
Municipal Administrators at Work – Information Needs and Seeking (IN&S) in Relation to Task Complexity: A Case-Study amongst Municipal Officials

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ABSTRACT

Task complexity, in terms of perceived a priori determinability, affects the types of information needed in tasks based on a motion submitted by the inhabitants of a town. Information which is connected solely to the task in hand (i.e. task information) is sufficient in most of the tasks. However, as the tasks becomes more complex task completion requires to a greater degree information which is useful in several tasks of the same domain (i.e. domain information). Instrumental task-solving information is nearly always unnecessary. Furthermore, most of the information needs experienced by municipal officials seem to be well-definable and routinely satiable. The increasing complexity leads to the increasing use of information sources and the usage of different types of information sources. Document sources are the single most frequently used information source type in the most simple task category, whereas the usage of persons as information sources increases drastically at the expense of document sources in more complex tasks. The results are based on a preliminary analysis of 38 original task performances by municipal officials of two Finnish towns. Multiple data gathering methods are utilized.

INTRODUCTION

The research objective considered in the present paper is the effect of task complexity – in terms of perceived a priori determinability – on information needs and seeking (IN&S) in a professional setting. It is based on an ongoing case-study which is carried out in a local government setting. The research objective has been chosen for two main reasons. First, task complexity enjoys the acknowledged position as one of the most crucial factors affecting task performance within psychological and organizational studies (e.g. March & Simon 1967; Daft & Macintosh 1981; Campbell 1988). Second, it has been only seldom studied within IN&S research (e.g. Culnan 1983; Tamiyu 1992; Zeffane

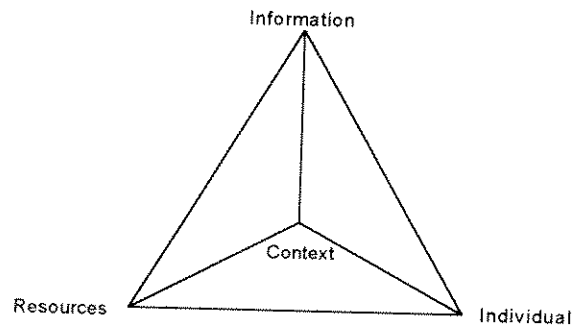
& Gul 1993) and even more seldom on the basis of single tasks in their real environments. The local government setting was selected mainly because it is clearly an information bound setting and because it is likely to cover several levels of task complexity (cf. Byström & Järvelin 1995).

The presentation begins with an overview of the state of information needs and seeking (IN&S) research. Common dimensions and different perspectives of the research area are highlighted. This is followed by a framework for the present study. IN&S is first considered as a process and then as a part of the larger process of task performance. Two widely applicable categorizations are presented: a task categorization and an information type categorization. Thereafter the research method for the present study is considered. It combines both qualitative and quantitative approaches and utilizes several data gathering techniques, and the data is analysed by a process-analysis method. After that the progress of the study is described. Since this is an ongoing study the results are tentative. However, some clear tendencies have emerged. Finally, the research method and the results are discussed.

THE FIELD OF INFORMATION NEEDS AND SEEKING RESEARCH

Information needs and seeking (IN&S) research has over the years emphasized various dimensions and taken different perspectives. An illustrative pyramid diagram for the research area of IN&S is presented in Figure 1. Each corner of the pyramid represents one of the four main dimensions emphasized in both theoretical and empirical IN&S studies.

FIGURE 1
Illustrative pyramid diagram for the research area of IN&S



One corner of the pyramid is occupied by resources or means (e.g. information systems, information services, information channels and information sources), another by information (e.g. type of information, content of information, usability of information), third by individuals (e.g. cognitive style, information seeking style, wide/narrow information profile, and motivation), and fourth by contexts (e.g. different work organizations, jobs, projects, or tasks, and everyday life situations). The nearer the middle point of the pyramid a study lies the more equally all dimensions are considered. Moreover, the pyramid can be contemplated from different perspectives. Thus the same research problem (e.g. the use of commercial databases) might be quite differently treated if the overall perspective varies (e.g. the perspective of systems or contexts).

Often IN&S studies concentrates on a single dimension from a single perspective. The more holistic research approach, the better the different dimensions as well as the perspectives can be considered. This seems to be a fruitful direction because it enables us to more thoroughly understand the IN&S phenomena. That understanding not only provides a solid platform for the development of information systems for certain contexts, but it also gives a solid platform for the development of the information behaviour itself in the contexts studied. This direction is pursued in the present study.

