The influence of task and time on information behaviour in organisations

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ABSTRACT

This research is about the information behaviour of organizational members in different contexts while dealing with the work tasks. The objectives of the research are to provide an understanding of information seeking, using, and sharing through illuminating answers to *"How is organizations' information behaviour shaped with regard to time pressure and task complexity?"* and *"How do organisational members process information in collaborative settings and decide for the next actions in stable vs. unstable environments?"* questions.

In work settings, tasks are commonly carried out in groups; information is processed in collaborative manner and affected by situational factors (time and complexity). However, relatively small number of articles presents collaborative information behaviour and its link to situational factors. To contribute to the existing literature, the research aims to explore collaborative information behaviour while carrying out tasks in varying complexity and under time pressure.

The research uses qualitative methodology. Data have been collected from Cihan News Agency-Istanbul (CIHAN) and Istanbul Metropolitan Municipality Disaster Coordination Centre (AKOM) through field observations and interviews. It is a cross case study exploring the differences and commonalities of the information behaviour in two different contexts and two different situations.

The interview transcripts and field observation have been interpreted to explain the decision making mode of the organisational members in dynamic environments and the way they process information; and grounded theory approach is used to construct collaborative information behaviour model for the CIHAN and AKOM contexts.

Information behaviour models, which are illuminating collaborative information behaviour (CIB), have been introduced as the first contribution of the research. Time pressure and varying task complexity shape the model through illuminating barriers to access information and complex needs of the tasks carried out. The

second contribution lies in clarifying the interaction between information behaviour and decision making type (intuitive vs analytical) under time pressure. Time pressure and the nature of the work tasks drive organisational members to use intuition or analytical mode.

Activity Theory has been used as the theoretical framework and methodological tool for the research. Activity Theory has been used to investigate individual information behaviour in the literature. Use of Activity Theory to investigate collaborative information behaviour is the methodological contribution.

ABREVIATIONS

AKOM: Istanbul Metropolitan Municipality Disaster Coordination Centre

AKOMAS: AKOM Disaster Information System

ASK: Anomalous State of Knowledge

AT: Activity Theory

C&C: Command and Control

CHAT: Cultural Historical Activity Theory

CIHAN: Cihan New Agency-Istanbul

CIB: Collaborative Information Behaviour

GIS: Geographic Information System

GPS: Geographic Positioning System

HAZTURK: Hazard Monitoring System of AKOM

IIB: Individual Information Behaviour

IR: Information Retrieval

ISP: Information Searching Process

ISIC: Information Seeking in Context

ITU: Istanbul Technical University

ODTU: Middle East Technical University

SNG: Satellite News Gathering

TOROS: Subscribers News Sharing System of CIHAN

TUBITAK: The Scientific and Technological Research Council of Turkey

YTU: Yildiz technical University

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CHAPTER 1 INTRODUCTION

This research is about the information behaviour of organisational members in different contexts while dealing with work tasks. The objectives of the research are to provide an understanding of collaborative information sharing and using in different contexts: how organisations' information behaviour is shaped according to time pressure and task complexity; how organisational members' information use and decision-making type alters in dynamic environments while bearing on the course of actions.

In real-life settings tasks are bound by context, carried under time pressure and most are complex in dynamic environments. Work tasks are mainly carried out in social settings (teams, groups) or individually. In this research, disaster management tasks and news production tasks are investigated. In most cases, tasks are carried out in teams for speed and effectiveness. The motivation behind this research is the shortage of studies dedicated to collaborative information behaviour in the literature, as well as to context-bound work tasks, the importance of timely information sharing in disaster management and news production in dynamic and stable environments, and the catastrophic results of ineffective information sharing.

Recent information behaviour models deal with isolated tasks or mostly investigate the information behaviour of individuals (Dervin, 1999; Wilson, 1997; Byström and Jarvelin, 1995; Ellis et al., 1993; Ellis, 1989; Dervin and Nilan, 1986; Krikelas, 1983; Belkin et al., 1982; Wilson, 1981). Recent literature consists of numerous studies on work tasks, decision-making and information sharing (Larson et al., 2004; Sadler-Smith and Shefy, 2004; Stasser and Titus, 2003; Stasser et al., 2000; Larson et al., 1998; Dennis, 1996; Stasser et al., 1995; Larson et al., 1994; Stasser, 1992a; Stasser et al., 1989; Stasser and Titus, 1987; Stasser and Titus, 1985); however, these studies are laboratory cases and the tasks are not bound by context.

As a relatively unexplored area, collaborative information behaviour has been discussed in some studies (Karunakaran et al., 2013; Hyldegård, 2009; Reddy and Spence, 2008; Hyldegård and Ingwersen, 2007; Hyldegård, 2006).

Hyldegård and colleagues apply Kuhlthau's ISP model to collaborative settings and do not deal with contingent time pressure. The deadline is set before the start of the students' assignment. Hansen, Reddy and Spence investigate the triggers of collaborative information behaviour in the time-critical context of health care. The investigation of collaborative information behaviour under time pressure and under varying degrees of task complexity is still a gap in the literature.

In real-life settings, decisions are not only made through analytical processing. In urgent situations organisational members use both their past experiences and feelings as intuitive tools, and also analytical information processing to decide on their next actions (Hodgkinson et al., 2009; Hodgkinson et al., 2008; Klein, 2008; Sinclair and Ashkanasy, 2005; Sjöberg, 2003; Klein, 1993; Klein and Calderwood, 1991). The decision-making groups' behaviour is widely discussed as analytical processing; however, scarce resources discuss both intuition and analytical information processes while carrying out a work task. Situational factors, such as time pressure and uncertainty, direct people to use intuition or deliberative tools to judge on a case. Thus, the information-sharing and use behaviour of organisational members in dynamic environments is the second gap in the literature.

