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Abstract

Purpose – The purpose of this paper is to operationalise and verify a cognitive motivation model that has been adapted to information seeking. The original model was presented within the field of psychology.

Design/methodology/approach – An operationalisation of the model is presented based on the theory of expectancy-value and on the operationalisation used when the model was first developed. Data for the analysis were collected from a sample of seven informants working as consultants in Danish municipalities. Each participant filled out a questionnaire, kept a log book for a week and participated in a subsequent interview to elicit data regarding their information source behaviour and task motivation.

Findings – Motivation affected source use when the informants search for information as part of their professional life. This meant that the number of sources used and the preference for interpersonal and internal sources increased when the task had high-value motivation or low-expectancy motivation or both.

Research limitations/implications – The study is based on a relatively small sample and considers only one motivation theory. This should be addressed in future research along with a broadening of the studied group to involve other professions than municipality consultants.

Originality/value – Motivational theories from the field of psychology have been used sparsely in studies of information seeking. This study operationalises and verifies such a theory based on a theoretical adaptation of this model made by Savolainen (2012c).

Keywords User studies, Cognitive motivation, Expectancy value theory, Information seeking, Source choice, Task

Paper type Research paper

Introduction

The motivation for initialising and conducting information seeking has often been explained with reference to a need for information as developed or realised by the information seeker in a given situation (Case, 2007, p. 69). The outlines of a concept for an information need have been widely discussed and thus this need has been defined in various ways. Today the most common understanding of an information need identifies this need as context dependent and therefore affected by a subjective perception of the need for information (Borlund, 2000). Although information need is the most widely used concept, within the field of information science, for what motivates the actions of an information seeker, it has been stated that a collective or unifying definition of the concept is lacking (Cole, 2011; Savolainen, 2012a) and the term has been questioned

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and criticised. Some authors have instead labelled the motivation for information seeking with concepts such as anomalous state of knowledge (Belkin *et al.*, 1982), uncertainty (Kuhlthau, 1993), and gap (Dervin, 1998). Wilson (1981) questions the existence of an actual information need and proposes that a more accurate term would be "information-seeking towards satisfaction of needs" (Wilson, 1981, p. 8) indicating that information seeking has a purpose that reaches beyond obtaining a specific piece of information.

These alternative terms for the motivations for information seeking denote that information-seeking behaviour cannot be explained solely by a rational need for information. For instance, Kuhlthau's uncertainty principle accentuates the affective aspect of information-seeking motivation whereas Belkin *et al.* (1982) focus on cognitive motivators in their ASK-hypothesis. These and other studies mark a recognition of motivational factors in information seeking that are not originated purely in an information need.

Despite these efforts, Savolainen (2012a, b, c) points out that research in the motivational factors of information seeking has not developed much in recent years. Savolainen (2012b, c) argues that only a few studies have explored the possibilities in adapting motivational theories from psychology to information studies, even though this has the possibility of moving research on the motivation for information seeking forward. Among the studies that use motivational theories are Bronstein and Tzivian's (2013) investigation of the perceived self-efficacy of library and information science professionals, Wilson's (1999) inclusion of self-efficacy in his model of information behaviour, and Savolainen's (2008a) study of unemployed people's information-seeking motivation using self-determination theory. In an article from Savolainen (2012c) makes a theoretical transition of a cognitive motivation theory, originally developed by Wigfield and Eccles (2000), Eccles (1983), Wigfield (1994), from psychology to information science. In a conceptual analysis he proposes that a motivation model, and the underlying theory, has the possibility to widen and enrich the current understanding of the motivation for information seeking with aspects not directly related to the concept of information need. The choice of this particular model relates to the type of motivation embraced in it. As mentioned, Savolainen's proposed model presents a theory of cognitive motivation, as opposed to biological or behavioural motivation. This type of motivation is particularly interesting to information science because it focuses on how expectations of potential, future actions, and evaluations of different alternatives affect the motivation of an individual. The trigger for this motivation type lies in the individual's processing of information about its surrounding environment and this makes it comparable to developing an information need and starting an information-seeking episode (Petri and Govern, 2004, p. 16, pp. 26-27; Savolainen, 2012a, b, p. 494). Expectancy-value theories represent a significant branch in motivation theory (Savolainen, 2012c, p. 493). The Eccles and Wigfield model is originally made to explain learning behaviour. Savolainen (2012c) argues that learning and information seeking involves comparable processes, in that change of knowledge structures is central to both actions. Thus this model has potential to be applicable to information seeking as well. In relation to information needs, Case (2007, p. 78) points out that this concept is difficult to study since it takes place inside people's minds and research on the topic therefore has to infer the information need on the basis of, for example, observed behaviour. It is reasonable to presume that similar barriers affect the study of other motivational factors since they, too, are located inside the mind of the information seeker.

Based on the above, the research aim of the present study is, from an expectancy-value perspective, to include motivational aspects into work-task based empirical research and in this way empirically study the link between cognitive motivation and information source use. Accordingly, the present study (based on Sigaard, 2013) empirically tests elements of the expectancy-value model presented by Savolainen (2012c). The study explores the information-seeking motivation of professionals in a work-task context and the information-seeking motivation model presented by Savolainen is employed as a theoretical starting point.

Related research and theoretical background

Information seeking in a work context

People's professional life is a frequently used context for studying information behaviour. This research touches on many different aspect of work-related information seeking. Almutairi (2011), for example, studies the effect of personal factors on information behaviour of state-employed managers, while Huvila (2010) explores the connection between perceived success and information behaviour among employees in financial companies and Robinson (2010) examines how much of their time engineers spend on information seeking and handling and behavioural patterns connected to these tasks. Franssila *et al.* (2012) identify information behaviour of groups of workers in a chemical company. Other studies try to rise above the specific job types, for instance knowledge practices in knowledge creating work activities (Souto *et al.*, 2012), the effect of company motivation on employees' document management (Mäkinen and Henttonen, 2011), and a general model for work-initialised information seeking based on a synthesis of three different job types (Leckie *et al.*, 1996). As mentioned in the introduction only few studies utilise motivational theories as their theoretical starting point. Lu *et al.* (2008) employs an expectancy-value framework in their study of nurses' information-seeking behaviour, but they focus solely on online sources.