INFORMATION NEEDS AND SEEKING AS A PART OF TASK PERFORMANCE

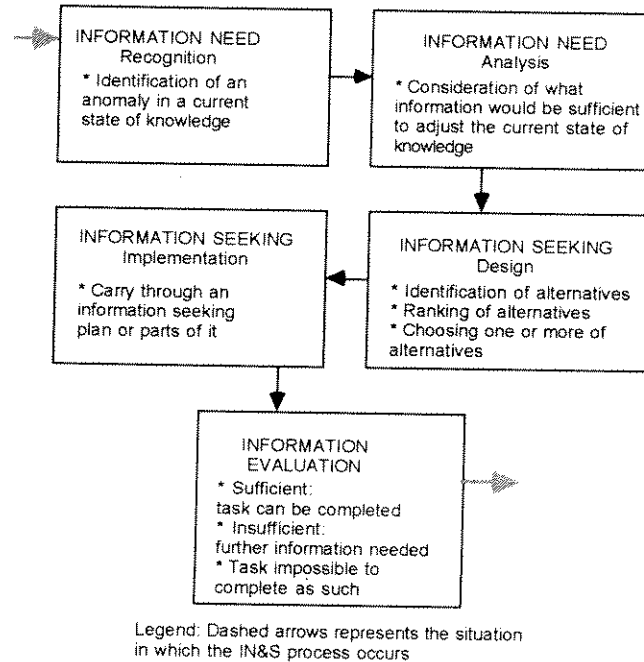
The information needs and seeking processes

Several IN&S researchers look upon information seeking as a process (e.g. Rouse & Rouse 1984; Wersig & Windel 1985; Dervin 1992; Kuhlthau 1991, 1993). A model of IN&S process (Figure 2) is based on an information seeking model by Feinman et al. (1976; cf. Mick et al. 1980). The model is constructed for professional settings, although it might be useful in other settings too. An IN&S process is launched by a matter which an individual has to attend to, but which she is not able to take care of at her current stage of knowledge.

The IN&S process begins with the recognition of an information need, or a Belkinian ASK, by an individual (cf. Belkin, 1980). After the recognition she tries to resolve what it is which is needed to cope with the current matter. Thus, the information need is by nature subjective: it focuses on the information which the individual considers as adequate for the matter, but which she cannot, or does not reckon to, cover with her prior knowledge (cf. Wersig 1973). Naturally, the information needs can vary between precisely specificable and very vague (Belkin et al. 1982). But if the individual recognizes an information need, she most likely is also able to outline it at some level.

Information need analysis is followed by information seeking design in the IN&S process. This phase incorporates the identification of possible information seeking channels and information sources, their ranking and the choosing of applicable alternative(s). The information seeking channels guide, or are

FIGURE 2
An IN&S process for professional settings¹



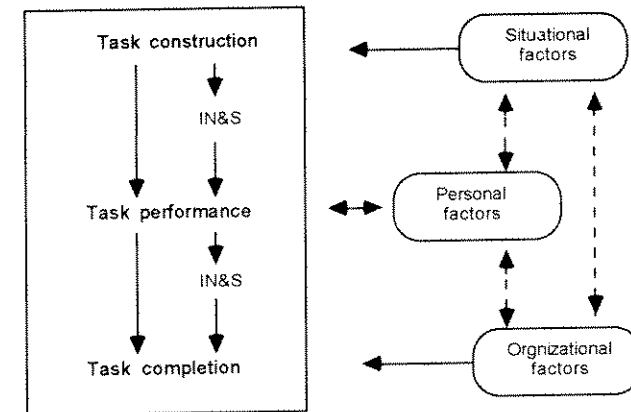
supposed to guide, the information seeker to the information sources which contain, or are supposed to contain, the desired information. She moves to the implementation of the chosen alternative(s) at the next phase of the process.

The IN&S process is concluded with an evaluation of the information gained in relation to, not primarily the information need experienced, but the original matter attended (cf. Dervin's sense-making triangle). Thus, even though the gained information would satisfy the experienced information need perfectly, the IN&S process might still not be over. This could be the case, for example, when the initially experienced information need does not cover all necessary aspects of the original matter to be resolved. Depending how well the gained information corresponds to the original matter, the IN&S process is either over or continues at a suitable phase (i.e. information need reanalysis or information seeking redesign). The IN&S process are likely to be interrupted whenever it is deemed unsuccessful.

The task performance processes

Task performance is also a process and it might include several IN&S processes (Fig. 3). The task performance begins with the – more or less conscious – task construction by its performer. Already at this phase the first information process of the task performance process may commence. If the performer considers her task construction too vague, additional information might be needed to clarify the preconditions. The IN&S processes are characteristic for the next phase, the actual task performance. Only one IN&S process can be sufficient in cases where the information requirements are well known. If information requirements are more unfamiliar several IN&S processes might be needed. When the task performer has collected enough information she continues with information processing and possible execution at the task completion phase.