Subsequently, there are two gaps identified in the literature in order, first, to explore information behaviour in stable and unstable environments and the way critical decisions are made in dynamic environments in real-life settings, and second, to observe the influence of time and certainty on information behaviour in two different contexts and four different situations. In this context, the researcher chose Activity Theory as a theoretical framework since it explores human activities in real-life settings, is linked to social activities, fragments the activities into sub-units to understand the phenomena in depth, presents the mediating artefacts which indicate that human actions are engaged with different factors while realising an objective, exposes the interaction between neighbour activities in activity systems and enables the transformation of activity systems, and finally its historicity enables the researcher to comprehend that present activities are an inheritance from past

experiences (Allen et al., 2011; Pereira-Querol and Seppanen, 2009; Venkat and Adler, 2008; Wilson, 2008a; Wilson, 2006b; Mwanza, 2002; Foot, 2001; Cole and Engeström, 2001; Engeström, 2000; Kuuti, 1999; Nardi, 1996a; Vygotsky, 1978).

As a result of the above discussion, the researcher chose case study organisations, which operate in different environments (stable, unstable), whose divisions are distinguished from each other concerning task categorisation. The Disaster Coordination Centre of Istanbul Municipality (AKOM) has rescue teams, which are involved in emergent cases. The CIHAN News Agency (CIHAN) in Istanbul has a news desk for breaking news, which involves broadcasting the news as soon as possible to the audience without any misinformation or failures. As organisations are operating in different environments, the work tasks require different information actions.

Task categorisation in each division is observed in the light of task categorisation as per Byström and Jarvelin, and Vakkari (Vakkari, 1999b; Byström and Jarvelin, 1995). Besides this, the rationale behind conducting cross-case research is to compare information behaviour styles. In addition, multiple-case research strengthens the theory by rich data sources more than single cases (Eisenhardt and Graebner, 2007).

As the research problem suggests, disasters are not determinable; however, effective team coordination, and effective information sharing and use may minimise losses. In this regard, the role of information behaviour (sharing and seeking) increases in the rapid response phase of disaster coordination and these information actions are considered for effective and efficient long-term planning during the post-disaster and preparedness phases. There are various practical examples from Turkey in recent years. 653 people passed away in the 1992 Erzincan earthquake, 61 people in the 1995 Izmir flooding, 420 people passed away in the 1997 Adana earthquake, more than 30.000 people in the 1999 Golcuk Earthquake (Durduran and Geymen, 2006), 31 people died in the 2009 Istanbul flooding (Sabah, 2009) and approximately 50% of Turkey's forests were destroyed between 1950 and 2010 (Cevre ve

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Orman Bakanligi, 2010). Every year more than 200 people die because of malpractice in emergency surgeries caused by discrepancies in the information systems of medical centres (Celik, 2010).

Besides the emergency units mentioned above, the news desk ensures the expedient flow of information under time pressure to release it to the audiences. However, sometimes the validity of the news is judged (Attfield et al., 2008). For instance, during the Danistay Attack in May 2006 (Scribd, 2006) most of the breaking news channels were manipulated by misinformation as an anomalous state of knowledge and uncertainty existed (Attfield et al., 2008). The transformation of the CIHAN Media resulted in an outstanding achievement by releasing 99% valid elections results in 5 hours (Erdogan, 2011). Collaborative information sharing facilitates this success. News desk involves time pressure and is an effective tool to gain the pulse of the community (Arslan, 2001). In the former case (emergency response teams operations) failure results in discrete losses (people are injured or die) (Sabah, 2009); in the latter case (breaking news) failure results in abstract losses (reputation loss) (Merkezi, 2010).

In both cases discussed above, the organisations (AKOM and CIHAN) coordinate teams for collaborative operations. Both organisations involve information-related work tasks and the coordination is facilitated via information sharing and use. Teams/departments share or use information found by others to hedge time pressure, task complexity or uncertainty. In this regard, these features of both organisations impressed upon the researcher to investigate the collaborative information behaviour and decision-making types of staff in fast-paced and slow-paced situations.

In light of the above discussions, the research compares the distinct information behaviour types of organisations and tasks concerning their operating environment, task complexity and time pressure. This situation has prompted the researcher to ask the following research questions: *How do task complexity and time pressure influence information behaviour (seeking and sharing) in organisations in different contexts?* and *How do task complexity*

and time pressure influence information processing and decision making in dynamic environments?

Two information behaviour models illuminating collaborative information behaviour (CIB) have been introduced as the first contribution of the research. Time pressure and varying task complexity shape the model by illuminating barriers to access information and the complex needs of the tasks to be carried out. The second contribution lies in clarifying the interaction between information behaviour and decision-making type (intuitive vs. analytical) under time pressure. Time pressure and the nature of the work tasks drive organisational members to use intuition or an analytical mode.

Activity Theory has been used as the theoretical framework and methodological tool for the research. Activity Theory has been used to investigate individual information behaviour in the literature. The use of Activity Theory to investigate collaborative information behaviour is the methodological contribution of this research.

As a practical benefit of the case study, organisations can be helped in two areas: 1) The reports presented to the two organisations provide a holistic view of their work process, and 2) They may design their workstation, action plans and hierarchical structure through evaluation of the research findings.

This research includes an Introduction (Chapter 1), Literature Review (Chapter 2), Methodology and Theoretical Framework (Chapter 3), Activity Systems and Data Analysis (Chapter 4), Discussion (Chapter 5) and Conclusion (Chapter 6).

Initially, Chapter 1 briefly explains the research objectives, research background, research problem and questions, the rationality behind the use of Activity Theory in the research, and the impact, contribution and content of the thesis.

Secondly, Chapter 2 aims to reveal the gap in the literature and presents the extant theoretical and practical studies. It consists of a literature review of information behaviour, communication, disaster management, news-production, tasks and decision-making literature. At the end of each section,

the researcher discusses the gaps in the literature and summarises the findings in the conclusion of the chapter.

Thirdly, Chapter 3 introduces Activity Theory. It also discusses the theoretical framework, the case study organisations' features, the research design, conceptual data analysis, research problem and questions, and finally the relevance of Activity Theory to the research and the ethical issues for the research.

Fourthly, Chapter 4 provides an understanding of the organisational tasks identified as significant to resolve the problems most often occurring in fast-paced and slow-paced situations. It presents the contexts' features and interacting activity systems, provides findings from the fieldwork and exposes the differences and commonalities of two contexts in regard to information behaviour.

