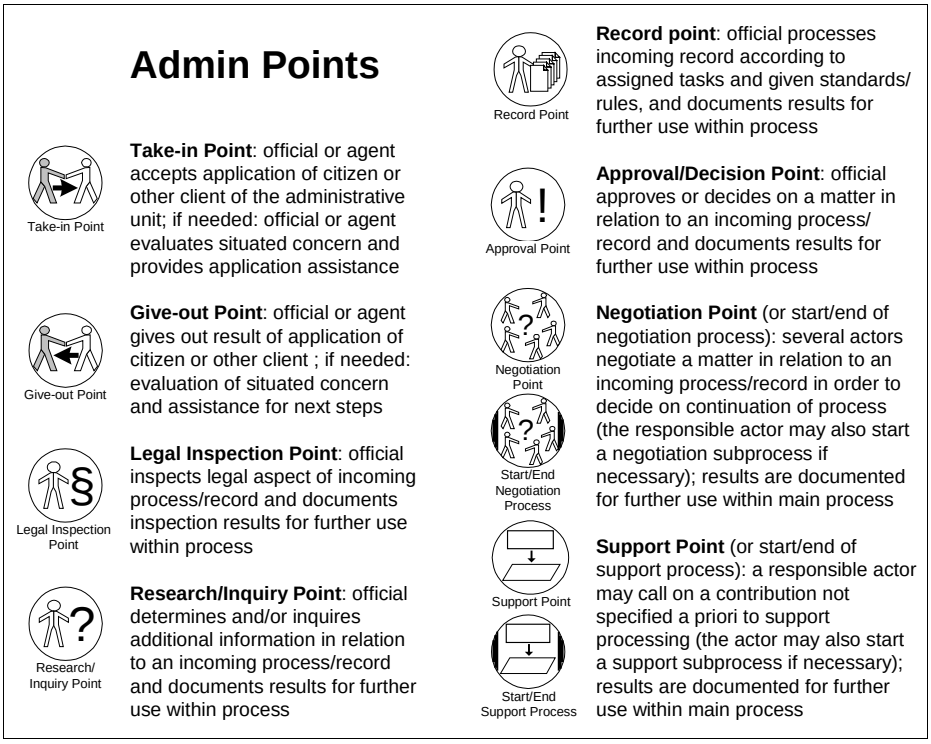

Fig. 2. Example of an admin point repertoire

Based on these ideas, administrative processes may be predefined as process patterns, i.e. a series of admin points (e.g. figure 3 denotes an admin flow for the postal vote application through the web portal www.hamburg.de). In practice, actors involved in administrative processes may use these patterns as a general agreement for standardised co-operation and, in each particular case, as a template for the process and for the related individual documentation.

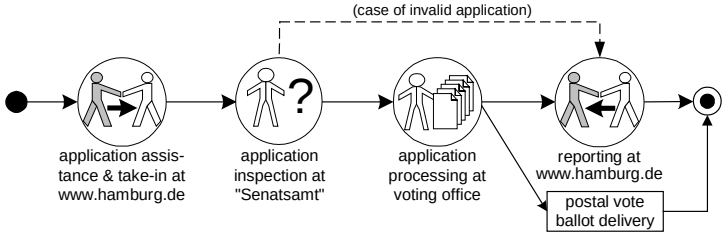

Fig. 3. Process pattern for postal vote (through the web portal www.hamburg.de) based on the admin point repertoire

Here, we can only briefly indicate how modelling of admin points and process patterns improves flexibility. While processing an individual case it is possible that, e.g.,

- the admin point schedule is predefined, but may be changed if necessary
- the task list at each admin point is predefined, but may be changed if necessary
- skilled work is needed to compare preconditions at each admin point with the accumulated postconditions of process history, and to decide about action to take
- skilled work is needed to document results at each point, in particular to compare actual postconditions with those premodelled and/or expected by other points

In addition, there are various ways of integrating negotiations into process execution:

- the point schedule is suggested, but may be suspended for negotiation (point or subprocess) any time
- the task list at each admin point is suggested, but may be suspended for negotiation (point or subprocess) any time
- skilled work is needed to compare preconditions at each admin point with the accumulated postconditions of process history, and to decide about action to take
- skilled work is needed to document results at each point, in particular to compare actual postconditions with those premodelled and/or expected by other points
- skilled work and/or legitimated decision is needed to evaluate negotiation results and to decide about course of process continuation

In practice, processes may be of mixed character. E.g. the postal vote application is well structured except for handling individual cases with unexpected characteristics revealed at inspection or at application processing (in rare cases these might involve negotiations). For many kind of processes (e.g. when an application for a building permit is filed) it is not clear at the outset if they relatively straightforward or not, and how complex they will eventually become.