FIGURE 3
A task performance process



Task performances are clearly contextual. They are affected by personal, organizational, situational, and even cultural factors. These factors do not have to be in a direct connection to the task. This also applies to IN&S processes which, furthermore, are characterized by the nature of the task itself. Examples of personal factors which formulates IN&S processes are motivation (e.g. Humphreys & Revelle 1984) and personal information seeking style (e.g. Ramamurthy et al. 1992). Organizational culture and resources are some of the organizational factors affecting on IN&S processes (cf. Salancik & Pfeffer

1978; Hjørland & Albrechtsen 1995). Situational factors (e.g. a lack of time) are characteristically incidental by their nature (e.g. Murtonen², 1992).

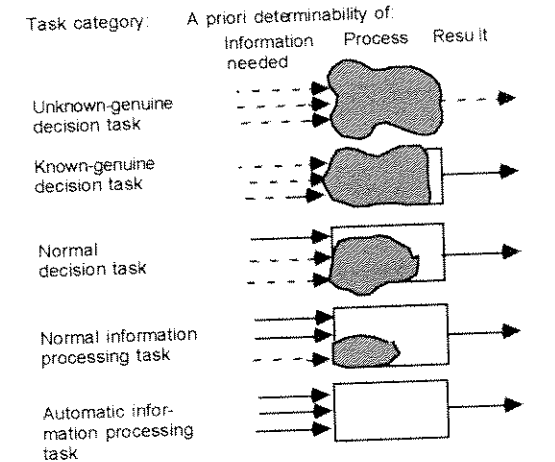
The task categorization

Hackman (1969, 97) wrote that "tasks play an important role in much research on human behavior, and differences in tasks and task characteristics have been shown to mediate differences in individual and social behavior". This has been acknowledged in IN&S research (e.g. Belkin et al. 1982; Taylor 1991; Ingwersen 1996) and numerous studies have already considered the effects of work on IN&S. However, this has been done on a basis of jobs rather than single tasks, especially if the laboratory experiments are excluded. One way to conceptualize a task is to see it as an object of worker's duty. A task is an abstract construct which becomes observable through its performance. Task performance includes physical and/or cognitive actions which have a recognizable beginning and end.

Task complexity has been bound to several factors in the literature. Some common factors are: repetitiveness, analyzability, variety, uncertainty, amount of cognitive and skill demands, multiplicity of possible actions, multiplicity of goals, changes in tasks during performance, activity duration, and outcome novelty (e.g. March & Simon 1967; Van de Ven & Ferry 1980; Daft & Macintosh 1981; Hart & Rice 1991; Zeffane & Gul 1993; Tiarniyu 1992; Tushman 1978; Kuhlthau 1993; Iselin 1990; MacMullin & Taylor 1984; Campbell 1988; Wood 1986). These factors can be divided under two headings: a priori determinability of task and extent of task.

A simple, uni-dimensional task categorization which applies to most professional settings is adapted from the information system design literature (Tietosysteemin ..., 1974). The task categorization covers tasks of the most a priori determinable types to the highly unpredictable types (Figure 4). The a priori determinability is considered in terms of task outcome, process and inputs (i.e. information requirements). There are five complexity categories: automatic information processing tasks, normal information processing tasks, normal decision tasks, known-genuine decision tasks, and unknown-genuine decision tasks. The most a priori determinable task category is the one for automatic information processing tasks: there are clear and comprehensive rules and directions for tasks performances. Nothing is left to a case-based consideration, or nearly so. Tasks belonging to the most unpredictable category, the unknown-genuine decision tasks, are unexpected and very vague: there is no established practice to follow or the performer is unaware of their existence. These tasks become structured in the course of their performance and therefore they are highly dependent on a task performer's discretion.

FIGURE 4
Task categorization (adapted from Tietosysteemin ..., 1974)



Legend: the a priori determinability is represented by solid arrows and solid boxes; the case-based consideration is represented by dashed arrows and shaded-in boxes

The information types needed in a task

It is widely agreed that information is transferred in the communication chain from its generator to its recipient, that it is a set of symbols brought together (e.g. letters, numbers, pictures, signs), and that it can be transferred in any physical or electronic form (e.g. written, oral, gestured). However, there are several features on which there is no agreement: the demand of intentionality, the demand to change the recipient's state of knowledge, the demand of novelty for the recipient, the demand to be a truthful part of somebody's knowledge etc. Wilson (1981) argued at the beginning of the 1980's that the real problem is not the multiple meanings associated with the term information but rather the undefined use of the term in single studies.