Fifthly, Chapter 5 discusses the research contributions via linking them to existing literature, the interpretation of the research findings, temporal issues and task categorisation regarding the operating environments. It introduces two collaborative information behaviour models that arose from the data analysis, and reveals the information use and decision-making modes of the two case study organisations' members while operating in dynamic environments.

Finally, Chapter 6 summarises the thesis and discusses its theoretical and methodological contributions. It concludes with sections on future research and limitations.

CHAPTER 2 LITERATURE REVIEW

2.1 Introduction

This chapter discusses the literature on information behaviour as treated in the disciplines of information science, communication science, task studies, decision-making theory, news management and disaster management. The aim of the chapter is to provide a comprehensive overview of the literature and identify any gaps.

Information behaviour is the totality of human behaviour while seeking, using and sharing information (Wilson 2000). Newly emerging themes in the literature include collaborative actions, since people collaboratively sort out their information needs problems in collective/collaborative manners. The figure below (Figure 1) indicates the information behaviour set, which is investigated in this research. All aspects of information behaviour are investigated, since none of the information behaviour activities could be demarcated from one another whilst people deal with information-related tasks. For example, if one would like to share or use information, initially one should come to possess it through seeking or searching for it. Thus, it is established that the study of information behaviour is broad in scope.
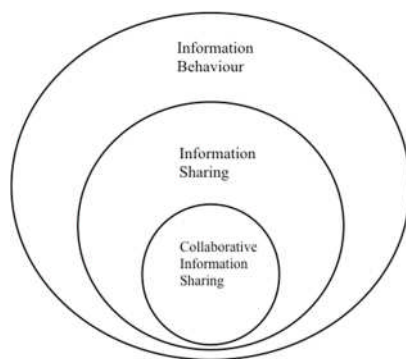
Figure 1 Information behaviour set (adapted from Karunakaran et al., 2013; Reddy and Hansen, 2008; Wilson 2006)

In organisational settings, people work in groups to sort out problems. Thus, interaction between people occurs and, in this context, the information found is used and shared.

In this research, the aim of the literature review is to analyse information-related activities in different fields. The focus of interest in this research is the intersection point of information behaviour and tasks, and information behaviour and decision-making modes in disaster management and news production contexts (Figure 2).
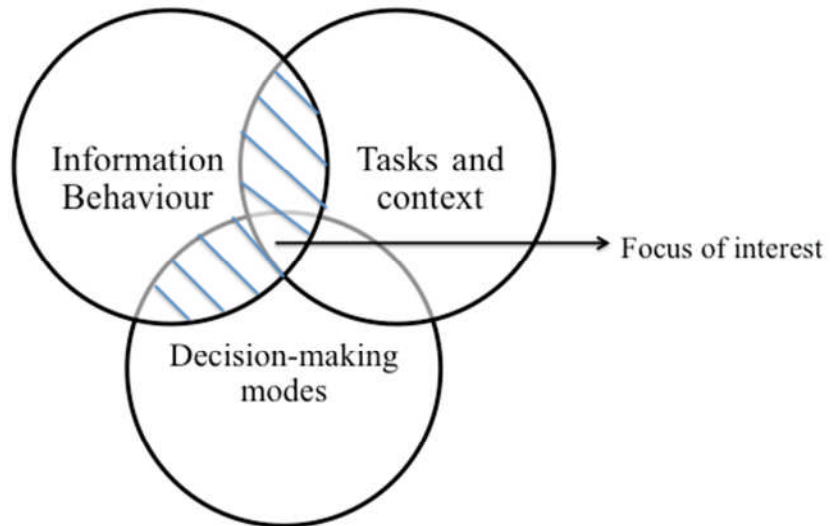
Figure 2 Focus of interest for this research

In the disaster management and news production contexts, work tasks are information-related. Depending on the tasks' complexity, organisational members (operational level, tactical level and strategic level) seek, share and use information while carrying out the work tasks. In this regard, this research discusses all aspects of information behaviour but especially information sharing and collaborative information sharing.

The following sections of this chapter involve a discussion of the studies attributed to information-sharing behaviour in information science and communication science, task studies attributed to time, uncertainty and complexity, decision-making studies attributed to the behaviour of people under time pressure and task complexity, and the literature in the context of disaster and news production.

2.2 Information behaviour

The departure point of the research is information behaviour. Humans and animals act or react to the stumuli around them. These actions and reactions are perceived as behaviour. Related to the Behaviour and Control School, the aim of the researcher is to observe human information behaviour in organisational settings. In particular, the collaborative information behaviour of organisational members is scrutinised.

User-centric approaches came into prominence by the second half of the 1970s and at the beginning of the 1980s in information studies; however, some sources mention much earlier papers. It is worth noting here that information behaviour used in the 1960s dealt with searching behaviour and the library use of scientists and technologists (Wilson, 1999b; Savolainen, 2007). User studies focus on the behaviour of information users while dealing with information, such as seeking, searching and using. The interest of this research, as mentioned above, overlaps with the information seeking, searching, using and sharing activities of organisational members in disaster management and news production contexts.

In user studies, the purpose of information seeking is the reduction of uncertainty or the satisfaction of the needs of individuals. In this context, the seminal paper of Dervin and Nilan (1986) discussed the paradigmatic change in information science. They mention the three innovations in the field that are based on the User Value approach of Taylor, the Sense-Making approach of Dervin (1983) and the Anomalous State of Knowledge approach of Belkin (1982). They emphasised that these three models focus on the cognitive side of information needs and uses; however, all three have substantial differences. Each of the models conceives human beings as actors while processing information, in contrast to the system-centric approach. The system-centric approach perceives human beings as the passive processors of information.