Contextually dependent work tasks

The present paper employs an understanding of information need and seeking as cognitive and contextually dependent. Other approaches focus on the interaction between information seeker and information system (Elsweiler *et al.*, 2009; Ingwersen, 2000), on the information need (Belkin *et al.*, 1982; Dervin, 1998), on behaviour (Ellis, 1989; McKenzie, 2002), or on demographic and social distinctions (Prigoda and McKenzie, 2007; Warner and Procaccino, 2004; Westbrook, 2009; Wicks, 2004). As stated in the introduction a conceptualisation of a contextually contingent information need is common in studies of information need and seeking (Belkin *et al.*, 1982; Dervin, 1998; Kuhlthau, 1993; Wilson, 1981). In the present study the contextual features were represented both theoretically and methodologically by utilising a work-task framework. The task concept has been widely applied (e.g. Borlund, 2000; Kumpulainen and Järvelin, 2012; Li and Belkin, 2010; Savolainen, 2012a; Vakkari and Huuskonen, 2012; Xie, 2009) and several researchers have presented definitions of the concept. Among the central contributions is Li and Belkin's (2008) faceted task classification in which they define task as activities that people need to undertake to move forward in their life. They present a hierarchy of tasks in which search tasks are subtasks of seeking tasks which are in turn subtasks of work tasks. All tasks, however, share a number of characteristics divided into two main groups, generic facets (e.g. source of task or task product) and common attributes (e.g. user's perception of task). Liu and Li (2012) use a similar definition of task in their study of task complexity as a

dimension of task. They isolate complexity as one of the most important aspects when defining a task. Complexity is seen as the sum of the collected amount of task characteristics, for instance input or time, which can either add to or lessen complexity. Xie (2009) study the dimensions of task and defines tasks as something a person does to achieve a goal. Xie works with two levels of task, work tasks and searching tasks as subtasks to work tasks. In relation to work task Xie identifies three task dimensions, the nature of the task, stadium of task, and timeframe of task. Searching tasks can be defined with reference to three aspects, origin, type, and flexibility.

The present study leans on a definition proposed by Byström (2007) and Byström and Hansen (2005). According to this definition a task is a set of connected physical and cognitive activities that has a purpose and a measurable beginning and end. In continuation of this definition a work task is a task that an individual carries out to meet his or her work responsibilities. A work task is defined by both individual, environmental, and situational factors and can be made up by a number of subtasks, among these information-seeking tasks and information searching tasks. Byström and Järvelin (1995) place the subjectively perceived task as part of the starting point in their model of information seeking (p. 9). The focus in their studies is on task complexity, defined as the task's a priori determinability of task outcomes, process, and information requirements (Byström and Järvelin, 1995, p. 5). The present study differs in this aspect by instead focusing on the motivational aspects of task performance.

Cognitive motivation

The task as a frame for an information need is compatible with cognitive motivation theories, since this framework assumes that the information need is, at least partly, defined by a cognitive processing of a given task. Similarly, cognitive motivation encompasses motivational influence gained from cognitive information processing in relation to a decision about the actions in a given situation. Cognitive motivation has been studied widely (Bronstein and Tzivian, 2013; Feather, 1967; Lee, 2007; Savolainen, 2008a; Vansteenkiste *et al.*, 2005; Vroom, 1964). Furthermore, many different approaches have been taken in the conception of cognitive motivation. Atkinson (1957) and Atkinson and Reitman (1956) define, on the basis of earlier research, motivation as a function of motive, expectation, and incentive. In his theory of planned behaviour Ajzen (1991, 2002) puts forward a motivation model that describes motivated behaviour as an intention created from an interplay between a behaviouristic perception, a normative perception, and a perception of control. Bandura (1977, 1997) presents the concept of self-efficacy, which is defined as a person's perception of ability to perform a given action, as part of his social, cognitive theory. Steel and König (2006) deduce a temporal model for motivation from a conceptual analysis of four different motivation models.

In its broadest sense Petri and Govern (2004) define motivation as the inner or outer influence that causes an individual to initiate an action and to aim this action in a specific direction. Additionally, motivation deals with the intensity and persistence of a given action. Vroom (1964, pp. 8-9) adds that it is only relevant to talk of motivated action when the given action is uncoerced. Seeing the study of motivation as the study of actions or behaviour, Petri and Govern (2004) single out reproduction and preservation of life as the most basic sources of behavioural motivation. Furthermore, they point out that not one theory can explain all types of motivation and divide motivational factors into biological, behaviouristic, and cognitive aspects.

The focus in the present study is on cognitive motivation. Cognition is understood as internal, intellectual processes taking place in connection to analysis and interpretation of the individual's thoughts and actions as well as the surrounding environment (Petri and Govern, 2004, p. 248). Cognitive motivation therefore emerges from expectations of future actions and evaluations of different alternatives.

The group of theories termed expectancy theories or expectancy-value theories represent a substantial branch within cognitive motivation (Steel and König, 2006, p. 893). Expectancy-value theories generally explain motivated behaviour as a combination of an individual's needs and the value of various goals in the surrounding environment. Furthermore, expectations about the possibilities of obtaining the respective goals plays an important role in this line of theory (Petri and Govern, 2004, p. 255). Some of the early theorists in this field include Tolman, who saw motivated action as an individual's activation of various intellectual systems, when exposed to a stimulus, and the use of a cognitive map of goals in the surrounding environment (Petri and Govern, 2004, pp. 248-250; Tolman, 1955, pp. 315-317), and Lewin (1968), who described motivated action as a homeostasis-driven need to reduce tension from unmet needs through actions based on evaluations of the individual's life space (Petri and Govern, 2004, pp. 251-255).

Expectancy-value theory

Additionally, modern expectancy-value theories build on a model, developed by Atkinson, that depicts the strength of a given motivation to be a multiplicative function of the strength of the motive, the expectation of an action's probability of success, and the value of the possible outcome (Atkinson, 1957). Eccles and Wigfield's (2002) expectancy-value model is one of the theories building on Atkinson. This model has as foundation the idea that choices and actions have both positive and negative features. Accordingly, motivation to perform one action as opposed to another is dependent on the relative value of a given action and expectations of success for the different possible actions. Expectancy and value affects the actions chosen, persistence, and amount of energy used and is in return affected by a number of psychological characteristics of the individual.