The suitable perspective for the present study is to consider information from a task performer's standpoint. Naturally, various kinds of information are

transferred in a work context, for example, information to fulfil single tasks, information to maintain a professional status, information to satisfy social needs, etc. As the study concentrates on IN&S processes in single task performances the information for these processes becomes central. Information is here seen as an abstract tool which enables the task performance, or – at least – is intended to do so. It can be whatever set of symbols in whatever form and it is not bound by any demands for novelty or truthfulness, but is viewed on a purely functional basis.

Consequently, information can be classified according to its applicability to tasks. Thus, information categories in this study are task information, domain information, and task-solving information (modified after Barr & Feigenbaum, 1981; cf. Järvelin & Repo, 1983, 1984). Task information satisfies information requirements considering only a certain task, whereas domain information satisfies common information requirements of several tasks of the area in question. Task-solving information is instrumental: it satisfies information requirements as to how to perform a task. As the task categorization explicated above, the information type categorization is also applicable in several contexts.

THE RESEARCH METHODS

The research method arrived at combines both qualitative and quantitative approaches and it is applied from the participants' point of view. Data is collected by diary, interview, organizational document review and observation methods. The process-analysis method is applied for the analysis of the collected data. The analysis method is based on a sequenced scrutiny of task performances: the task performances are divided by topics (i.e. a priori determinability of the task, information needed), after which the topics are scrutinized each one as such and also in relation to the other topics.

The data gathering methods

Task diaries are divided into two parts. The first part is semi-structured and its purpose is to record the initial stage of task performance. Participants are asked to describe minutely the task they are attending to, the information needed for completing it, and the realistic means to acquire that information. Furthermore, they are asked to estimate their expertise in a current matter, their awareness of the information and performance demands of the task, and the complexity of the task. The second part of the task diaries is unstructured. The participants are just asked to make notes about the stages of the task performance and the ways of gathering the information when working with the case. The participants are also encouraged to write down any notions which the task performance brings to their minds.

After the completion of the task an interview is made of it. The idea of the interviews is on the one hand to minimise misunderstandings, complete and

amplify the data collected in the task diaries. Furthermore, the participants are asked to make a subsequent estimation of the task complexity. A task classification based on *a priori* determinability is presented to them and they are requested to classify the task. On the other hand interviews makes it possible go further than the task diaries and discuss the task performance on the participants' terms.

Additional interview, or discussion, takes place later. The issues here are participant's work (e.g. description and opinion of it, factors affecting it), the work related to information (e.g. crucial information for work, inaccessible information, information resources organized by the employer and the participant), and participant's background (e.g. title, education, experience). The possible implications of participation in the study are also considered.

In order to become more familiar with the organizational structure and its culture, attempts are made to learn from organizational documents and observations of decision-making processes in the organizations studied. Because of the public nature of the local government organizations, there are a lot of documents describing both the procedure principles and the single cases themselves.

Observation was omitted as a primary data gathering method, because the participant's task performance is usually fragmentary, i.e. task performance might be completed in sections during several days, or even months. Thus, the task performances are difficult to cover by observation. However, observation is applied to study the decision-making procedure in practice. Thus it will serve as a validating method to ascertain that what is collected by the task diaries and the interviews also corroborates to the overall picture.

The process-analysis method

A process analysis method is based on a scrutinizing of different parts of task performance. The task performance is divided among other things under the following topics: *a priori* determinability of the task, expertise in the current matter, ambition level, performance duration, task complexity, information needed, and information sources utilized. Each task performance is examined and all data concerning a given topic – notwithstanding the data gathering method – is collected together. Tasks are classified according to the *a priori* determinability to the five task categories (Figure 4). Different parts of task performance are then ready to be examined within each task category and different task categories can be compared with each other.

There is one more classification which is utilized in the analysis in addition to the task categorization and the information type categorization, namely an information source classification. This classification is contextual: it is tailored for local government settings. Information sources are classified as (1) *people concerned* (e.g. people initiating, or affected by, administrative actions), (2) *experts* (including knowledgeable colleagues), (3) *literature* (e.g. books, reports,

journals, newspapers), (4) *official documents* (e.g. agendas, meeting minutes, letters, applications, memoranda, maps, unpublished planning documents), (5) *registers* (manual and computerized catalogues and files), (6) *commercial databases*, and (7) *meetings* (more than two persons present). Furthermore, information sources are divided into external and internal sources according to their location (cf. the internality/externality determined by the origin of the information source). All information sources which are obtained inside the organization are classified as internal, otherwise they are external.