In the vast literature on information behaviour models, information-seeking behaviour is outstanding. Wilson (2000, 49) defined the information behaviour notion as *"the totality of human behaviour in relation to sources and channels of information, including both active and passive information*

seeking, and information use. Thus, it includes face-to-face communication with others, as well as the passive reception of information as in, for example, watching TV advertisements, without any intention to act on the information given." Similar to this definition, Savolainen (2007) states that information behaviour is not a solely passive phenomenon. It consists of face-to-face contact and interaction among people to act on information received or given. Davenport (1997, 83) explain the notion as *"...how individuals approach and handle information. This includes searching for it, using it, modifying it, sharing it, hoarding it, and even ignoring it."* Wilson (2000, 49) defines information-seeking behaviour as *"the purposive seeking for information as a consequence of the needs to satisfy some goal. In the course of seeking, the individual may interact with manual information systems (such as a newspaper or a library), or with computer-based systems (such as the World Wide Web)."*. Kulthau (1991) explains that information seeking is the process of searching for information to use and construct a meaning for the solution of a particular problem. In other words, information behaviour contains all aspects of information searching, seeking and usage (Case, 2006; Wilson 2000). Furthermore, this research opens another door to the argument that *"information sharing is also another element of information behaviour"*, and that searching, seeking, sharing and the usage of information cannot be demarcated from each other while carrying out organisational tasks in real-life settings.

Subsequently, the paradigmatic change in the field from system-centric to user-centric makes a change in its research methods: from quantitative to qualitative. Faced with this challenge, several models have been introduced by Wilson (1981, 1997, 1999b). Also, there are many other information-seeking models constructed by different researchers. The most cited models, besides Wilson's models, are Dervin's (1983) sense-making theory, Krikelas' (1983) information-seeking behaviour model, Kulthau's (1991) information search process model, Ellis' (1989, 1993) information-seeking strategies of the scientists model, and Leckie and colleagues' (1996) information-seeking behaviour of the professionals model. Each information seeking-model looks like a flow-chart indicating the sequences of events that took part in the

seeking period. In the next section, these information models are introduced and their relation to this research is discussed.

The searching, seeking, using and sharing of information are activities of human beings. In the prominent information-seeking models, information is perceived as a human need to facilitate satisfaction in any situation. It is not, however, a primary need as are physiological needs (Wilson, 1981). The information need of individuals can only be recognized by the inference of human behaviour or individual expression, otherwise it is not accessible by the observer, as it is embedded in the mind (Wilson, 1997). To lessen uncertainty or satisfy their information needs, humans seek, share and use information. Prominent information behaviour models approach information processing from the user's side. Table 1 indicates the features of the prominent models.

Table 1 Prominent information behaviour models (adapted from Karanukaran, 2013)

Model	Features
Wilson's Models (Wilson, 1981, 1999) (See Appendix 8.3, and 8.7)	Information need as trigger for the overall information-seeking behaviour Information need is not a basic need, but part of a process to satisfy three basic needs, namely physiological, cognitive and affective
Sense-making model (Dervin, 1998)	Information seeking is a sense-making process used by an individual actor to construct a bridge between a context and a desired situation
Information-seeking behaviour of professionals (Leckie et al., 1996) (See Appendix 8.9)	Specific to a particular professional practice Roles and related tasks carried out by professionals lead to information needs, leading to information seeking Importance given to intervening factors
Process-oriented information process model (Ellis, 1989)	Multi-stage model Starting, differentiating, monitoring, extracting, verifying and ending
Information search process (Kulthau, 1991) (See Appendix 8.6)	Process of construction that involves the experience of the person, feelings as well as thoughts and actions Activities include: initiation, selection, exploration, formulation, collection and presentation
Information gathering habits (Krikelas, 1983) (See Appendix 8.8)	Information gathering and giving habits of scientists One-way arrow flow information behaviour activity Immediate and deferred information needs exist and to reduce uncertainty information needs are satisfied
Task-oriented information seeking (Bystrom and Jarvelin, 1995) (See Appendix 8.5) (Hansen, 2005) (Hansen and Jarvelin, 2005)	Work tasks are the triggers for information seeking Information-seeking tasks are embedded in the work tasks Uncertainty and other situational factors influence information-seeking and search

Information-seeking behaviour is a main discussion point in information-behaviour research; however, as much as seeking behaviour people share information in their social or work life.

2.3   Information-sharing behaviour

Different people have different information strategies at work; however, they do not differ in information behaviour (seeking, searching, using, sharing) (Solomon, 1997). They feel that these are not extreme activities to mention. However, from an academic perspective, information behaviour is a decisive field. Thus, in the studies of information science, information seeking has been a central research area (Case, 2006; Talja, 2002). Therefore, many models have emerged during the past two decades engaging with information seeking behaviour.

In recent years, researchers' interest has shifted into communicative actions in information management. This situation is a key challenge for the field (Widén-Wulff, 2007). Thus, in this part of the literature review, the researcher will discuss information sharing as related to information science. Besides this, the literature review will refer to other related fields, such as communication, psychology and organisational studies.

Human activities are social and they are initiated by the interactions between the people in a community (Tuominen et al., 2005). As all human activities are social, human information behaviour (sharing, seeking and using of information) is a social phenomenon since these activities exist between/among people too (Wilson, 1981). People mostly do not think about any information behaviour they employ while they are performing in different contexts, such as their daily lives or in the workplace. However, all people are surrounded by their social habitat and interact with others. Every time people encounter uncertainty, they try to find information to hedge that uncertainty. Their sources are other people around them or different kinds of libraries. Even though people are not aware, they interact with others while seeking and sharing information about any issue. Thus, information-sharing

behaviour is facilitated by interaction with others while looking for answers to questions about our daily or work life.

As information sharing behaviour originates in information behaviour, the literature includes other aspects of information science and information behaviour. Information sharing in this research is conceded as a part of information behaviour that is embraced in the broad definition of Wilson (2000, 49) as *"the totality of human behaviour in relation to sources and channels of information, including both active and passive information seeking, and information use. Thus, it includes face-to-face communication with others, as well as the passive reception of information as in, for example, watching TV advertisements, without any intention to act on the information given."*

There are various academic studies focusing on information sharing in different contexts. The consensus is that it is a component of information behaviour and a communicative action. Davenport and Hall (2002) approached information-sharing activity as a type of information behaviour, essential in all collaborative activities to tie group members and communities. Information providers and information seekers are the actors of information-sharing behaviour. These two actors collaborate with each other to transfer the information from one party to the other. In some cases, we cannot easily distinguish between the provider of the information and the seeker. Also, it is hard to distinguish the seeker from the provider in collaborative work settings. In a similar vein, *"information-sharing behaviour can be defined as* the *collaboration between two groups of actors in order to exchange information with the purpose to achieve their individual or common interests (Bao and Bouthillier, 2007, 4)"*.