Eccles and Wigfield (2002, p. 119) illustrate these relations in a cognitive motivation model, which depicts expectation and value as directly affecting action, while other factors, such as goals, previous experiences and cultural stereotypes, affect actions indirectly through these variables. The model is originally framed within studies of educational motivation among school children (Wigfield, 1994). Building on the work by Eccles and Wigfield (2002), Savolainen (2012c) modifies the model to make it applicable to the field of information seeking (Figure 1).

Savolainen's modified model (Figure 1) illustrates that the information-seeking activity, termed "choices and performance related to information seeking" (the box in the left side of the model), is affected directly by expectations of success and subjective task value. The other elements of the model, actor's goals and general self-schemata, affective reactions and memories, previous experiences, and social and cultural context affect each other in a hierarchy with social and cultural context being the most basic point. The collected impact of these aspects forms information-seeking behaviour indirectly via expectations of success and subjective task value. Experiences gained from information-seeking feeds back into the element of previous experiences.

The characteristics operationalized in the present study are expectations of success and subjective task value. Task value covers the different types of value that an individual ascribes the goal of a given action. According to both Eccles and Wigfield (2002), Wigfield and Eccles (2000), and Savolainen (2012c) the task value can be divided into four types of

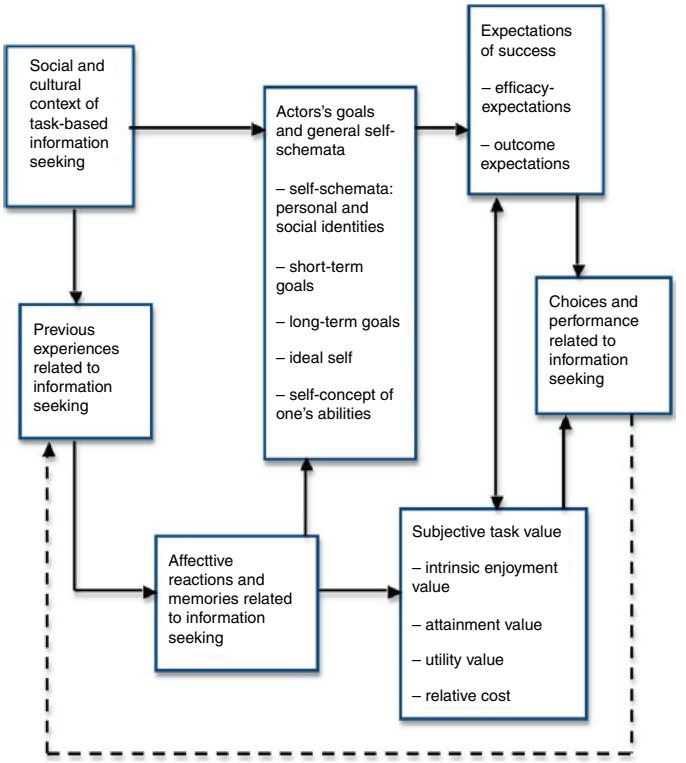

Figure 1.
Expectancy-value model for information seeking

Note: Reprinted with permission
Source: Savolainen (2012c, p. 504)

value: intrinsic value, attainment value, utility value, and relative cost. Intrinsic value covers the pleasure or enjoyment an individual gains from performing a task as well as the subjective interest the task poses (Eccles and Wigfield, 2002, p. 120). Attainment value describes the personal significance a person attributes to the solution of a given task and relates task-solving to identity and self-conception (Wigfield *et al.*, 2009, pp. 57-58). The utility value assigned to a task is gained from expectations of the task's possibility to help obtain other goals, meaning that the task can attain value by being a means to solve another task (Eccles and Wigfield, 2002, p. 120). The relative cost value focuses on the demand of a given task. This covers two aspects, first what the task performer has to give up when choosing to execute a given action, and second how many resources the individual expects to have to invest in the action to complete it (Wigfield *et al.*, 2009, p. 58).

Expectation of success refers to the individual's perception of own task-solving abilities and the outcomes of a given task. Savolainen divides this motivational aspect in two, efficacy-expectations and outcome expectations with reference to Bandura's theory of self-efficacy (Savolainen, 2012c, pp. 496, 503). Efficacy-expectation refers to the individual's belief that (s)he has the ability to perform a given action in a way that will result in the desired goal (Bandura, 1997, p. 3). Outcome expectations define an individual's expectation that a given action will lead to a given outcome irrespective of the person's belief in own capability to perform the action (Bandura, 1997, p. 21).

Savolainen (2012c, p. 503) emphasises these six factors for studying the impact of motivation in information seeking, and they are also the chosen focus in the present study. The reason for this inclusion is that, according to the model, these are the factors affecting information-seeking behaviour directly. The remaining factors affect behaviour via either task value or expectations of success. They define the reason a given individual has certain values or expectations and to involve them would require a thorough analysis of the life world of each participant, and is outside the scope of this study. The implication of this choice is that no statements can be made about why a participant values or expects something, only that this thing is valued or expected. This should not affect the validity of the results, however, since the aim is to describe the link between motivation and behaviour, not how a certain motivation came to be.

Methodology

As explained in the introduction, the research aim of the present study is, from an expectancy-value perspective, to include motivational aspects into work-task based empirical research and in this way empirically study the link between cognitive motivation and information source use. Drawing on the theoretical framework presented above, the study specifically addresses the following research questions:

RQ1. What is the applicability of the expectancy-value model presented by Savolainen in the study of motivators for task-based information seeking?

RQ2. To what extent do expectations of success and subjective task value motivate the work-related use of information sources?

The study design involved operationalising an expectancy-value model by Savolainen (2012c) and the collection of data about the work-related information source behaviour of municipality workers and the motivation associated with this work.

Informants

The focus of this qualitative study is work tasks involving information seeking. The sample was therefore chosen among professionals who seek information as part of their job. The area of interest was confined to professionals with the title developmental consultant (or similar titles) working in Danish municipalities. The sample is a purposeful convenience sample. A letter was sent to consultants in five Danish municipalities explaining the purpose of the study and the role of the informants. In the end seven professionals from four municipalities participated. It was estimated that this was enough participants to carry out the study since only one job type was included and the respondents showed many of the same behavioural patterns. The group consisted of six women and one man ranging in age from 28 to 46 years with an average age of 33.9 years. All participants had academic backgrounds (Master's degree) but their level of work experience varied considerably, from two months to 22 years (see Table I).