PROGRESS OF THE STUDY

The empirical research is being carried out mainly in Tampere (appr. 200 000 inhabitants), the third largest town in Finland. Some research material has been collected in the town of Pori (appr. 80 000 inhabitants). All participants are municipal officials whose duty it is to prepare a given case for the decision-making organs of the town, i.e. the town council, the town government, or the municipal official with the executive power. The tasks of the sample are based on motions submitted by the inhabitant(s) or organization(s) of the two towns (except a few tasks provided by the participants from Pori).

The primary empirical research in Tampere followed a tentative pilot study carried out in Pori. Because only minor changes were made on the basis of the pilot study, this material was also included in the analysis. The study progressed as follows: Six Pori officials agreed to participate in the pilot study. They were contacted and the purpose of the study as well as the data gathering methods were explained to them. The participants were asked to choose one or two tasks to follow by task diaries. Altogether eight task performances were recorded. Participants were contacted – and they could also contact the researcher – during their task performance. One participant was observed for two days. The participants were interviewed after task completion: data in the task diaries were corrected, completed and clarified. The participants were asked to make a subsequent estimation of the perceived task complexity. A task classification based on a priori determinability was also presented to them and they were asked to classify the task. The interviews took place in the participants' offices and these situations were also utilized for observation.

The primary empirical research in Tampere proceeded in the same way except the selection of tasks and participants. It was decided that all new matters which the town received via its registrar's office during a two week period and which necessitated decision making were taken under surveillance. This meant that the participants could not be selected beforehand but were contacted as they received the matter for preparation. So far have 30 matters went through the decision-making process via twelve municipal officials. There are still about fifteen cases, of which two are in preparation of work teams, in process. The second interview round is still ahead.

PRELIMINARY RESULTS AND CONCLUSIONS

The results presented below are based on the task diaries and task interviews of the 38 tasks which performances have been completed so far. The allocation of these tasks into the task categories by the participants is presented. This is followed by a scrutiny of the information needed in the task performances and the acquisition of this information. First, overall pictures of these IN&S aspects are mapped. Second, the analysis is made more precise by an examination according to each task category.

The complexity of the tasks

There were 14 tasks perceived to belong to the task category of the most a priori determinable tasks, i.e. automatic information processing tasks. They all were provided by participants from Tampere. It was very clear for the participants what information was required to cope with the tasks. The average of the perceived clarity of information requirements of the tasks was as high as 97 percent, the highest estimation being the highest possible, i.e., 100 percent, and the lowest 75 percent.

Participants classified 14 of the tasks as normal information processing tasks. One task was provided by a participant from Pori, while the rest of them were performed by Tampere officials. The participants' highest and lowest estimations of their awareness of information requirements of the tasks was the same as in the previous task category. The average, however, was lower than earlier, 87 percent.

There were seven tasks perceived as normal decision tasks. The municipal officials of Tampere performed three and their colleagues from Pori four tasks. Their awareness of information requirements was still high but decreasing from the level of the previous task categories, the average being 81 percent. The highest estimation was a little lower than earlier, i.e. 95 percent. The lowest estimation was, as above, 75 percent.

The remaining three tasks belonged to the category of known-genuine decision tasks. Thus, they were the least a priori determinable tasks of the sample. One of them was provided by a participant from Tampere and two by participants from Pori. Since there were so few tasks in this category, their analysis is merely presented for reflective purposes.

Most of tasks which are initiated by the town's inhabitant(s) or organization(s) seem to be quite routine for municipal officials³. This becomes visible through the participants' estimations of how well they know what information was going to be required to complete the tasks. The highest value was 100 percent, in which cases the task performer trusted herself to be completely aware of information requirements of the task in hand. The lowest value was 75 percent, which is still relatively high. The average for all tasks was as high as 89 percent. Thus the participants were very well aware of the information requirements already at the

beginning of the task performances. However, there is a clear tendency that the awareness of information requirements decreases as the tasks becomes more complex.

The information needs of municipal officials

The participants described the information they expected to be needed in their tasks (Table 1). According to these descriptions, the absolute majority of tasks were expected to be completed with task information only. Task and domain information were supposed to be needed on approximately one quarter of tasks. Only once was all three information types expected to be needed. This indicates that the task performers already possessed the relevant domain and task-solving information and did not need to acquire it for the tasks in hand. Task information, because of its disposable nature, is unlikely to be stored in a task performer's memory.