In this regard, both of them may interact with each other. The activity may be a two-way-process, as Talja (2002) conceptualised. Her research is about academic societies that benefit from each other's research findings to promote their knowledge capacity in related topics. According to her case study, there are four types of sharing: strategic, paradigmatic, directive and social sharing. She suggested that social aspects of information behaviour

could not be considered in an independent context. These social aspects are tied to social and cultural norms. Hence, in social networks information is not only sought, but also interpreted, used and created (Talja, 2002). In its social side and the use of found information by others, it is reminiscent of passive collaboration between academics. Thus, this case illuminates the works on collaborative information-sharing studies.

Another experimental study about information sharing –based on the Social Exchange Theory– has been conducted by Constant, Kiesler and Sproull (1994). They concentrate on understanding the attitudes and norms that facilitate or constrain information sharing in technology-based organisations. They used the Social Exchange Theory of Kelly and Thibaut as a research framework to investigate the organisational members' attitudes from the view of cost-benefit analysis in the information sharing process. They attested that, individuals mostly tend to share their knowledge (including expertise) when they expect good outcomes for their interests and for the whole organisation (Constant et al., 1994). This study is one of the pioneer studies that addressed the role of organisational members' attitudes and norms in information-sharing behaviour.

Hall and Widen-Wulff (2008) proposed three main types of exchange structure while discussing the information-sharing context. First is the *direct or restricted* that enables two agents to share reciprocally; second is the *generalized* where the reciprocation is less easily defined since the agents share in the group; third is the *productive* where agents are employed to achieve a joint output. Here, a collective effort comes into action through networks such as communities of practice or communities of sharing (Bao and Bouthillier, 2007).

In this research, the researcher focuses on information sharing that is one of the components of information behaviour. On a general level, before one shares information, he or she has to possess it (Hansen and Jarvelin, 2005). Therefore, information sharing cannot be investigated without taking the other information behaviour activities into consideration.

2.3.1 Cognitive vs constructionist viewpoint

In the comprehensive work of Savolainen (2007), umbrella concepts of information behaviour and information practices have been discussed. According to Savolainen, discourse in information science approaches information behaviour from a cognitive viewpoint. On the other hand, information practice emerges from the social constructionist view. However, both of them are recognised as umbrella concepts for information activities. They are ontologically and epistemologically different and rely on different meta-theoretical perspectives (Savolainen, 2007). Savolainen, however, distinguishes between information behaviour and information practice concerning their epistemological and ontological origins. He acknowledges that it is not easy to separate these two concepts since their borders are so elusive. In this regard, the researcher uses information behaviour in the current research as an umbrella concept, as Wilson discussed (Wilson, 2008b).

Another work on meta-theories is that of Talja and colleagues (2005). They make a distinction between the three (cognitive constructivism, collectivism and social constructionism). They reached a conclusion that all three are applicable in information science. Furthermore, all three complement each other.

Cognitive approaches in information behaviour studies are interested in how individuals concern themselves with information needs, seeking and using activities (Pettigrew et al., 2001). There are several models that approach information behaviour from a cognitive viewpoint as mentioned in the information behaviour models part. Cognitive constructivism recognizes knowledge as the creation of mental models (Talja et al., 2005). Information needs, seeking and the affect and cognition of the information user are the issues of cognitive constructivism. The cognitive approach concerns individual actors. Nonetheless, this makes it less appropriate for studying the broader social aspects of information behaviour. The aim of the researcher is to approach information sharing from a social constructionist view, but the

cognitive viewpoint is important because before the possessor expresses information, this is cognitively processed in his/her mind.

There have been studies on the social constructionist view in recent years (Widén-Wulff and Davenport, 2007; Talja et al., 2005; Widén-Wulff and Ginman, 2004; McKenzie, 2003a; Pettigrew, 1999; Savolainen, 1995). Social constructionist meta-theory emphasises linguistic over mental processes; the emergence of knowledge is facilitated by conversations (Talja et al., 2005). As Talja emphasis here, conversation is the precondition for the constitution of knowledge and the social world. According to the constructionist approach, a phenomenon is discussed from different aspects and different states via the different perspectives of the participants (Faucault, 1969 (2009)). Thus, interaction between different agents is the issue of the constructionist viewpoint. For information science, constructionist studies explore *information, information technology and information users* that are constructed with discourses (Tuominen et al., 2005). In the constructionist view, the direction of the studies is diverted from the individual level to the organisational and group level; therefore, the concern about information-sharing activity could be articulated by the two-way process people interact with each other during the activity (Talja et al., 2005).

Similar to the above discourse, Hansen and Jarvelin (2005) stated that problems are solved in group-based interactions, so that people process information through a collective effort. Thus, they learn about new experiences and emotions through dialogue and discourse (Tuominen et al., 2005).

Consequently, group-based behaviours are mostly related to social interaction. Information is generated through interactin between agents. For this research it is difficult to distinguish between the cognitive and social side since both meta-theories are overlapping. The present research will investigate information behaviour in team-based works, so it is societal. On the other hand, organisational members are supposed to seek information individually to complete work tasks. Thus, the researcher scrutinises both in this research.

2.3.2 Collaborative information behaviour

Most information behaviour studies have investigated information behaviour as individual activities. In real-life work settings, most tasks are carried out via collaborative action; however, there are only a limited number of studies investigating collaborative information behaviour. These articles discuss information processing in group-based activities. They indicate that information processing occurs in group-based settings besides being processed individually (Veinot, 2009). In this context, Talja and Hansen (2006a, 114) perceive collaborative information behaviour as *"an activity two or more actors communicate to identify information for accomplishing a task or solving a problem."* Another more detailed definition of collaborative information behaviour is *"the totality of behaviour exhibited when people work together to understand and formulate an information need through the help of shared representations; seek the needed information through a cyclical process of searching, retrieving, and sharing; and put the found information to use (Karunakaran et al., 2013, 2438)."*. Therefore, newly emerging themes in information behaviour science are collaborative actions, team and group information behaviour activities (Talja and Hansen, 2006b, Sonnenwald, 2006).

