

DEVELOPMENT OF A POLICY-SUPPORTING SIMULATION MODEL OF THE RECORDS MANAGEMENT SYSTEM OF THE DUTCH PUBLIC AUTHORITIES

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ABSTRACT

The Dutch public authorities are confronted with large backlogs in processing the archives of their services. In view of this, the Ministry of the Interior, which is responsible for coordination of these processing activities, wanted to have a planning model for simulation, in a quantitative sense, of the archives movements within the public administration. The underlying thought was that such a model would enable problems in the fields of depot space, cost structure, allocation expertise and processing speed to be approached in a more adequate manner. A first exploration of the problem area (October 1984 - April 1985) showed that the quantitative problem of the processing backlogs is to a great extent affected by qualitative processes within the records management system and between said system and the client system. It was concluded that a planning model focused on quantitative factors cannot make an effective contribution towards solving the problems as the effects of measures aimed solely at efficiency will in the long run be affected adversely by qualitative processes. When the study was continued (September 1985 - April 1986), it was therefore decided to further investigate the processes of a more qualitative nature and to analyse their coherence. The results obtained provide a first step towards development of a simulation model for the records management system which, while supporting the relevant policies in this field, forms a tool for determining the effects of policy changes in the system both in the short and in the long run.

PROBLEM DEFINITION

In the Netherlands, each ministry has its own responsibility for the organisation of its records management system, the general framework being the guidelines formulated by the Ministry of the Interior for registration and archiving of documents entering and leaving the systems. In Figure 1 the flow of documents is shown. Regulations prescribe which of the documents are to be registered. These documents are subsequently distributed in the organisation, while they are also included in the dynamic archives. These may be located at a central point within the organisation, or they may be decentralised, depending on the organisation. As long as documents are being processed, they remain in the dynamic archives. It is an objective to keep this period limited to two years. After this, these documents are either included in the semi-static archives or destroyed. The semi-static archives are situated centrally in the organisation. Files may not be stored in the semi-static archives for longer than 20 years. After this period they are to be destroyed or delivered, after being purged, to the static archives of the Dutch public authorities.

The problem as originally formulated focused on the enormous backlogs in the processing of files in the semi-static and static archives. One of the causes was the huge increase in the number of documents since the sixties. As a result of this increase the responsible ministry, that of the Interior, groped in the dark as regards the expected supply of files and the times at which files are supplied. As a consequence, it was no longer possible to plan the requirements as regards space, financial resources and manpower. A solution was sought in the form of a planning model that can be used to simulate physical flows. It would have to take into account the automation of the records management system as experimented with by a number of ministries.

When the possibility of developing a planning model was being investigated, it was found that there are a number of vicious processes within the organisation that strongly affect the processing backlogs. Figure 1 shows that a qualitative factor like the records management discipline of the client system has an effect on document registration and on processing in the dynamic archives, and thus on the quality of the archives in the sense of accessibility and completeness. Shadow archiving, failure to register documents to be passed on, non-compliance with regulations, etc., have a negative effect on the quality of the archives and thus on the processing speed of the dynamic archives. The lack of records management discipline in the client system is caused by this system's negative image of the records management system.

Figure 2 represents the main processes that emerged in the exploratory phase in the form of coupled control loops. Depending on the quantity of personnel, there is a number of available man years that can be used for the following tasks: registration, archives processing and services.

The quantity of personnel is determined in part by the trust the client system places in the records management system. This can be translated as the value in use that the latter system has to the client system. If this value is low according to the client system, the archives department will, for instance, be the first one to suffer when savings are called for. More work will then have to be performed by less personnel, resulting in increasing backlogs and thus affecting the quality of the archives and the ideas the client system has of the value in use of the records management system.

The value in use depends on the quality of the archives in the sense of accessibility and completeness. Trust or value in use influences the communication between the client system and the records management system. Communication in this context should be understood to include an adequate exchange of information about bottlenecks, wishes and regulations. The quality of the communication affects the quality of registration as regards progress checks and the like, and this in its turn affects the quality of the archives.

The quality of registration is affected not only by the quality of communication and of regulations, but also by the quality of the clerical personnel, the method of registration and the number of man years available for registration. One of the

bottlenecks in this respect is the quality of the training of said personnel.

Together with the number of man years available for archives processing, the quality of the archives determines the speed at which archives are processed. If the archives to be processed are inaccessible or incomplete, the speed of processing decreases. At the same time, the number of man years available for processing decreases as more time is to be spent on services.

The backlog in archives processing increases not only because of the lowering processing speed, but also, and to a large extent, because of the increase in the last few decades in documents to be archived. This increase is to be attributed to social tendencies, increased complexity of records management, increases in the number of public servants, and the use of tools such as copying equipment. The increasing processing backlog may in its turn lead to deterioration of the average quality of archives.

In these vicious processes there are various points at which action can be aimed to eliminate bottlenecks. Such action may be directed at:

- the quantity of personnel, by hiring more people;
- the quality of personnel, by in-service training and/or improvement of the quality of training;
- the allocation of available man years to the various task fields;
- the quality of registration, by adjustment of regulations, introduction of new (automated) registration techniques, etc.;
- the communication between the client system and the records management system, by formally changing the level at which it takes place.

The causal relationships make it clear that the vicious circles are not unrelated but form part of a coherent whole. This implies that action aimed at only one of the vicious circles cannot provide a permanent solution to the problems identified, for the results of changes within one of the circles may in the short or the long run be weakened or strengthened by the other vicious circles. An integrated approach is called for.