	R1	R2	R3	R4	R5	R6	R7
Experience in current position	5 years	9 months	2 months	1 year	5 years	5 years	1 year
Relevant experience from earlier positions	17 years	4 years	Newly qualified	2½ years	6 years	2 years	1½ years

Table I. Participants' work experience

Data collection

A naturalistic setting was chosen for the data collection on the grounds that motivation was presumed to be highly context dependent. Thus a naturalistic study would more realistically depict the motivational factors affecting real-life work task information seeking than a laboratory study.

The methods applied in this naturalistic study reflect the objects of the study, operationalisation and verification of the motivational model. Three methods, questionnaire, log book, and interview, were chosen. First, the study sought to collect data about the information-seeking behaviour of the participants. For this purpose the log book was used, as it records data parallel with the execution of the activity wished to be studied. Second, data about the motivational factors in relation to this information-seeking behaviour were needed. The complexity of the questions of motivation was estimated to be too great to include these in the log book. Follow-up interviews were therefore applied to allow participants to elaborate on the work tasks recorded in the log book and the associated motivational factors. Due to the limited number of participants the study also included a questionnaire eliciting background information about the informants, seeing that contextual factors could in some cases further clarify the analysis. This combination of methods mirror that of Byström in her studies of the information-seeking behaviour of professionals (Byström, 2002; Byström and Järvelin, 1995). The framing of the present study design was done with the Byström methodology as a basis. Modifications were made when necessary, predominantly with regards to inclusion of collection of motivational data.

The background information gathered in the questionnaire had a contextualising function and was furthermore used to identify potential outliers. This usage of the questionnaire method is seen in other studies of information searching and seeking (Borlund, 2000; Byström and Järvelin, 1995). The questionnaire was inspired by Byström and Järvelin's (1995) study and it was kept short, ten questions, due to its minor role in the study. The questionnaire consisted of factual questions, both closed and open-ended, with the purpose of collecting data about the participants, their jobs, and information-related aspects of that job.

A log book is a method for collecting data concerning ongoing events, occurrences and behaviour within an individual's everyday context (Bolger *et al.*, 2003, p. 580; Zimmerman and Wieder, 1977, pp. 480-481). An advantage of the log book method is that it provides the opportunity for the collection of context sensitive data about actions in situations that might otherwise be inaccessible. Furthermore, it lowers the risk of memory distortion present in retrospective data collection methods. A disadvantage is the high level of dedication needed from the study participants because it is a time-consuming data collection method and the responsibility of recording data lies solely with the participants (Bolger *et al.*, 2003, pp. 591-592). This puts a limit to the extent of the log book. In information studies the log book is suitable for collecting data about the execution of individual tasks (Byström and Järvelin, 1995, p. 11) or data about information behaviour in relation to actions, thoughts, and interactions that would otherwise be difficult to observe (Hyldegård, 2006).

In the present study the purpose of the log book was to obtain data on the information-seeking behaviour of the participants following from their efforts to solve a number of genuine work tasks. These behavioural data then provided a basis for the subsequent interviews. The log book is shown in Figure 1. Both the structure and the questions were inspired by the log book presented and used by Byström and Järvelin (1995, pp. 198-199). The log book is designed to collect three types of data.

First, data about participants' behaviour is sought through questions six and eight (see Figure 2) regarding the number and characteristics of sources used and time spent on the task and on information seeking. Second, questions one to three (see Figure 2) relate to task context; these questions elicit descriptions of the work task and of situational influences and estimation of level of ambition. Third, data about the participant's evaluations concerning a given work task are collected by asking the participant to reflect on their information need, reasons for sources used, and judgements of relevance (questions 4-7 in Figure 2).

The subsequent interviews were based on data recorded in the log books. The purpose of the interviews was to collect additional data about the motivational factors affecting a sample of the work tasks described by participants in the log book. For each of the respondents two to four entries from the log book were selected for the interview. Accordingly, the interviews focused on 18 work tasks out of a total of 36 work tasks described in the log books. It was the aim that the sampled entries accounted for a representative extract of the recorded tasks based on aspects such as task type, level of ambition, time spent, and number of sources used.

The interview questions are grouped in four clusters. The first cluster relates to the task in general. The opening question asks the interviewee to elaborate on the task description. This serves multiple purposes; it gives the interviewer a better understanding of the task at hand and provides the interviewee with a possibility to recall the task. At the same time this relatively straightforward question helps loosen up the interviewee so (s)he talks more freely. This cluster also includes questions about the priority and origin of a given task. The next two clusters relate the task as a whole to the two motivational factors, expectation and value respectively, in Savolainen's model. The questions are formed based on the categories in each of the factors using the original questions made by Eccles and Wigfield (Wigfield, 1994, p. 53) as a point of departure. Thus the operationalisation takes the shape of an adaptation of the

Log book
Date:
Describe your task:
Describe any relevant situational factors affecting the task:
What level of ambition are you aiming at in this task: high, medium or adequate?

	Thoughts in the beginning of the task	Thoughts emerged later in the task
Describe what type of information you think you'll need to solve the task		
What sources are you considering (also mention the ones you are not going to use)		

What sources did you use? (include yourself; mention all consulted colleagues; mention use channels regardless of whether you reached the sources or not):

Source	Why chosen	Internal/external	Success *	Usefulness #

* Success: You got the information a) completely, b) partly, c) not at all
# Usefulness: The information was a) useful, b) partly useful, c) not useful at all

Was the total amount of gathered information a) sufficient for the task, b) insufficient for the task?
Estimate the total amount of time spent a) on information seeking, b) on the entire task

Figure 2.
Log book

questions of Eccles and Wigfield. Table II shows the original questions (the first column) and their adaptations (the second column). The original model and questions were made for a prospective investigation of school children's perception of math classes. The present study is a retrospective study of adult professionals' perception of their work tasks. Sensitivity to the change in context, group, and timeframe were the focal points of the adaptation.