Collaborative information behaviour differs in three points from other individual information behaviour. As summarised in Table 2 below, there is interaction between individuals, integration of the fragmented information sources, and communication differentiating collaborative information behaviour from individual information behaviour (Karunakaran et al., 2013, Reddy and Jansen, 2008).

Table 2 Differences between individual information behaviour (IIB) and collaborative information behaviour (CIB) (adapted from Karunakaran et al. 2013; Reddy and Jansen 2008, Sonnewald, 2006)

	IIB	CIB
Motives	Lack of relevant information to complete a task Gap between the current situation and the expected outcome	Complex information needs Fragmented information resources Lack of domain expertise or distributed domain expertise Lack of immediately accessible information
Mediators	Querying, seeking, searching	Interaction between information users Communicative action among information users
Objective	To fulfil the affective, physiological, cognitive information needs To carry out the individual work tasks	Ensuring collaboration between information users To accomplish the shared objective

Triggers for collaborative information behaviour can be categorised under three main domains: fragmented information needs that require team members to communicate to each other to be aware of the situation, lack of domain expertise, and immediate accessible information (Reddy and Jansen, 2008). Their findings from their case studies confirm the existence of these three triggers. In the communication part, team members seek information from each other and the *seeking-sharing-seeking* circle in the teamwork occurs. In this case, team members collect information from different agents and combine the different pieces of information to satisfy their information needs and solve the problem. In a similar vein, information sharing (communication) is *sine qua non* for collaborative group actions; otherwise the group work will fail (Sonnenwald, 2006; Sonnenwald and Lievrouw, 1996).

The second trigger for collaborative information behaviour is the lack of domain expertise. The complexity of the task constrains individuals from

reaching a decision individually. In this regard, each of the individuals focuses on different parts of the problem according to their expertise. Also, this point is well discussed in many communication studies (Franz and Larson, 2002, Stasser et al., 1995).

The third trigger is the information retrieval technologies. Individuals interact with technological tools to seek or share information. In collaborative settings, information technologies have a substantial role in supporting collaborative information work. It is notable here that in collaborative settings, information technologies have a supporting role (Reddy and Jansen, 2008).

Collaborative information sharing is one mode of systematic information processing in group- or team-based settings. It is not a serendipitous activity. It involves collaborative query formulation, database searching, information filtering, interpretation and synthesis (Talja and Hansen, 2006b). Therefore, it enables the group or the team to work on a specific task with a planned division of labour. So, the decision-making groups work in collaboration to make decisions on any course of action.

In a study on a battle simulation, Sonnenwald (2006) investigated dynamic group information behaviour and effective information sharing in a group that is influenced by organisational, inter-cultural and interdisciplinary differences. In her study she investigates face-to-face and remote communication of organizational members in command and control. One other collaborative information behaviour study is conducted by Hyldegård (2006, 2009) and Hyldegård and Ingwersen (2007), who investigated the collaborative information (seeking) behaviour of students in educational settings. These studies investigates Kulthau's (1991, 2004) information search process in group settings. They scrutinises how the attitudes and affects of individuals alter in group-based works as opposed to individual works. Critics of these works identified that most information behaviour emerges in group settings. In contrast to this situation, previous researches have investigated individual behaviours, isolated from social factors. In light of this critique, they observe students who engaged in collaborative work

activities that refer to physical activities, and cognitive and emotional experiences. Hyldegård (2006, 2009) find out that every group member had different emotions during the search process, and that also intra-group divergence has an impact on motivation and feelings (uncertainty, frustration, disappointment). In addition, group members influence each other during group work. According to the results of the case studies, Hyldegård and Ingwersen (2007) point out that so many differences occur depending on contextual and social factors while working in the groups. They assert that group-based work is a dynamic process and that Kulthaus' ISP model does not fully indicate the group members' information behaviour while they are working collaboratively.

There is still a gap in the understanding of CIB comprehensively. Most of the work investigates seeking behaviour and information retrieval (Reddy and Jansen, 2008, Hansen and Jarvelin, 2005). There are a scarce number of papers devoted to information behaviour in information science while investigating collaborative actions and dynamic contexts. The societal part of information behaviour is still an underdeveloped area in information behaviour research.

2.3.3 Studies on information sharing behaviour

Recent information science literature on information-sharing theories or models is really scarce. In the edited book of Fisher, Erdelez and McKechnie (2006), that embraces the theories of information behaviour, there are only attributes to information sharing while discussing Rioux and Erdelez's (2000) and Pettigrew's (1999) works. In the work of Rioux and Erdelez the acquisition of information encountered and shared on the Web is discussed. Information acquisition and sharing models propose that individuals encounter and store other people's information needs. When this information is relevant for others, the possessor recalls this information and then shares it with individuals who need this. In the acquisition and sharing model, the acquirer behaves considering his or her own needs and the other people's

needs. In Pettigrew's (1999) work, the information environment in health clinics and the information behaviour of the nurses, patients and seniors are identified. The social atmosphere in the clinics enables both parts to create and share human services' information. The clinic is a social area where information is created through the interaction of individuals. In this context, the social constructionist approach is inevitable for investigating this kind of information behaviour of patients, nurses and seniors. Thus, the study developed information ground concepts where human services information is created by the conversation between the nurses, patients and seniors. Pettigrew's work is similar to Tuominen and Savolainen's (1997) social constructionist approach. They propose that people construct versions of reality by communicating among themselves and, thus, exchanging what they know about the problem. Through information exchange, they intend to solve their problem. In their study, people facilitate the purposeful and spontaneous information sharing in their conversations.

As there are some other works that focus on the information-sharing behaviour of individuals in different contexts, one other similar work to Pettigrew's is McKenzie's (2003b) *Everyday Life Information Seeking model*. People seek information from each other. They assist each other by exchanging information to solve each other's information problems. Proxy information exchange occurs through: active seeking in information encounters, active scanning in information encounters, non-directed monitoring in information encounters and interaction by proxy with others (McKenzie, 2003b).