This also implies that a planning model directed at quantitative flows and solutions in the sphere of efficiency is not an adequate tool. In the continuation phase of the study the problem definition was therefore shifted to the possibility of developing a simulation model supporting the relevant policies which the managers responsible for the records management system could use to gain insight into the effects of policy changes in the system in the short and the long run. In the following chapters the results of the continuation study and the first steps towards development of such a model will be discussed.

SYSTEM DESCRIPTION

Introduction

The continuation study revealed that processes at the management level of the organisation strongly affect the way that the clerical sector of the records management system functions. Historically viewed, these processes furthermore have grown into a fossilized culture, which seriously impedes any change processes. Below, the organic structure and the historical perspective will be outlined.

Organic structure

Figure 3 shows the overall organic structure in ideal form, together with some important relationships between its parts. The boxed section on the right-hand side represents the records management system, while the left-hand section represents the client system.

The records management system comprises three layers:

1. the clerical personnel;
2. the middle management, i.e. day-to-day operational leadership;
3. the top management.

The client system comprises two parts:

4. the public organisation
5. the top management of the entire organisation (Secretary General and Directors General).

Layer 1 of the records management system can be considered the organisation component in which the primary processes take place. Information is the major operational tool of any public body, and therefore this layer functions as a memory and conscience of the organisation. By means of registration and archiving, the clerical personnel controls the flows of information within the organisation. For proper functioning it depends on the interactions between the other layers.

In the ideal situation, the middle management acts as an adequate regulator between the clerical personnel and the top management of the records management system as well as between the clerical personnel and the public organisation. By maintaining the channels of communication it ensures that the top management of the records management organisation is provided with correct information on (bottlenecks in) the way the clerical personnel is functioning and, on the other hand, that the clerical personnel receives information from the top management about management decisions, etc. The middle management further keeps up the communication with the public organisation as regards complaints, measures, etc.

The top management of the records management system is responsible for representing the interests of the records management system towards the top of the organisation (layer 5). The latter, in its turn, is responsible for providing the proper resources (personnel, financial and other), enabling the clerical branch of the records management system to perform its duties in an adequate manner. If the top management of the records management system is able and willing to convince the

top management of the entire organisation of the importance of proper functioning of the records management system to the rest of the organisation, the latter top management will be prepared to make available the resources asked for.

In that case, the top management of the entire organisation will also propagate its recognition of said importance to the public organisation, which will be forced - if necessary by means of measures - to satisfy the conditions of adequate functioning of the clerical personnel. If the services of the clerical personnel to the public organisation are optimum and there is good communication between the middle management and the public organisation, the latter organisation will form a positive image of the clerical personnel, so that it will be prepared to meet the requirements posed by the top management of the entire organisation.

Historical perspective

In practice, the relations between the parts of the organisation are not as described above. The reasons for this should be viewed in the light of the historical perspective. Within the records management system a formal structure has evolved in which:

- job evaluation of the top management is in part determined by the staff allocated to members of this group;
- the middle management is given positions on the basis of the length of service and expertise rather than on the basis of (management) qualities;
- the individual potential for development, by job rotation, widening of experience, etc., of the clerical personnel is limited by detailed, narrow job descriptions and corresponding job evaluations and career possibilities.

On account of the formal structure that has evolved, interaction differs from that in the ideal situation as described above:

- middle management consists essentially of specialists that have a tendency to focus their attention on the elements from their disciplines in the clerical tasks, rather than provide the required channels of communication, for which they lack the necessary qualities. As a result, information does not come across, or is strongly filtered.
- since the power and prestige of the top management is determined in part by staff allocations and available resources, the game of musical chairs is constantly being played at that level. It goes without saying that this takes place at the expense of the work proper.

These structural aspects have grown into a fossilized culture with strong alienation aspects that affect the processes in the system. The model structure will have to take this into proper account, for such aspects make themselves felt whenever changes are introduced into an organisation. They take the form of long times required for adaptation because of the poor flexibility and possibly a great deal of resistance.

MODEL DESCRIPTION

Introduction

In the present phase of the study only the outlines of the model structure can be sketched. Parts of the model will be detailed in the form of flow rate structures. This chapter will be concluded by describing the progress of the study and the model development.

Model structure

The vertical line in the left-hand part of Figure 3 represents the system boundary that has been chosen. There are various reasons to draw this boundary only just inside layers 4 and 5. In the first place, an additional study would be required to describe the processes taking place in these layers and to model them adequately. In the second place, a study of phenomena in this part of the system, interesting though these may be, is beyond the scope of the order.

The detailed descriptions referred to will, therefore, relate only to the top management, the middle management and the clerical level of the records management system. The clerical level will be described in further detail than the higher levels, for at this level a number of lines converge that originate in the higher levels.

Top management

Figure 4 represents the processes taking place at top management level. The weight of the top is determined by the formal structure of the public organisation, the allocated staff and the available resources. These factors also determine to what extent the potential capacity is used on the game of musical chairs. Capacity use for musical chairs is increased by the degree of alienation existing between top management, middle management and clerical level. Alienation forms part of a vicious circle. When the game of musical chairs is joined, the capacity available for performing management functions will decrease and quality will deteriorate. At the same time, the quality of the communication between the middle management and the clerical level will deteriorate. This results in increased alienation and thus in more of the capacity being used for musical chairs. This completes the vicious circle. One of the side effects may be that the quality of actual performance of managerial tasks will diminish, which may affect the way the organisation as a whole functions. Because of these processes alienation may increase throughout the organisation.

From the structure as described the other parts of the model are influenced in two major ways, viz.:

1. the quality of communication and leadership to subordinate layers;
2. the procurement of support, notably cooperation (records management discipline) of the client system.