3 Discussion

Aiming to provide a platform for collaboration across agencies and to design appropriate IT support for the variety of administrative processes and decision making, we need new approaches to understand and model such processes. We suggest to focus on the unique tasks and activities of each actor involved and to present the relation of each individual contribution to the overall process as something tangible in order to support flexibility through case-based contracting of process elements. Prior to modelling it is essential to comprehensively understand the work situations which unfold every time when an individual process is started. In these processes, process patterns based on admin points should serve as a guide, allowing for departures from the patterns at the discretion of human actors.

Reviewing the different types of work encountered in public administration (mostly based on professional knowledge and processing information), we find that not all types can be adequately described as processes, especially those having to do with organisational learning [3]. There, approaches from collaborative computing might be a better choice for modelling. E.g. in the case of multilateral negotiations, such as in the area of house construction and issuance of building permits, the situation can best

be rendered by assuming a platform for free collaboration where the architect, the owner and the issuing agency meet to discuss the relevant questions.

However, in most instances the process view is inherent in the nature of the work of public administration and also of the judiciary and of legislative bodies. It is always (except for individual actors trying to improve their knowledge without producing any tangible results) about delivering a product – mostly an informational product such as a legally binding administrative decision – to some actors in their environment, or to society at large. This implies that an input (demands, supports, legal constraints) is transformed through a conversion process into an output. It is therefore not advisable to model collaborative working situations without a process structure.

We do not expect that the modelling approach presented here will soon be adopted widely. It still needs further research and empirical evidence to (1) prove the feasibility of modelling admin points and admin flows in public administration, (2) provide guidelines as to the identification of process elements and the required granularity of modelling admin points and respective flow patterns, and (3) gain experience on the scope of the modelling approach and its (possible) impact.

Finally, we do not claim that the modelling approach exposed here is the only one possible permitting to escape from a view which implies the strict co-ordination of process steps and which treats human actors as simple executing agents. But we do argue that this approach offers more potentials for flexibility and for acknowledging the central role of human agency than any of the concepts applied up to now. A radical departure from standard workflow approaches is now required in order to achieve an integrative understanding of the work in the public sector and to avoid blocking opportunities for improving productivity, performance as well as working conditions.

References

1. Klischewski, R., Wetzel, I., Baharami, A.: Modeling Serviceflow. In: Godlevsky, M., Mayr, H. (ed.): Information Systems Technology and its Applications. Proceedings ISTA 2001. German Informatics Society, Bonn (2001) 261-272
2. Klischewski, R., Wetzel, I., Serviceflow Management: Caring for the Citizen's Concern in Designing E-Government Transaction Processes. In: Proceedings HICSS-35. IEEE (2002)
3. Lenk, K: Notwendige Revisionen des Geschäftsprozessdenkens. In: Maria A. Wimmer (ed.): Impulse für e-Government, Internationale Entwicklungen, Organisaton, Recht, Technik, Best Practices. Österr. Computer Gesellschaft, Wien (2002) 65-74
4. Lenk, K. Traunmüller, R., Wimmer, M.A.: The Significance of Law and Knowledge for Electronic Government. In: Grönlund, A. (ed.): Electronic Government – Design, Applications and Management. Idea Group Publishing, Hershey, London (2002) 61-77
5. Mowshowitz, A: Virtual Organization. Communications of the ACM, 40-9 (1997) 30-37
6. Wetzel, I., Klischewski, R.: Serviceflow beyond Workflow? Concepts and Architectures for Supporting Inter-Organizational Service Processes. In: Proceedings of 14th CAiSE (International Conference on Advanced Information Systems Engineering). Springer, Berlin (2002)