TABLE 1
The types of information expected to be needed and acquired in each task category

Task Category	Information Type			
	None	Task Information	Task and Domain Information	Task, Domain and Task-Solving Information
Automatic Information Processing Tasks				
<i>expected</i>	-	13	1	-
<i>acquired</i>	8	5	1	-
Normal Information Processing Tasks*				
<i>expected</i>	-	9	4	-
<i>acquired</i>	1	9	3	-
Normal Decision Tasks				
<i>expected</i>	-	4	3	-
<i>acquired</i>	1	3	3	-
Known-Genuine Decision Tasks				
<i>expected</i>	-	1	1	1
<i>acquired</i>	-	1	1	1
All Tasks*				
<i>expected</i>	-	27	9	1
<i>acquired</i>	10	18	8	1

* one task excluded

After the task performances the kinds of information actually acquired to complete them were clarified. In almost all cases the expected information was also acquired. Without exception the acquired information, in terms of information types, was never broader than expected. For example, if only task information was expected to be needed, it never turned out that domain and/or task-solving information would also have been needed.

The clarity of information requirements in the automatic information processing tasks also appears through the examination of information types (Table 1). Task information was expected to be needed in 13 tasks and it was actually acquired in five of them. Information seeking was unnecessary in eight tasks, i.e. all information the task performers needed was attached in documents provided by initiator(s). There was only one task in which both task and domain information was expected to be needed and later acquired. Task-solving information was never considered nor acquired in the automatic information processing tasks.

Information which was expected to be needed in the normal information processing tasks corresponded well to the information which was later acquired (Table 1). In nine tasks task information was expected to be needed, and in nine tasks that information was also acquired. However, one of the original nine was accomplished without any further information acquisition. One of the four tasks in which both task and domain information was expected to be needed was actually completed with task information only. Task-solving information was never expected to be needed nor was it acquired.

In the normal decision tasks the need for both task and domain information became as probable as the need for task information only (Table 1). Both task and domain information was required in three task performances. Task information was likewise sufficient in three task performances. One task was completed without any information acquisition. Task-solving information was not relevant for any of known-genuine decision tasks.

The information types expected to be needed in the three known-genuine decision tasks varied maximally. Task information was expected in one of them, task and domain information in the second, and in the third – for the first time – task-solving information together with the other two information types was considered necessary. The expected information types were also acquired later.

Probably because of the participants' long experience in their duties, the most task performances were carried through with help of task information only. Furthermore, the task performer did not need to acquire any information at all in ten tasks. This can be explained by the common task performance pattern in the task type of the sample: the task performer receives the task enclosed with the documents provided by the initiator, i.e. the town's inhabitant(s) or organization(s), who has activated the matter. Sometimes these documents include all necessary task information. If the task performer already has

sufficient domain and task-solving knowledge, information acquiring is simply not required.

All results above point to the conclusion that the information needs experienced by the municipal officials are most often not only clear but also quite limited in terms of information types. It is usual that the task performers know from the beginning what information becomes necessary to complete the task in hand. Sometimes these expectations might be broader than actually proves necessary, but it seems fairly unlikely that they would be too narrow.

Generally, it is only occasionally that other information types than task information are even considered. Examination according to the task categories discloses a variance in the occurrence of information types. Task information was almost exclusively sufficient in the automatic information processing tasks. In the normal information processing tasks task information was still usually sufficient but task and domain information were also considered at times. Task information and task and domain information were equally acquired in the normal decision tasks. All information types were required only once in the known-genuine decision tasks. What is not visible in the Table 1 is that the information needs did also become wider within the category of task information as the task complexity increased.

The information seeking of municipal officials

Persons and documents as information sources

In the 38 task performances analysed there were 192 information sources were consulted. Fifteen of these were meetings either with the colleagues only or together with external experts and/or people concerned. The 192 information sources consist of 155 internal sources (i.e. obtained from inside the organization), 30 external sources (i.e. obtained from outside the organization), and seven meetings with external participants. The distribution between persons and documents as information sources in each task category is presented in Table 2.

There was only a slight difference between the usage of persons and documents as information sources. Persons seem to have been somewhat more consulted, especially as meetings consist of several participants. The examination according to the task categories reveals the rather distinct tendency of the decreasing document use as the task complexity increases. The document sources were popular in the task category of automatic information processing tasks. In the middle task categories – the normal information processing and the normal decision tasks – documents and persons were quite equally consulted, persons being slightly dominant. The usage of documents collapsed in the known-genuine decision tasks, whereas persons became extremely important as information sources.

TABLE 2

The usage of internal and external persons and documents as information sources in each task category

Information Source Category	Task Categories				All Tasks
	Automatic Information Processing	Normal Information Processing	Normal Decision	Known-Genuine Decision	
Persons	9	36	27	38	110
%	30	51	55	88	57
Documents	21	34	22	5	82
%	70	49	45	12	43
All	30	70	49	43	192
%	100	100	100	100	100

The types of information sources

The preparing level of a local government organization is clearly knowledge-based. This becomes visible through the distribution of information sources (Table 3). The most consulted information source type was experts. They were usually the task performers' knowledgeable colleagues. Official documents were nearly as frequently consulted. However, almost a half of their consultation was self-evident: the documents were received together with tasks, i.e., they were material provided by the initiator(s) in the matters. People concerned, usually the initiator(s) in the matters, holds the third place. Literature, meetings, and – suprisingly – registers are information sources that are consulted less often.