Middle management

The basic structure of the middle management is virtually identical to that of the top management. There are, however, some important differences. The manpower volume of the middle

management is determined not only by the formal structure of the public organisation and the number of staff allocated to it, but also by the geographical dispersion of the ministries. The alienation of the middle management mostly does not arise from musical chairs, but rather is the resultant of several factors. At this level, the poor communication with and the lack of support from the top management leads to a withdrawal into small "kingdoms". This effect is reinforced because the middle management has insufficient management qualities. Middle management selection takes place mainly on the basis of years of experience and expertise.

Alienation results in increased use of the available capacity for activities outside the scope of the work proper and in further withdrawal to familiar ground: that of the expertise. One of the major management tasks at this level, communication with the client system, is strongly neglected.

In the model structure as described above, the "law of conservation of misery" becomes apparent. The problems that develop in the top layer are devolved upon lower levels, to end up at the clerical level. The poor communication with the client system leads to inadequate establishment, execution and support of regulations and the ensuing formal duties. This gives rise to deterioration of the quality of registration and archiving. The above will be discussed in further detail in the paragraph on the clerical level.

One property of the "law of conservation of misery" is that the misery devolved upon lower levels in the end makes its way back up to the top. Each of the levels forms part of the vicious circles. Manifestation of the misery at the bottom level causes a deterioration in task implementation. This increases the pressure exerted on the middle management by the client system and by the bottom level. The middle management, shielding itself off, refers to the top. The top management is confronted with the poor functioning of the organisation and finds its own position endangered. Chances are that the top management will then take vigorous action.

Clerical level

The complexity of the structure and phenomena at this level justifies entering into more detail in describing the flow of documents, the personnel module, the quality module and the social variables.

Flow of documents

As starting points for a description of the clerical level, the physical quantities are chosen, viz. documents and persons. The physical quantities are described in a flow rate structure as variables of state that can be changed by other quantities. The flows of documents have already been discussed to some extent in the paragraph on problem definition (Fig. 1). The quantity accounting for the movement is the total flow of documents. Each transition of flows from one variable of state to another is determined by the (desired) residence time on the one hand and the processing speed on the other.

Figure 5 indicates that the processing speed is determined by

the effects of archives quality, number of man years used and labour productivity. The processing speed thus links the quantitative flows of documents with the other parts of the model: via the effect of archives quality to registration quality, via the number of man years used to the personnel module, and via labour productivity to the module in which social variables are described.

Personnel module

Figure 6 describes the structure for the clerical personnel. The desired number of personnel is computed from the work package divided by labour productivity for the following activities: services, registration and archives processing. A major limitation in the hiring policy is the staffing policy prescribed by the top.

The package of services to be rendered is determined to a large extent by the quality of the archives and the existing backlog in processing. These two aspects determine the average time needed to answer questions.

The distribution of personnel among the various tasks to be performed represents an important control parameter in the model. As shown in Fig. 7, in the existing system archives processing is regarded as work to be performed only when the demand for services and registration has been satisfied. The man years still available after these tasks have been performed, are spent on archives processing. The calculation of the required number of man years corresponds with the calculation of personnel requirements: work to be performed divided by labour productivity. For allocation of the available man years alternative formulations are possible.

The basic dynamics for the clerical personnel are the same as those for the top and the middle management.

Quality module

The quality aspects of the flows of documents are described as a co-flow of the physical flow of documents in the model structure (Fig. 8). Quality comprises two aspects: completeness and accessibility. The dimension to be used for these in the model will be decided upon in the next phase of the study.

The moment at which it is decided to register, the first step of the total process, determines the quality of the following steps. Registration takes place upon receipt of the post, use being made of formal characteristics. One part of the post is registered, another one is not. The registration method used is the multicopy system (cards) and associated methods. This method is aimed primarily at document registration and document management and is suitable mainly for registration of information relating to policy and less so for information relating to established, well-defined procedures having a more or less fixed time path (e.g. subsidy regulations). The amount of management information is estimated to account for 5 to 10% of the total flow of documents to be registered. This implies that a method is used for the entire flow which in principle is suitable only for a relatively small part. By means of the simulation model in the following phase of the

study the effects of a different registration method can be calculated.

Social variables

Besides the classical production factors such as capital and labour, human properties of a more qualitative nature may also be considered essential production factors. Without professional knowledge and organisational cooperation there is no way a production system can function.

As shown in Fig. 9, professional skills are built up of two components: formal knowledge and experience. Someone may have a complete insight into the nature of the techniques to be employed, and also have thorough knowledge of the procedures, yet without experience he may be helpless in an organisation. Time is of the essence, literally, if the missing part, experience, is to be obtained. This applies not only to production-directed activities and to the ability to cope with unexpected events, but also to assessment of the quality of the work performed.

Formal knowledge and experience are regarded as variables of state or stored quantities. The (applicable) formal knowledge can be increased only through an active learning process of the personnel. The difference between desired and available formal knowledge is not eliminated instantaneously: there always is a delay. It will take a certain time to attend courses, etc., but the delay is caused also by the fact that available knowledge disappears for a number of reasons: skilled and experienced people leave the organisation, knowledge can no longer be used or becomes superfluous, for instance due to introduction of new techniques; knowledge acquired is not used regularly, giving rise to a slow fading process.

Identical dynamics can be described for the increase in experience, but there is an interesting difference. Experience can be regarded as informal knowledge acquired in practice. Direct contact with practice, i.e. exposure to the technique adopted, appears to be the predominant factor for people possessing adequate knowledge. When the job to be performed is narrowed, for instance, the necessary exposure decreases, causing a long delay in processing of experience. Too large a degree of labour distribution may have a counterproductive effect, and in the long run it may give rise to more rigid communication procedures. This will detract from the capability to adequately solve unexpected problems.