The second cluster contains two questions about the interviewee's knowledge on how to solve a given task and the degree of capability the interviewee feels in relation to solving this task. The third cluster is comprised of four questions, one for each of the

Motivation type	Original questions[a]	Adapted questions used in the present study
Expectation of success: outcome expectation	How well do you expect to do in math this year?/How good would you be at learning something new in math?	Did you have a clear idea of what you had to do to reach the wished result for the task?/Did you know what you had to do to solve the task?
Expectation of success: efficacy expectation	How good in math are you?/If you were to list all the students in your class from the worst to the best in math, where would you put yourself?/Some kids are better in one subject than in another. For example, you might be better in math than in reading. Compared to most of your other school subjects, how good are you in math?	How challenging did it seem to solve the task?/Did the task seem complicated? Why?
Subjective task value: intrinsic interest value	In general, I find working on math assignments (very boring – very interesting (fun))/How much do you like doing math?	Was it a good/interesting/fun task to solve? Why?
Subjective task value: attainment value	For me, being good in math is (not at all important – very important)/compared to most of your other activities, how important is it for you to be good at math?	Did the task have any personal significance for you? How?/Was it a task that was important to you personally? Why?
Subjective task value: utility value	Some things that you learn in school help you do things better outside of class, that is, they are useful. For example, learning about plants might help you grow a garden. In general, how useful is what you learn in math?/ Compared to most of your other activities, how useful is what you learn in math?	What was the task needed for? How important was this?/Was the task part of a bigger project? Was this an important project?
Subjective task value: relative cost	Cost refers to what the individual has to give up to do a task (e.g. do I do my math homework or call my friend?), as well as the anticipated effort one will need to put into task completion	Were there any other tasks you had to push aside because of this task?/Was there anything you had to give a lower priority because of this task?/How many resources/much energy did you have to put into solving the task?

Table II.
Motivation-related interview questions

Note: [a]The examples in the second column are based on the original questions in the studies by Wigfield (1994, pp. 52-53) and Wigfield and Eccles (2000, p. 70)

four types of value. The fourth cluster consists of six questions and focuses directly on what the respondents wrote in the log book. These questions are included to clarify factors regarding the information need related to a given task. All questions were added alternative wordings for the interviewer to use in the interview if needed. All the questions were asked to each of the selected tasks and thus the whole set of questions was completed two to four times per interview.

Procedure

The data collection took place in April and May, 2013. Prior to the investigation the data collection tools were pilot tested and several adjustments concerning layout and wording were made while the overall structure remained the same. The data collection procedure followed a series of steps. First the participants were sent the questionnaire and log book by e-mail along with an introduction explaining how to answer these. The respondents kept the log book for a period of one to two weeks. Upon return of the log book a follow-up interview was arranged. For the interviews the interviewer met the participants at their workplace, except in one case in which the interview was done by phone on request of the participant. The interviews lasted between 29 and 47 minutes with an average of 36 minutes and were taped and subsequently transcribed.

Data analysis

The study combines three data collection methods and includes both qualitative and quantitative data. The sample is too small to make any conclusions that assume representativeness of a larger group. Instead the aim of the analysis is to verify the usability of an operationalisation of a theoretical model and to draw preliminary conclusions about the validity of the theory of expectancy-value in describing information seeking. The questionnaire is a secondary method and mostly used to gather background information on the participants to uncover the degree with which they overlapped or varied in terms of work context. The log books are used to identify the quantitative work task features, for example number of sources, source types, and time spent. These data are not used independently but are instead employed in the qualitative analysis of the interviews to describe the characteristics of tasks with different degrees of motivational strength. The analysis of the interviews is structured in accordance with the six motivational factors. Each work task is analysed separately and categorised as either having or not having a given motivational factor. This categorisation is then compared with the log book data.

Results

Work context

In the following the participants will be referred to as R(*n*). The information universes of the participants overlapped in several ways. With regard to information types almost all participants mentioned needing information about legislation and their respective fields, and many also noted the need for project-related information. Both external and internal sources were used by all participants and they had all or almost all of the presented sources at their disposal (Table III). The situational context of the participants included often having to do several tasks in parallel and handling both short-term and long-term tasks. Additionally, working from home and the introduction of tablets were factors mentioned by three participants, respectively.

Source type	Number of participants
Internal	
Involved people	7
Colleagues	7
Personal collections	7
Official documents	7
Experts	6
Literature	5
Professional networks	5
Registers	4
Other: unofficial conversations, meetings, rumours	1
External	
Commercial databases	7
Experts	7
Literature	7
Professional networks	7
Involved people	6
Other: newspapers, courses, education as part of job, conferences, colleagues, Schultz Kommunekoncept (ed.: external database), printed UFR (ed.: journal), printed Karnov, 6-byerne (ed.: municipality co-operation), official documents	5
Registers	4

Table III.
Types of sources normally used by participants

Work tasks

The participants recorded from two to 15 work tasks in their log books. A total of 36 work tasks were collected with an average of 5.1 tasks per respondent and a median of four tasks. Of the 36 tasks 23 were perceived by the participants as tasks were they had a high level of ambition. Nine tasks were associated with a medium level of ambition and four tasks were perceived as tasks that had to be adequately performed (Table V). Between two minutes and 200 hours was spent solving one task (Table IV).

From these work tasks three general task types could be extracted:

- Meeting-related tasks. In these tasks the participants were to draw up presentations for meetings, structure meetings, hold meetings, and write minutes of meetings.
- Inquiries from colleagues to assist on specific questions. Here participants were contacted by internal colleagues concerning cases that the colleague in question was working on.
- Respondents being coordinators on internal projects. In these tasks participants were responsible for structuring and implementing a range of internal projects.

Between one and seven sources were used to solve the work tasks with an average of 2.7 sources. In total 46 internal and 44 external sources were used. Among

	R1	R2	R3	R4	R5	R6	R7
Min. time	2 min	5 hours	45 min	6 hours	5 min	1 hour	30 min
Max. time	3 hours	10 hours	2 days	200 hours	6 hours	4 hours	45 min
Number of tasks	6	4	4	2	15	2	3

Table IV.
Interval of time spend on a single task

the internal sources colleagues, internal registers, own knowledge, and internal documents were used, with colleagues being the most popular of all sources used. Of external sources external literature was the most frequently consulted. An external search engine, external people, licensed databases and professional networks were also used (Table V).

Analysis

In coherence with the research questions the analysis focuses on explaining the relation between work-related information source use of municipality consultants and their task motivation, and empirically study the applicability of the expectancy-value model presented by Savolainen. As described above, the expectancy-value model for information seeking describes motivation as cognitive in the sense that it is determined by the information seeker's expectation about the possibility of success of a given action and the value ascribed to the action and to the expected outcome. Table VI shows the results of the following analysis and the source use behaviour for each of the sampled work tasks.