Similar to the above studies, Fulton (2009) investigat the information-sharing activities of genealogists in the context of leisure activities. His work is based on Talja's (2002) collaborative information-sharing model (social exchange), Erdelez and Rioux's encountered information (on the Web) and Hersberger, Murray and Rioux's (2007) online information exchange communities model as analytical frameworks. In the emergency health care context, Sonnenwald and her colleagues (2008) have conducted research on information-sharing by teleconferencing. Their research aims to investigate how to facilitate

immediate access to the required domain information held by experienced senior health staff when distance exists between the team members. Their study investigated the information-sharing activities of team members from both the informatics side and the social capital side. The use of 3D technology for information sharing in the emergent cases help paramedics to take action more effectively and respond to urgent cases. Immediate access to the required information gave the advantage of rapid responses.

As another information exchange environment, communities of practice (CoP) have been studied in many researches. CoP is a social world where all participants learn from each other through exchange and communication (Lave and Wenger, 1991). It emerges that in the context where people have common concerns they embrace sharing activities among people (Davenport and Hall, 2002). Communities of practice are groups of people who share a set of problems, or a passion about a topic and who deepen their knowledge by interacting with others on an ongoing basis (Wenger et al., 2002). This information-sharing practice is interpersonal, among members, and incorporates sharing expert or professional knowledge, or any other kind of information through informal means. Wenger et al. (2002) point out that knowledge creation and learning is deeply embedded in CoP. CoP is concerned with how newcomers learn their professions by seeking and sharing with others.

Social capital and information-sharing linkage is investigated by Widén-Wulff and colleagues (Widén-Wulff et al., 2008, Widén-Wulff and Ginman, 2004). They investigated the phenomenon through the dimensions of social capital and they discuss the link between the information-sharing motives of the organisation members and organisational knowledge (Widén-Wulff and Davenport, 2007).

Widén-Wulff and Davenport's (2007) paper is amongst the first to analyse the information-sharing behaviour of the organisational members of two Finnish firms in terms of organisational knowledge production through the analysis of activity systems. Also, their work is intimately related to the present researcher's interests since it uses Activity Theory as a theoretical

framework. Their aim is to investigate the individual and group information behaviour role in organisational development and evaluate the mediating artefacts in the process via using Activity Theory as an analytical tool.

Another comprehensive work about information behaviour models is the book of Case (2002). In the book there are prominent information behaviour models; however, none of them pertains to information sharing as a main discourse. The models are mentioned considering the information seeking behaviour of social groups or work groups, such as professionals, students, ordinary people etc. Recent models, such as Wilson's (1981, 1997, 1999b) information behaviour models attribute information exchange to individuals; however, this point is not discussed in depth from a social point of view. This point does not highlight information sharing behaviour in collaborative situations. In his early model, Wilson (1981) discusses the information seeking behaviour of the user as opposed to other people. He determines this as the *"information exchange"* where *"the use of the word 'exchange' is intended to draw attention to the element of reciprocity, recognized by sociologists and social psychologists as a fundamental aspect of human interaction. In terms of information behaviour, the idea of reciprocity may be fairly weak in some cases (as when a junior scientist seeks information from a senior but hierarchically equal colleague) but in other cases may be so strong that the process is inhibited, as when a subordinate person in a hierarchy fears to reveal his ignorance to a superior"* (Wilson, 1981, p.4).".

As a summary, the recent information behaviour research literature which discusses information-sharing activity, focuses on the types of and motivations behind information sharing (Widén-Wulff, 2007; Talja, 2002; Davenport and Hall, 2002), sharing the encountered information on virtual communities (Fulton, 2009; Hersberger et al., 2007; Erdelez and Rioux, 2000), spontaneous information exchange in everyday life contexts for everyday life information needs and information exchange for health care (Sonnenwald et al., 2008; McKenzie, 2003b; Pettigrew, 1999), and social capital and information-sharing behaviour (Widén-Wulff et al., 2008; Hall and Widén-Wulff, 2008; Widén-Wulff and Ginman, 2004). It is worth noting

here that there are many studies on information sharing in the supply chain and organisational networks but these are not related to this research area so they will not be discussed in this part. There is still a gap in the literature regarding collaborative information-sharing behaviour.

2.3.4 Conclusion

As an under-developed area in information behaviour research, new emerging themes in the information behaviour field include information behaviour in societal contexts and information sharing as a communicative action. In particular, they are investigated using social meta-theoretical approaches. In this study, the aim of the researcher is to investigate information behaviour in social life settings from a group-based perspective through the lens of Activity Theory. The purpose of Activity Theory is to use the advantage of comprehending the phenomenon in real life settings and societal situations. How the collaborative information behaviour is influenced by task complexity and time pressure will be investigated, and ill-structured aspects will be analysed to develop a new information behaviour model involving the collaborative side of information behaviour.

2.4 Information sharing in communication studies

Information sharing is a social activity that takes place between individuals who communicate through language. It occurs face-to-face or through other communication tools such as mails, phones, computers and other technological tools. Information-sharing literature in information science mostly deals with information sharing among individuals and among organisations, and with what are the motivators that enable this kind of activity. Other than information science, information sharing has been mainly investigated in communication and psychology sciences.

As a communicative action, information sharing in groups and among individuals has been investigated in many studies (Stasser and Titus, 1985; Stasser and Titus, 1987). These studies focus on the role of shared and

unshared information in the quality of group decisions. The central point of these studies is observing the role of group discussion on the communication of unshared information, and how shared and unshared information influences the output (decision). In the laboratory cases, it was pointed out that two situations (shared and unshared information) have different consequences on the decision quality and effectiveness. Without the motivation of both actors, the activity will fail or the actors will not reach the expected outcomes because of the hoarded information or unsystematic share (Sonnenwald 2006).