The extent to which personnel will use its professional skills for production purposes will depend on the formal and informal organisational conditions and on the degree to which formal and informal objectives coincide.

Development of the simulation model

The model description of the system's structure makes it clear that the behaviour of the system is determined by various processes that interact in a complicated manner. This has the following consequences for action aimed at the structure of the system:

- Random interventions aimed at one quantity have little effect and may even be disastrous for the system, for no consideration is given to other processes affecting system behaviour. Unilateral intervention may result in reinforcement of the negative aspects of the system, and even in wrecking of the system, by these processes. It is, therefore, necessary to take action aimed at several quantities simultaneously.
- Action must not be based on a short-term policy. In many cases it will take a long time before the effects of action on quantities become visible. This must be taken into account in the management strategies to be adopted.

Further development of a simulation model is desired to provide the responsible managers with insight into the coherence and the consequences of management strategies. To this end, in a following phase of the study the model structure is to be further refined, quantified and validated. At the same time, however, it must be ensured that the responsible managers recognize the usefulness of a simulation model and support its development. This means that they will have to be closely involved in the development process, as otherwise there is a high risk that an instrument is created which the intended users do not wish to employ.

CONCLUSIONS

The study shows that the records management system of the Dutch ministries is in a turbulent situation. Several causes can be identified:

- from the client system and from within the own organisation, the records management system is considered to function inadequately. This leads to various management decisions aimed at improvements;
- the records management system has increasingly become a focus of interest because of the automation drive;
- the automation drive is reinforced because automation is regarded as a technical solution to a large part of the problems within the records management system;
- automation of chaos does not yield anything but automated chaos.

The turbulence referred to has resulted in a need to gain insight into the total complexity of the problem area as described here. This need has been reinforced because the various paths followed, or intended to be followed, to arrive at a solution fail to yield positive effects on the system's functioning, or yield effects that are not as strong as expected. The following causes can be indicated:

- action is taken to modify one point of the system, without taking into account the offsetting counterforces;
- the analysis reveals that the interaction between the records management system and the client system is determined by the importance that the client system attaches to proper functioning of the records management system and, derived from this, the willingness to submit to the records management discipline. If it is not recognized

that proper functioning of the records management system is important to the way the entire organisation functions, then the effect of measures aimed at improvement is adversely affected by the client system's unwillingness to cooperate.

The first point indicates the need to continue developing a policy-supporting simulation model that can be used to check the correctness of alternative policies and to test them for their implications in a "laboratory situation". The second point indicates that the development of a simulation model as an instrument in support of policy will be useful only if the relevant managers subscribe to the importance of proper functioning of the records management system and realize that it is useful to develop such an instrument. This calls for two parallel processes: development of the model and an intensive exchange of information between those performing the study and those affected.