Expectations of success

Outcome expectations. The participants were asked to estimate, prior to task solving, what was needed to solve the specific task. They were asked "Did you have a clear idea of what you had to do to reach the wished result for the task?/Did you know what you had to do to solve the task?" The respondents felt they knew which steps the task required in ten of the 18 work tasks (see Table VI, column 2). The respondents assigned these evaluations to experience, routine tasks, simple tasks, and distinct scope of tasks. One respondent, for instance, commented that there was "[…] some upkeep in it, right, so there is a routine in" (R1).

In the remaining eight tasks the steps to solving the work tasks were not clear to the respondents. This uncertainty was explained with a flexible task frame or unfamiliarity with the field the task arose from. In general it can be stated that participants had a tendency to use more sources and more human sources in tasks with low-outcome expectations than in tasks with high-outcome expectations.

Efficacy expectations. The questions "How challenging did it seem to solve the task?/ Did the task seem complicated? Why?" explored which degree of self-efficacy the participants felt in relation to a given task. The respondents found that 13 of the tasks did not seem complicated (Table VI, column 3). This stemmed from the task being done merely to provide an extra service for someone, from knowledge of the field of the task and from personal interest.

Three participants reported a total of five complicated tasks. These tasks were vaguely described, unfamiliar in type, or had a demanding outcome product. R5, for example, commented on one of her tasks that "[…] it is only something I have started working with after I have started out here". For efficacy expectations it can be suggested that this factor only affects information seeking to at lesser degree though challenging tasks tended to involve a high number of sources and the application of many different source types.

Subjective task value

Intrinsic enjoyment value. The participants' assessment of intrinsic task value was assessed through the questions "Was it a good/interesting/fun task to solve? Why?"

R(*n*)	Task. no.	Description	Number of sources	Source types	E/I	Ambition level
R1	1	Prepare item for agenda	2	Register, document	E (1), I (1)	High
R1	2	Minutes of meeting	1	Database	E (1)	Adequate
R1	3	Prepare meeting	1	Register	I (1)	Medium
R1	4	Inquiry from colleague	1	Database/document	E (1)	Adequate
R1	5	external request	1	Document	E (1)	Medium
R1	6	Coordination of colleagues	1	Register	I (1)	High
R2	1	Presentation for agenda item	3	Self, database, colleague	E (1), I (2)	High
R2	2	Coordination of efforts	4	Expert, self, colleague, register	E (1), I (3)	Adequate
R2	3	Preparation for meeting	4	Colleague, expert, document, network	E (3), I (1)	Medium
R2	4	Select applicants	2	Document, database	E (2)	High
R3	1	Establish status on initiative	3	Colleague, database	I (3)	High
R3	2	Communicate internal knowledge of a group	7	Literature, document, colleague, register	E (2), I (5)	High
R3	3	Evaluation of group	2	Colleague	I (2)	High
R3	4	Evaluation of working procedure	6	Literature, colleague	E (2), I (4)	High
R4	1	Project manager on internal project	5	Involved person, expert, literature, colleague, database	E (3), I (2)	High
R4	2	Presentation for agenda item	5	Involved person, expert, colleague	E (2), I (3)	Medium
R5	1	Legal evaluation	4	Database, document	E (3), I (1)	High
R5	2	Request from colleague	3	Database, document, colleague	E (2), I (1)	Adequate
R5	3	Preparation of internal note	3	Network, database, colleague	E (3)	High
R5	4	Preparation of external document	6	Document, database, expert, colleague	E (3), I (3)	High
R5	5	Request from colleague	1	Database	E (1)	High
R5	6	Request from colleague	2	Database, network	E (2)	Medium
R5	7	Request from colleague	2	Database, document	E (2)	High
R5	8	Request from colleague	1	Document	I (1)	High
R5	9	Request from colleague	5	Database, document, colleague	E (4), I (1)	High
R5	10	Request from colleague	4	Database, document, colleague	E (1), I (3)	High
R5	11	Request from colleague	2	Database, self	E (1), I (1)	Medium
R5	12	Request from colleague	1	Self	I (1)	High
R5	13	Request from colleague	2	Database, self	E (1), I (1)	High
R5	14	Request from colleague	2	Database, self	E (1), I (1)	High
R5	15	Request from colleague	1	Self	I (1)	High
R6	1	Prepare internal document	5	Colleague, expert	E (3), I (2)	Medium
R6	2	Structure internal course	1	Document	E (1)	Medium
R7	1	Evaluation of internal plan of action	1	Database	I (1)	High
R7	2	Meeting with colleague about coordination	1	Database	E (1)	High
R7	3	Orientation in received material	1	Document	E (1)	Medium

Table V.
The participants' recorded work tasks

Note: Tasks discussed in the interviews are highlighted

	Outcome expectations	Efficacy expectations	Intrinsic value	Attainment value	Utility value	Relative cost	Number of sources	Source types	External/ internal
R1-1	High	High	Low	High	High	Medium	2	Document	E (1), I (1)
R1-3	High	High	High	High	High	Medium	1	Register/document	I (1)
R1-4	High	High	High	Low	Low	Low	1	Database/document	E (1)
R1-5	High	High	High	Low	Low	Low	1	Document	E (1)
R2-2	Low	Low	Low	High	High	High	4	Expert, self, colleague, register	E (1), I (3)
R2-3	Low	Low	Low	High	High	High	4	Colleague, expert, document, network	E (3), I (1)
R3-2	Low	High	High	High	Low	Low	7	Literature, document, colleague, register	E (2), I (5)
R3-4	Low	Low	High	High	High	Medium	6	Literature, colleague	E (2), I (4)
R4-1	Low	High	High	High	High	High	5	Involved person, expert, literature, colleague, database	E (3), I (2)
R4-2	Low	High	High	High	High	Medium	5	Involved person, expert, colleague	E (2), I (3)
R5-2	High	High	Low	Low	Low	High	3	Database, document, colleague	E (2), I (1)
R5-4	High	Low	High	High	High	High	6	Document, database, expert, colleague	E (3), I (3)
R5-10	Low	Low	High	High	High	High	4	Database, document, colleague	E (1), I (3)
R6-1	Low	High	Low	Low	Low	Medium	5	Colleague, expert	E (3), I (2)
R6-2	High	High	High	High	Low	Medium	1	Document	E (1)
R7-1	High	High	Low	High	High	High	1	Database	I (1)
R7-2	High	High	High	High	Low	High	1	Database	E (1)
R7-3	High	High	Low	Low	Low	Low	1	Document	E (1)

Table VI.
Characteristics of sampled work tasks

The participants found that 11 of the tasks were interesting or fun (Table VI, column 4). The reasons given included the task being different than most tasks, the task being within a participant's core field, the knowledge gained through the task also being personally useful, being able to relate personally to a task and the task containing specific elements that the participant liked doing. An example of the latter was given by R5 who said "[…] I always think it is exciting to be allowed to write something […]".