Municipal officials seem quite reluctant to seek information outside their organization. More than three quarters of information sources were obtained from inside the organization (Table 3). Both the most often used information source types, experts and official documents, were almost exclusively internal. Furthermore, nearly all literature and all registers were internal. Meetings were quite equally distributed into external and internal, although sometimes colleagues participated also in external meetings. Only the people concerned of all information source types were mainly external, but neither here the difference was extreme.

The most common information source were official documents in the automatic information processing tasks (Table 3). Only one of these were acquired through information seeking, whereas 16 of them were received

TABLE 3
The types of information sources consulted and their frequency of use in each task category

Information Source Type	Task Categories				All Tasks
	Automatic Information Processing	Normal Information Processing	Normal Decision	Known-Genuine Decision	
People concerned	4	12	14	-	30
<i>internal</i>	-	3	9	-	12
<i>external</i>	4	9	5	-	18
Experts	4	24	11	26	65
<i>internal</i>	3	20	11	23	57
<i>external</i>	1	4	-	3	8
Literature	2	9	4	4	19
<i>internal</i>	2	8	4	3	17
<i>external</i>	-	1	-	1	2
Official documents	17	18	17	1	53
<i>internal</i>	17	18	15	1	51
<i>external</i>	-	-	2	-	2
Registers*	2	7	1	-	10
<i>internal</i>	2	7	1	-	10
<i>external</i>	-	-	-	-	-
Meetings	1	-	2	12	15
<i>internal</i>	-	-	2	6	8
<i>external**</i>	1	-	-	6	7
All sources	30	70	49	43	192
<i>internal</i>	24	56	42	33	155
<i>external</i>	6	14	7	10	30+7**

* Registers do not include commercial databases which were not used in task performances analysed. ** Meetings were not exclusively external since colleagues were also participating.

together with the tasks. The usage of other information sources types were rather insignificant; even together their usage did not reach the same frequency as the usage of official documents. Two information sources were usually consulted in each task performance.

Experts were the most often consulted information source type in the normal information processing tasks (Table 3). Official documents were quite often used, and a considerable amount of them (7) were not automatically received but especially acquired for the task performance. The usage of the other information

sources, except meetings, was moderate. Five consulted information sources was the average in the normal information processing tasks. The internality of consulted information sources was at the same level than in the automatic information processing tasks (80 percent).

In the normal decision tasks official documents were once again the most popular information source type, although people concerned and experts were not far behind (Table 3). As in the normal information processing tasks, official documents were reasonably often searched. Other information source types were consulted only occasionally. The information needed was usually obtained from seven information sources. The internality of used information sources raised a little from the level of the two previous task categories (86 percent).

In the few tasks perceived to be known-genuine decision tasks experts were clearly the most often consulted information sources (Table 3). This, together with the drastically increasing use of meetings as information sources, points to the conclusion that flexible and refined or tailored information is required in these tasks. The task performers used from 9 to 19 information sources. The internality of information sources decreased to the lowest level in the task categories, but it is still relatively high (77 percent).

DISCUSSIONS

The methodological discussion

The research methodology utilized has proven to be well-functional and well-suitable on the present professional setting. Because of the multiple data gathering methods, the recording of task performances can be considered as exact. Although the data gathering is a time consuming process, it provides rich and detailed data for the researcher and an opportunity for self-analysis for the participants. The latter gain was unintentional and brought up by some participants themselves.

The essence of a task and task complexity were the most troublesome aspects of the methodology. These concepts has been debated in the literature (e.g. Campbell, 1988; Wood, 1986; Hackman, 1969) but not agreed on. Furthermore, the theoretical definitions (e.g. "a task has an indentifiable beginning and end") can be difficult to operationalize objectively in practise. In the present study the scope of tasks was confined to those which preparatory processes were based on a motion submitted by the town's inhabitant(s) or organization(s) (except for a few tasks included in the pilot), i.e. they began when the motion is received and ends when the decision is made. The distinction between a task and a subtask was also quite clear in the task of the sample. A task is considered to consist of all aspects of the matter together, whereas a subtask is a part of the original matter.

The determination of task complexity, in terms of *a priori* determinability, was allocated to the participants, because they have the most detailed knowl-

edge of their duties. This was concluded because the real task performances do not necessarily have any objective task descriptions in detail available. The participants seem to have quite consistent line in their evaluation of the *a priori* determinability on the given premises (cf. Figure 4). Only one participant has estimated his tasks to be clearly less *a priori* determinable than would seem to be appropriate in comparison with the other tasks.