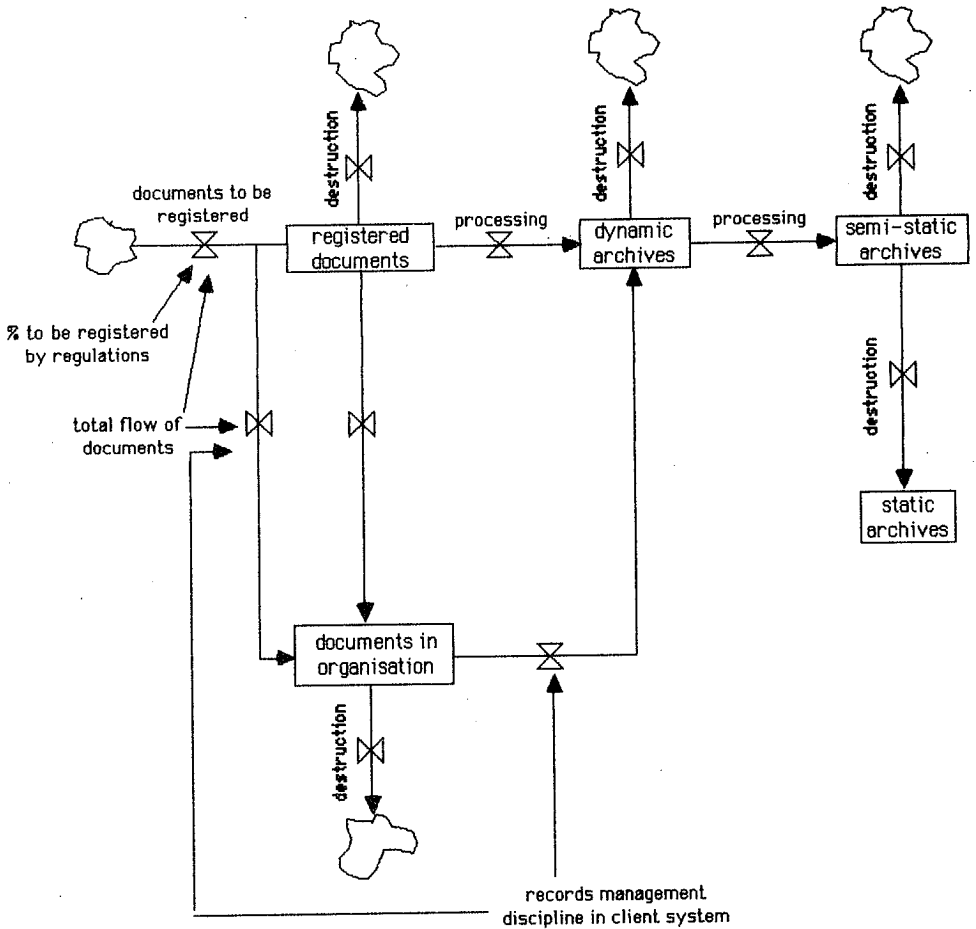


Figure 1: flow of documents

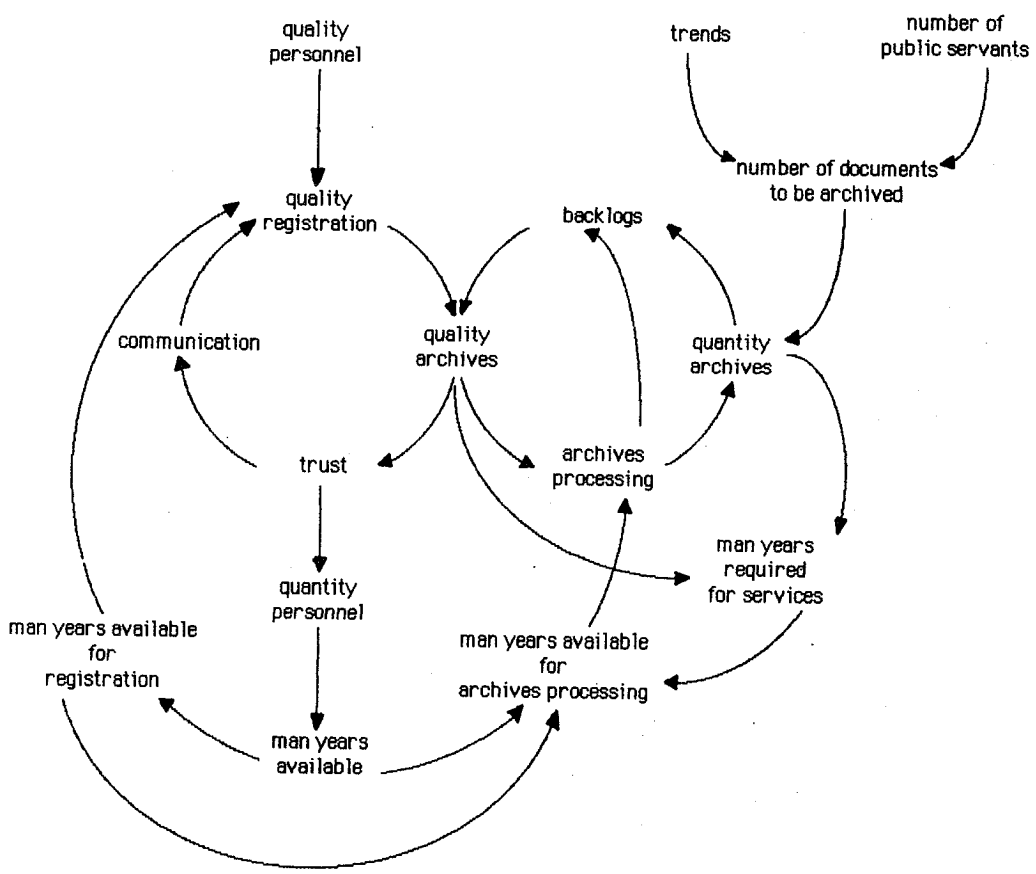


Figure 2: summary of exploratory study