Seven tasks were assigned low intrinsic value. The participants characterised these tasks as routine tasks, frustrating tasks, or tasks where they couldn't be as thorough as wished or whose topic was of lesser interest to the participant. Analysis indicates a weak tendency towards an increased use of internal sources at high-intrinsic value. Furthermore, the tasks with the highest source numbers were assigned high-intrinsic value.

Attainment value. The questions "Did the task have any personal significance for you? How? Was it a task that was important to you personally? Why?" covered the potential attainment value of a given task in the interviews. In all, 13 of the 18 tasks were found to have personal value to the participant (Table VI, column 5). This importance was in some cases given to tasks where the respondent wanted to appear in a specific way to other parts of the organisation (manager, colleagues) through the solving of the task. Another reason for attainment value was the task covering a topic that the participants identified with personally. R7, for instance, commented that "All this with the Swedish model […] is something I am very enthusiastic about". Other reasons included attainment value given to tasks that were prioritised in the organisation, tasks were the participant was able to learn something through the task, tasks that contributed to defining the work environment and tasks that took part in shaping the appearance of the municipality externally.

Five tasks had low-attainment value. These tasks were explained by the task not being part of the participants' field of responsibility. From this it can be concluded that tasks with high-attainment value had higher source use than low attainment value tasks. High-attainment value also increased the tendency to combine written and interpersonal sources and to use more internal sources.

Utility value. The utility value of a task was predominantly assessed through the questions "What was the task needed for? How important was this? Was the task part of a bigger project? Was this an important project?" supplemented by the questions "How important was the task? What priority did this task have?" These questions established the importance of the task and in continuation hereof the importance of the objective of the task. Ten of the tasks could be said to have utility value (Table VI, column 6). Four of these were explained with the task being needed for political aims. Other reasons included the task being a part of specific objectives in the municipality. R3, for example, was part of a project "[…] about doing things a bit smarter […] and that is like something we would like to, the municipality would like to bring in to focus a little […]". Considerations of employees' safety and the task being a bottleneck of another task were also mentioned in the explanations.

The remaining eight tasks were deemed not particularly high in utility value by the participants. Reasons for this evaluation included the task being just a smaller part of a bigger task whose objective was unknown and/or beyond the responsibility of the participant, the task not being prioritised by the task giver or the task being concerned with the respondent keeping herself up-to-date on received material. Based on this it

can be suggested that a higher degree of utility value resulted in the involvement of more sources, more frequent use of internal as opposed to external sources and a greater preference for interpersonal sources.

Relative cost. The relative cost of a task was identified by the questions "Were there any other tasks you had to push aside because of this task? Was there anything you had to give a lower priority because of this task? How many resources/much energy did you have to put into solving the task?" Eight of the tasks covered in the interviews had had priority over other tasks (Table VI, column 7). In six of these cases the priority was related to task deadlines. The two remaining tasks were prioritised by the organisation and therefore also by the participant.

Ten of the tasks did not take time/energy from other tasks. Overall the comments related to these tasks split into two types of reasons and this division was kept in the analysis. In one group the task did have priority even if the participants did not feel they solved the task on the expense of other tasks. This could be due to experience, "[…]I'm such an old hand (laughs) so I have such control of, I manage the things I need to […]" (R1), there being enough time for all tasks or the participant merely working a bit extra at that time. This accounted for six of the ten tasks not identified with high relative cost. The last four tasks were given lower priority than other tasks. The explanations revolved around the tasks being of little importance or outside the respondent's field of responsibility. From this it can be derived that higher relative cost in a task resulted in a higher number of sources used. Furthermore the amount of interpersonal sources rises with the relative cost and also the tendency to combine written and interpersonal sources.

Discussion

The above presented analysis indicates that cognitive motivation affects source choice behaviour when municipality consultants look for information as a part of their work task performance. This relates to other studies of source choice in various ways. In a study of the interpersonal information seeking of people working at a university Xu *et al.* (2006) conclude that task importance does not significantly affect source choice in task-related information seeking. Presuming a relatedness between importance and attainment and utility value, this goes against the conclusions of the present study. However, Xu *et al.* measure source quality whereas the present study focuses on frequency and types of sources used. Therefore the two studies are not necessarily opposed. Xu *et al.* furthermore conclude that important tasks involve a higher amount of geographically close sources which supports the present study's conclusion that the participants used a higher amount of internal sources when the task was important. Agarwal *et al.* (2011) study the information-seeking behaviour of professionals and concludes that increased task complexity also increases the number of sources used. This connection is pointed out by Byström and Järvelin (1995) as well, in their study of professionals' information seeking. Linking high complexity with low expectations of success and outcome expectations these studies follow the same conclusions as the present study. Furthermore, Agarwal *et al.* (2011) report that online and face-to-face sources are the most frequently consulted. Although the present study categorises the sources differently (e.g. no distinction is made between face-to-face and telephonic human sources) the same general picture presents itself in the collected data, increasing the data validity. Concerning source types Yuan *et al.* (2011), in a study of professionals' source preferences, conclude that increased complexity has a positive correlation with the use of human sources which mirrors results from the present study.

In the remainder of this section two issues will be discussed. First the suitability of the expectancy-value model by Eccles and Wigfield as a cognitive motivational theory for information seeking is discussed. Next the present study's methodological operationalisation of this model is debated.

The expectancy-value model was originally chosen as motivational theory based on an article in which Savolainen (2012c) makes a theoretical application of this psychological theory on information seeking as an activity. As mentioned above, the theory did in many respects show to be appropriate as a starting point for investigating motivation in information seeking. Thus it can be argued that this study confirms the applicability of the theory in the qualification of the understanding of information-seeking behaviour. Still, it is possible that aspects from other cognitive motivational theories could further differentiate or clarify the conclusions.