The discussion of the preliminary results

The preliminary results confirms several previously made findings concerning task complexity and information seeking behaviour. People tend to consult more information sources when the complexity of tasks increases (e.g. Tiarniyu 1992; Culnan 1983). They also turn to persons rather than documentary sources in the case of a highly complex task (e.g. Tushman 1978; Daft et al. 1988; Tiarniyu 1992). Internal information sources – which usually are more easily available than external information sources – are favoured (e.g. Tiarniyu 1992; O'Reilly 1982), although the less available information sources will also be attempted if it is clearly demanded by the task (Culnan 1983).

The preliminary results also gives us rather more detailed suggestions about the effects of task complexity, in terms of perceived *a priori* determinability. Although the differences between the task categories were not always great, they were, however, quite distinct. It should be borne in mind that the study was carried out in a local government setting. This makes the results applicable in this or a similar setting but not necessary in other kinds of settings. Most of the tasks performed during the data gathering period were routine for the participants. This is quite understandable for two reasons. First, the participants have often worked with the same duties for several years. Thus, they have become familiar with the task types including their duties and the way of performing them. Second, the nature of the organization requires a consequential behaviour which quarantees the equality between similar cases. This means that many tasks have to be done according to a certain procedure, i.e. there is a strong organizational culture that guides a single task performances.

IN&S were of fairly limited nature in the automatic information processing tasks. Several tasks did not raise any information need and, thus, information seeking was also unnecessary; sufficient information for task performances were received together with the tasks in form of official documents. If an information need was experienced, it was very clear, corresponded well to the information requirements of a task, and was easy to satisfy. One or two information sources were usually consulted in a task performance. Tasks were familiar for the task performers who commented on them as follows: "A matter which recurs every year. I remember" or "the event is traditional...".

There is a clear difference between tasks belonging to the categories of automatic and normal information processing tasks. The clarity of information

needs was still quite the same, but the amount of information needed grew. The usage of all information source types increased: municipal officials consulted approximately five information sources during a task performance. Experts who possess a flexible knowledgebase became more important information sources than immutable official documents. This was strengthened by increasing consultation of persons concerned.

The normal decision tasks could be completed with an equal probability either with task information only or with both task and domain information. Information gathering was somewhat more substantial than in the previous task category. In one task performance seven information sources were usually sufficient. Official documents, people concerned, and experts were all popular information sources.

Because only three tasks were perceived as known-genuine decision tasks, there are only very slender grounds for any conclusions. However, the only task with the need for all information types belonged to this task category. There was also an immense rise in the usage of information sources: the average was the double of the previous task category, i.e. 14 information sources in each task. Experts were the by far the most important information sources. Meetings which were only sporadically utilized in all the previous task categories became a significant way to gather information.

There were no unknown-genuine decision tasks within the sample. To get a such task in the sample would be very serendipitous. These tasks are rare: they have to be essentially new and unexpected to their performers. Thus, it is not the task type that constantly occurs in an ordinary, or even any, professional setting.

Information sources were mainly internal throughout all present task categories. This might be explained by the large size of the organizations. The reason might also be – at least partly – "an organizational habit"; local government organizations, which cover several expertise areas, have over the years become used to producing information for its own purposes and to rely on this information. In the modern information society where information flows are abundant and rapid this model becomes unavoidably old-fashioned. This is something that should be considered in information system development for similar organizations.

A distinct result is that most information needs the participants experienced were clear and explicit for them. The result contradicts the generally emphasized assumption that information needs usually are obscure and, thus, difficult to express (e.g. Belkin et al., 1982). This seems not to be a case in, at least the present, professional setting. Municipal officials also knew how to obtain the missing information. This raises a question about the clarity of the experienced information needs and the routine information seeking in other professional settings. If the information needs generally prove to be as well definable, and their satisfaction as goal-directed as it seems according to the present study, it

has an interesting consequence for the field of information system design in these kinds of context. If the new information systems are intended to become a natural part of the work practises, the expertise of the intended users on their IN&S should not be overlooked.

NOTES

- 1 The IN&S process here is simplified. Naturally, the process is more scattered in reality.
- 2 Murtonen is the present author's maiden name.
- 3 The allocation of tasks into the task categories above is somewhat distorted. This is because the tasks of participants of Tampere which were not completed at the time of the preliminary analysis, seem mostly belong to the categories of decision tasks. The duration time seems usually to be longer for the more complex tasks than for the less complex ones. However, the tasks provided by the participants from Pori balances the allocation. The municipal officials of Pori were allowed to choose freely the tasks attended to with the task diaries and they seem to have chosen more challenging tasks.

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