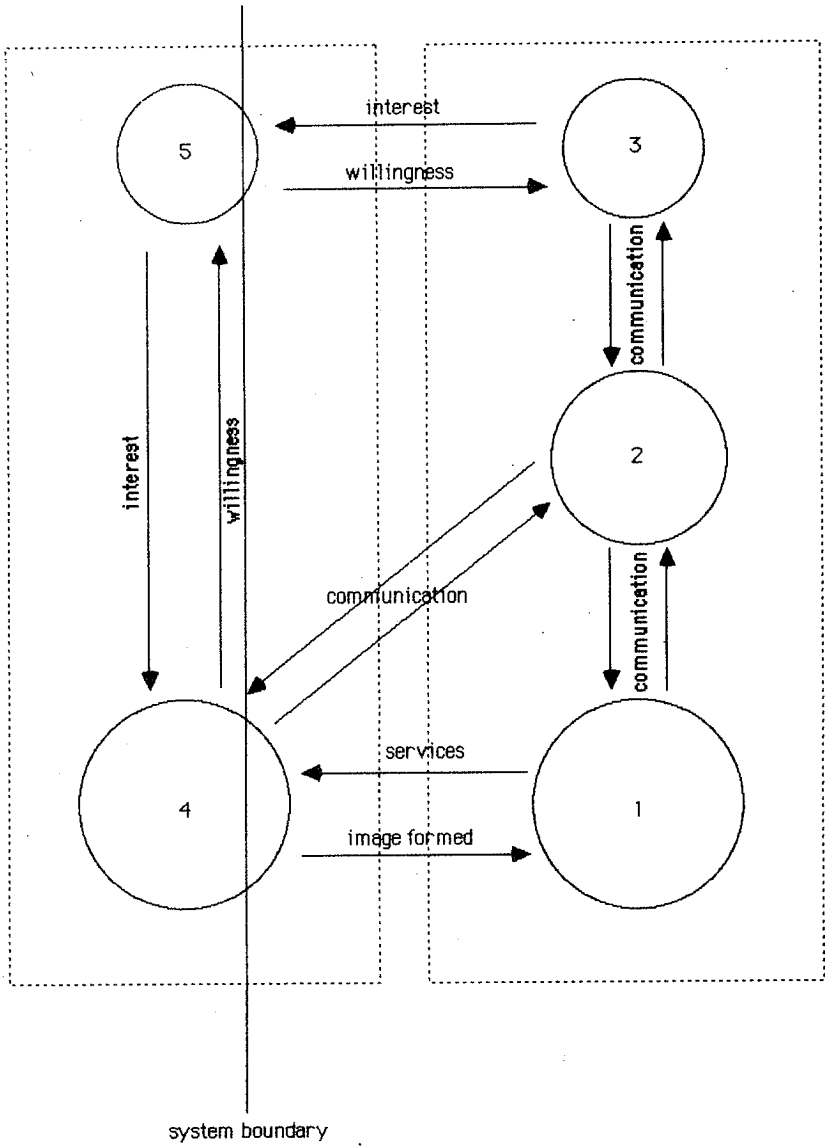


Figure 3: organic structure

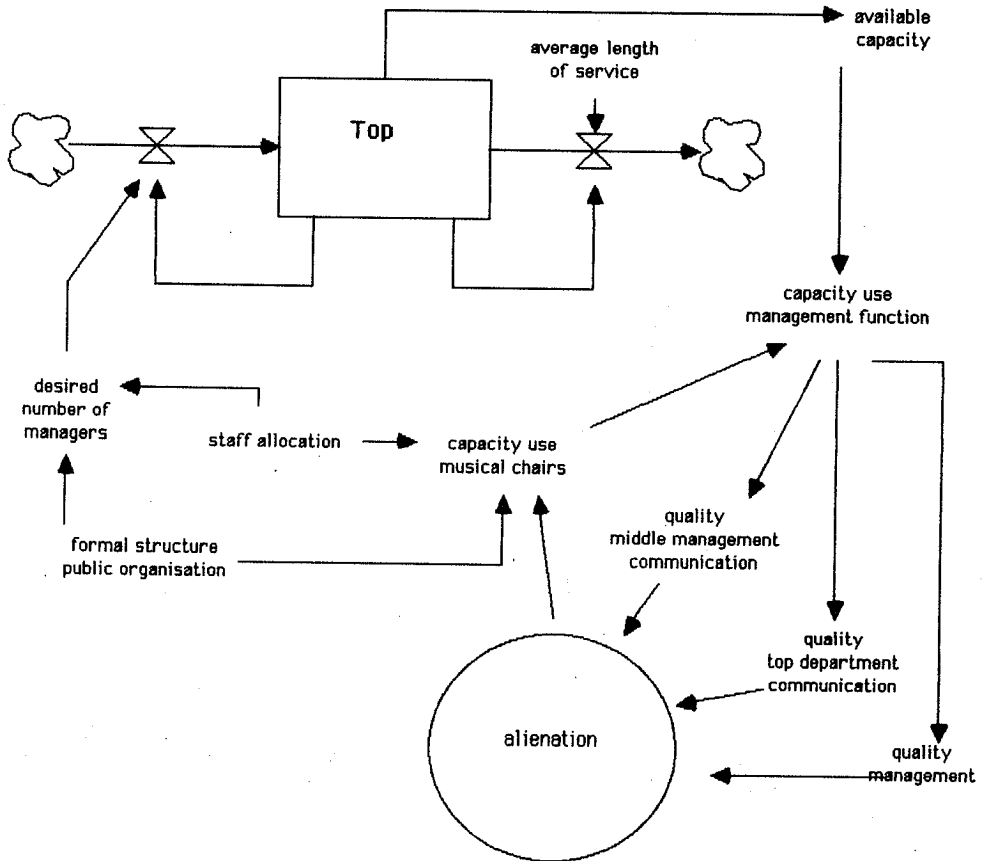


Figure 4: top management

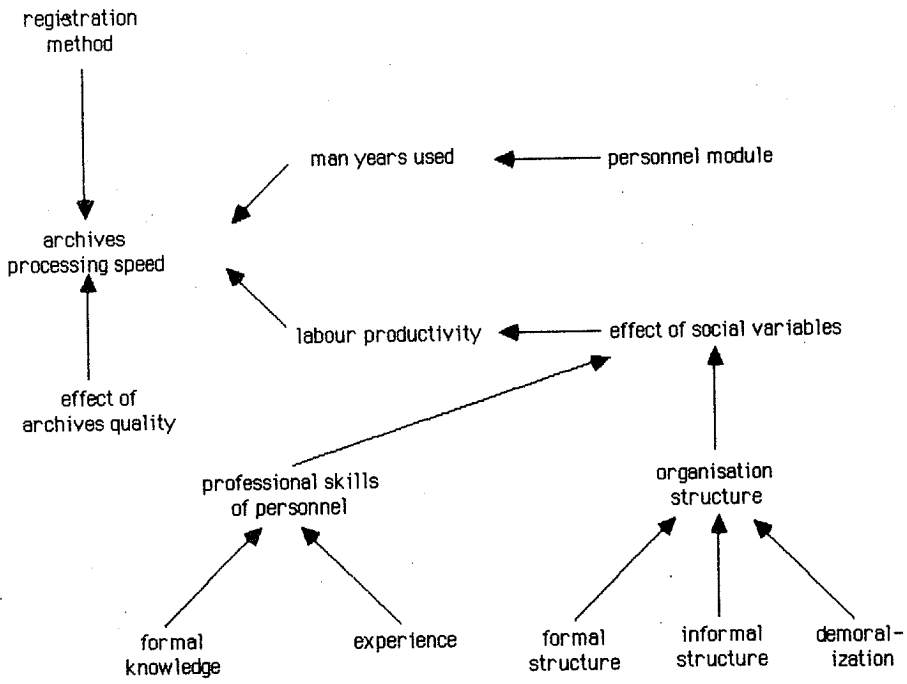