In a study of the job seeking behaviour of unemployed people Vansteenkiste *et al.* (2005) compare expectancy-value theory and self-determination theory. They argue that a concept of control would clarify the explanatory ability of expectancy-value on job seeking. It is not evident that this would also hold true for professionals' information-seeking behaviour since the allocation of control is more explicit in this context. Still, it is possible that a clarification of the degree to which the information seeker feels in control of the outcome of a task could qualify the description of this behaviour. Control or lack of control was not mentioned directly by any of the participants in the interviews. Savolainen (2008a) found, in a study of the information seeking of unemployed people, that a feeling of control affected information seeking. Hence there is a foundation for claiming that this is a significant concept in information-seeking motivation although there is a considerable difference between the context of professionals and unemployed people.

A factor frequently mentioned by the participants in the present study was time's effect on their motivation. This is not an explicit variable in expectancy-value theories. Instead a more static conception of task value and outcome expectancies forms the basis of this theory. Steel and König (2006) point this out in connection with a presentation of a motivational model based on four existing models. This model accentuates the time factor, arguing that time is an essential motivational variable when having to prioritise tasks. In the present study time was incorporated in the utility value, which involved evaluations of the importance of a task. The participants used time as a reason for the importance of a task. It can therefore be argued that time not being an independent factor did not restrict the validity of the study, but that such a distinction might be able to further clarify the conclusions.

The methodology applied in the present study was inspired by a research design developed by Byström (2002), Byström and Järvelin (1995), in which log books and interviews are used in combination. Log books and interviews are thoroughly tested research tools in information behaviour research (see e.g. Bronstein, 2010; Connaway *et al.*, 2011; Hyldegård, 2006; Kuhlthau, 1991; Savolainen, 2008a; Savolainen, 2008b). This study's research design differed from Byström's in its attempt to collect data about motivation. In the following the suitability of the chosen methods will be discussed. The questionnaire had a minor role and will not be mentioned.

The purpose of the log book was to collect data about the work-task related information needs and source behaviour of the participants. This proved a suitable method for observing this type of behaviour. Another observation method that could have been used was shadowing. Saastamoinen *et al.* (2012) use this technique, in which the researcher follows a respondent for a number of hours or tasks and questions him/her during the process. Since time consummation was the biggest concern of the

respondents when agreeing to participate, log books proved to be an acceptable amount of disturbance. The content of the log books also worked as intended. The log book questions about information behaviour were simple enough to fill out, although the importance of a thorough introduction must be stressed. As a basis for the interviews the log books worked very well, facilitating better memory of the tasks and their context.

The interview is, as mentioned, a frequently used method for qualitatively studying information seeking (see, for instance, Fidel and Green, 2004; Savolainen, 2008b; Serola, 2006; Yuan *et al.*, 2011). Its form is suitable when rich data about a limited number of subjects is needed. Savolainen (2008a) employs interviews in his study of the information-seeking behaviour of unemployed people. His study is similar to the present study in its use of a motivational theory; furthermore, the interviews take a starting point in a conversation about the participants' preceding behaviour. This supports the present choice of the interview for investigating work-task related source behaviour.

Within cognitive expectancy-value theories, motivation has been operationalised several times before, though mostly through the questionnaire method (e.g. Vansteenkiste *et al.*, 2005; Wheeler, 1983). The original expection-value model by Eccles and Wigfield was also developed and tested by using a questionnaire (Wigfield and Eccles, 2000, p. 70) as research method. These questions, combined with Savolainens' adjusted model, formed the theoretical background for this study's operationalisation. The operationalisation did overall function as intended. It was in general possible for the participants to answer the questions and the interview form enabled clarification when needed and sensitivity to choosing the wording most suitable for the individual respondent. The latter was important since questions about for example the challenges posed by a task or the ambition level attached to it can be sensitive. It can therefore be argued that the chosen operationalisation is suitable for researching the task-related motivation of information seekers.

Conclusion

Even though it holds great potential for widening the understanding of what triggers information seeking, the influence of motivation on information seeking is an aspect of information research that has not been studied very often. This study answers the call for an operationalisation and verification of a cognitive motivation theory presented by Savolainen (2012c). Savolainen makes a theoretical adaptation of a cognitive motivational model from the field of psychology to the context of information seeking. The model, originally presented by Eccles and Wigfield (2002), delineates motivation to perform an action as affected by expectancies of success and the perceived values of the action.

The present study empirically studies the application of the expectancy-value model presented by Savolainen (2012c). The first research question addresses the applicability of the expectancy-value model on information-seeking behaviour. In the present study this framework proved suitable for explaining the source choice behaviour related to task performance. Furthermore, in accordance with the second research question the extent of this relation is determined. The analysis shows that both expectation of success and subjective task value affect source use in the context of work-task related information-seeking behaviour. The motivational aspects of expectation of success relates to two aspects of expectation. The results show that especially participants' outcome expectations influence source use

behaviour as participants had a tendency to use more sources and more human sources in tasks with low-outcome expectations than in tasks with high-outcome expectations. Participants' efficacy expectations, on the other hand, only affects information seeking to a lesser degree. The motivational aspects of subjective task value relates to four types of value. The analysis shows that across the four types of task value, there is a clear relation between task value and number of information sources used. That is, a higher degree of task value results in a higher number of sources used. The analysis further indicates relations between the task values and types of information sources used. This meant the preference for interpersonal and internal sources increased when the task had high-value motivation or low-expectancy motivation or both. Overall it is concluded that within the context of Danish municipality consultants the theory of expectancy-value can help explain information source behaviour. Motivation therefore presents a relevant addition to for example task complexity and information need in explaining information behaviour. It more directly measures the effect of subjectively perceived value and perception of own capability on information-seeking behaviour.

Still, further research is needed to more firmly establish the results. The conclusions need to be proven in larger samples. Furthermore, the present study focuses on the information-seeking behaviour of municipality consultants. There is a need to determine whether the same influence of motivation can be established in other professions as well as in more free-time-oriented contexts. Research in this aspect would enhance the general applicability of the present study's results. Also, the usability of other motivational theories should be examined, to enable comparisons and discussions of strengths and weaknesses.

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