Figure 5: processing speed

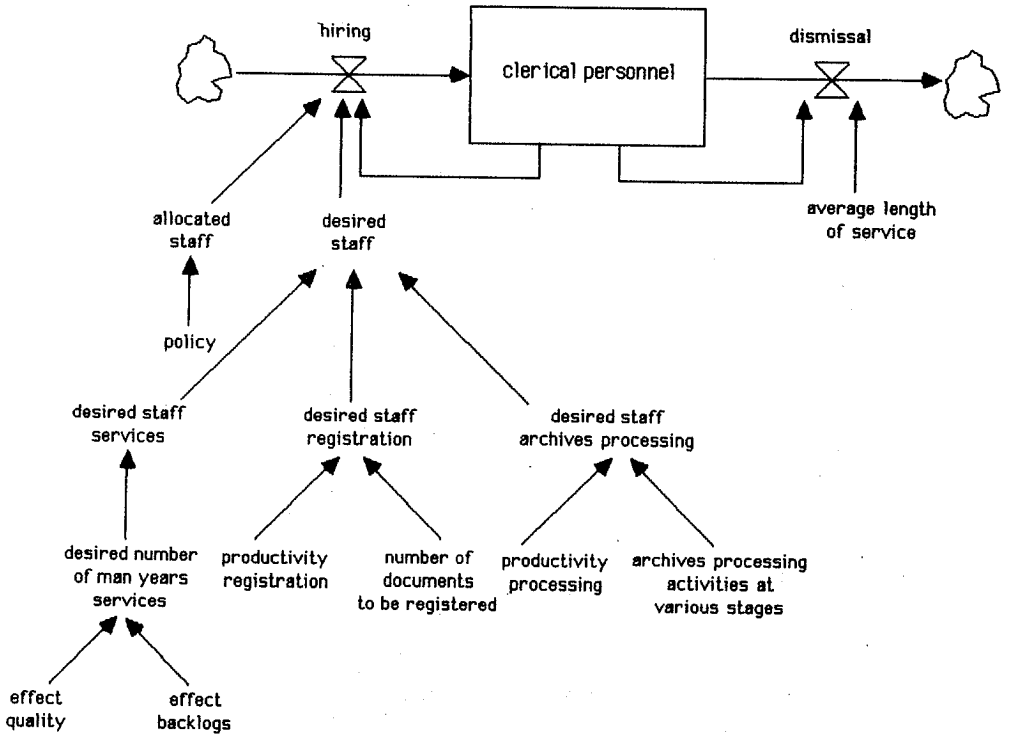


Figure 6: personnel module

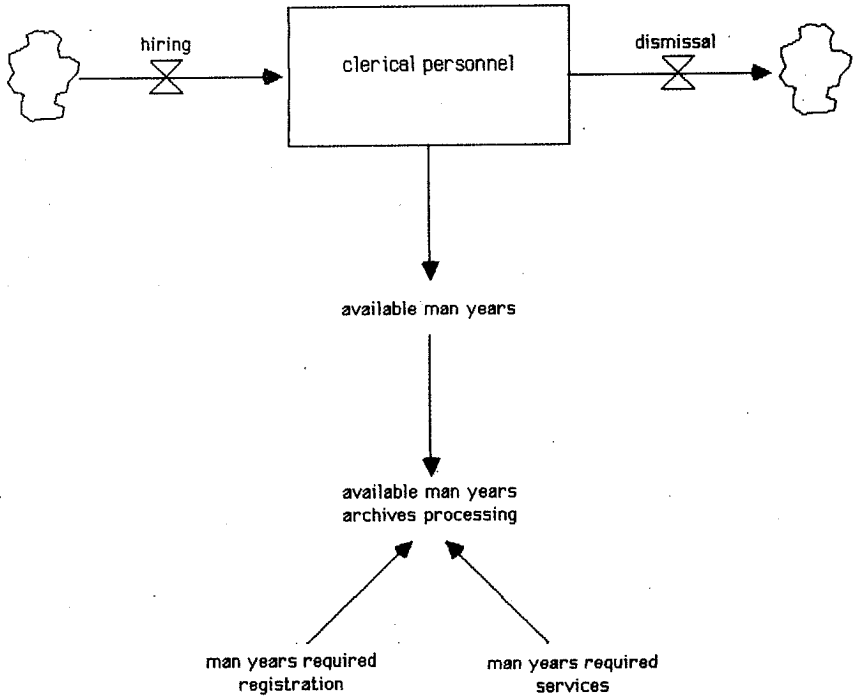


Figure 7: task allocation

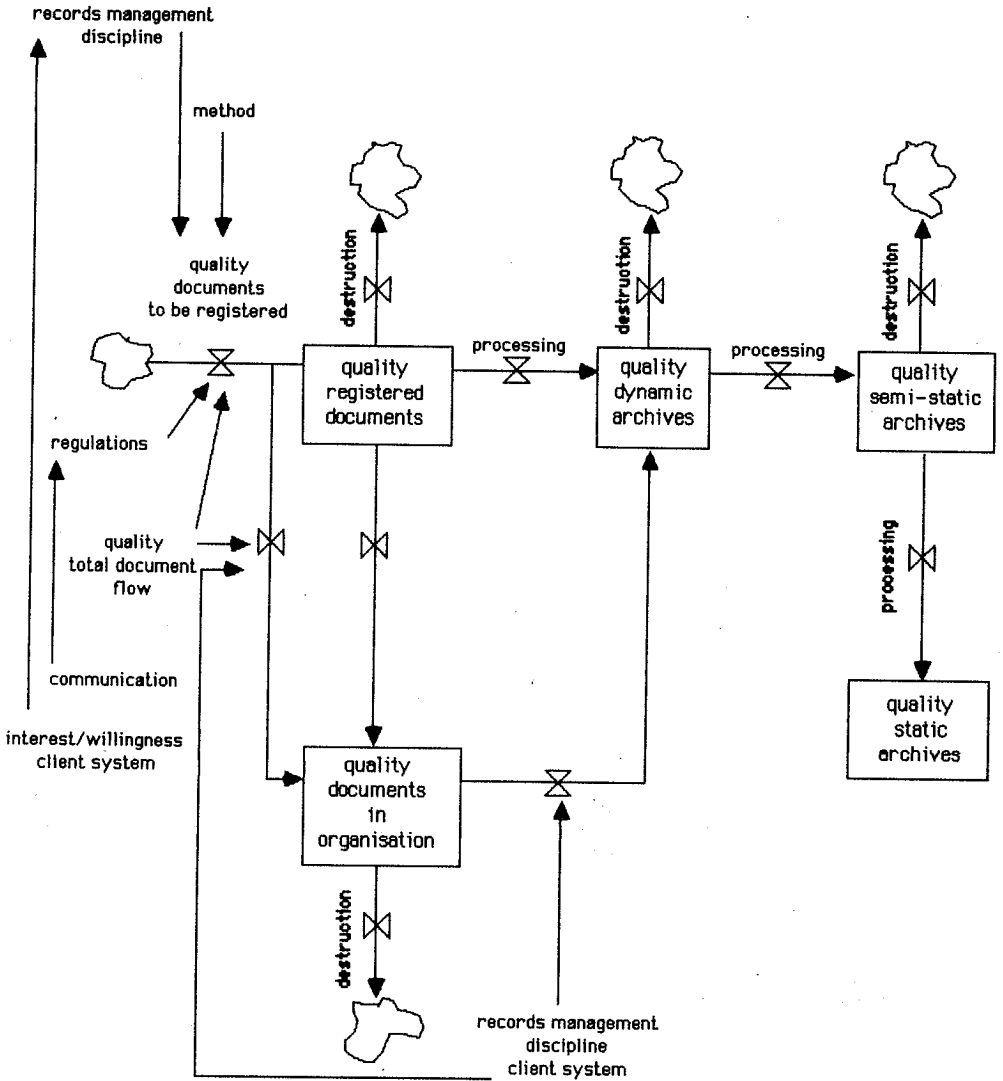


Figure 8: quality module

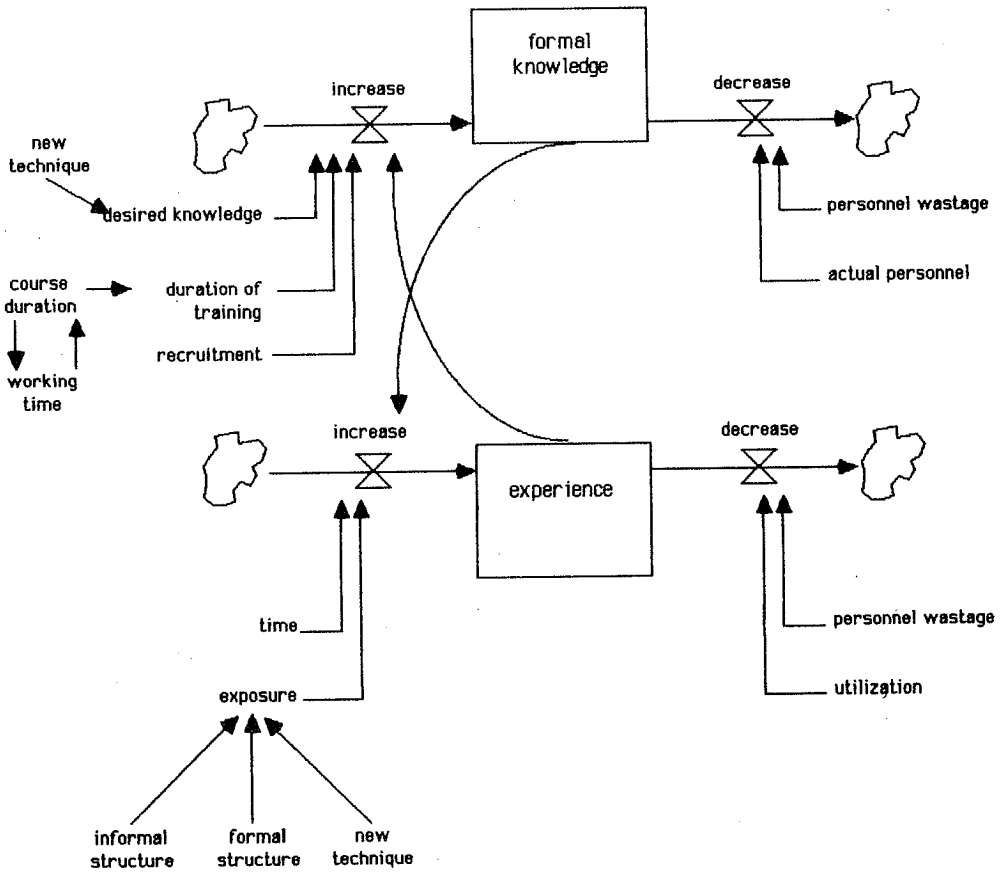


Figure 9: social variables