2.4.1 Hidden profile paradigm

Early researches by Stasser and Titus (Stasser and Titus, 1987; Stasser and Titus, 1985) have been decisive in information sharing in decision-making groups. They discuss hidden profile paradigm in their experiments, which are a socio-psychological topic. Following them, much research has been conducted to investigate the hidden profile paradigm in groups and its impact on the decisions of those groups. The hidden profile paradigm suggests that some of the information is distributed to all group members before the discussion (shared information), and any part of the information is known by only one person (unshared information). In their studies, small group discussion in a hidden profile situation is investigated. They find that the best alternatives are selected in all shared situations. Similar to this discourse, if the group members discuss the unshared information during the group discussion, they choose the best alternative. Accordingly, some studies indicate that hidden profile begot suboptimal decisions in most cases (Wittenbaum et al., 2004).

On the other hand, hidden profile influences pre-discussion preferences. Moreover, post-discussion preferences can alter due to the hidden profile paradigm and collective information sampling. At the beginning of the discussion, if the hidden profile paradigm exists, individuals' preferences are determined by the biased information that may favour inferior alternatives. During the discussion, interaction between group members and the

emergence of the unshared information facilitate the group to reach a decision that addresses the best alternative. Although they investigated the role of unshared information in group discussion, they pointed out that the shared information is discussed more than the unshared in group settings, which is similar to most of the early researches (Larson et al., 1994; Stasser and Titus, 1987; Stasser and Titus, 1985).

In this context, discussing more shared than unshared information is a sub-optimal use of the group's resources. To avoid this situation *"groups might be actually better off discussing more of their unshared information because doing so would add to their collective knowledge base (Larson et al., 1994, 457)"*. To achieve this objective there are two options: first, all group members should be aware of the information which is held by other group members, or secondly, the group should pool the information which is held by the other group members at the beginning. In this case, the collective information sampling model has been introduced by Stasser and Titus (Stasser and Titus, 1987; Stasser and Titus, 1985) dictates that all the group members work in collaboration to share information among themselves to pool all the relevant information. Thus, the decision quality increases.

When investigating decision-making groups in disaster and news contexts, decision-making groups/teams initially seek relevant information from each other. After the groups are satisfied that all the relevant information is shared and possessed by the group members they agree on the decision. It is worth noting here that the time pressure/speed of the decision vs the quality of the decision made become crucial in both contexts.

2.4.2   Collective information sharing

Groups mostly face the difficulty of pooling their unshared, unique information. They expect to pool the common information and unique information of the group members during group discussions. Stasser and Titus (1987) deduce that group discussion is the process of sampling arguments and facts. When Stasser and Titus (1985) talk about the collective information-sampling model, they find that shared information has a

sampling advantage over unshared information. This is because all group members know shared information. Since only one knows the unshared information, it loses its sampling advantage. And they also assert that the reason for failures in the discussion of mostly shared information is caused by the combination of imperfect individual recall and collective sampling process that stimulate to the discussion of shared rather than unshared information. Accordingly, the purpose of pooling the unique information would be to see the best alternative objectively (Larson et al., 1998) and pooling of unshared information would be vital when it is relevant to complete the task (Stasser, 1992b). One more advantage of the information pooling during discussion is to avoid the ignorance of the members' unique information (Stasser et al., 1989). Collective information sampling can be achieved by the recognition of the each member's specific information domain and coordinating information processing (Stasser and Titus, 2003).

The formulation of the CIS model is by Stasser and Titus (1987). They propose the probability of the sampling of the unshared and shared information during group discussion. The probability increases if more people are aware of the information. So, this case supports the shared information sampling advantage that is known by all, over the unshared that is known only by one. In their model, they concede that the sampling of information is a disjunctive task where only one member has to recall the item to sample it. According to this process, repetition of the item increases if more people are aware of it.

According to the disjunctive task, the group fails in discussing any of the items if all members fail (Steward and Stasser, 1995). In general, the information sampling model of Stasser and Titus (1987) reveals that exchanging of unshared information increases during the discussion if the ratio of the unshared to shared information increases. Hence, group members intend to discuss less common information if the common information is relatively less well distributed before discussion. If the information load is low, the chance of the unshared to be mentioned increases. This static version

of the sampling model has been revised by Larson et al. (1994), who created a dynamic collective information sampling (DCIS) model.

Larson et al. (1994) propose a model of dynamic collective information sampling model. Their model is based on sequential discussions. It proposes that early in the discussion common information would be presented, and then the discussion would go towards the unshared, unique information. They argue that common items dominate the discussion in the early stages; however, the unique items are recalled and discussion would linger on unshared items rather than common ones, as it progressed. They support their propositions by strong empirical studies and their work is a refinement of the information sampling models. However, they discuss the likelihood of mentioning the unique items in the prolonged discussions, pointing out that the threat to avoid the discussion of the unique information is less than expected. They argue that groups often determine a topic when group members agree. So, this situation prevents them from discussing all the relevant information that group members hold. One more threat for DCIS is the early formation of the group members' opinion on the discussed topic. Even the discussion is prolonged; group members' opinions are consolidated and formed early (Larson et al., 1994).

2.4.3 Motivated information sharing

Since the early information sampling models are shaped by the hidden profile paradigm and represented by the laboratory cases, Wittenbaum et al. (2004) introduces the motivated information sharing model in group settings. In their model, they prefer to use natural decision-making processes by criticising the hidden profile paradigm, which they also enhance (Please see Figure 3). They state *"information exchange is a motivated process whereby members deliberately select what information to mention and how to mention it to particular members in order to satisfy goals (Wittenbaum et al., 2004, 286)."*

INPUT   PROCESS   OUTPUT

Features of Context → What information is mentioned → Group Decision Quality
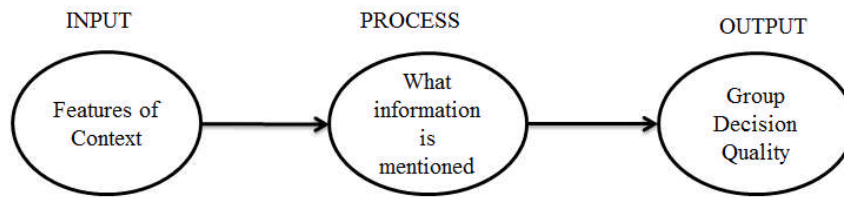
Information sharing in decision making groups with hidden profile task
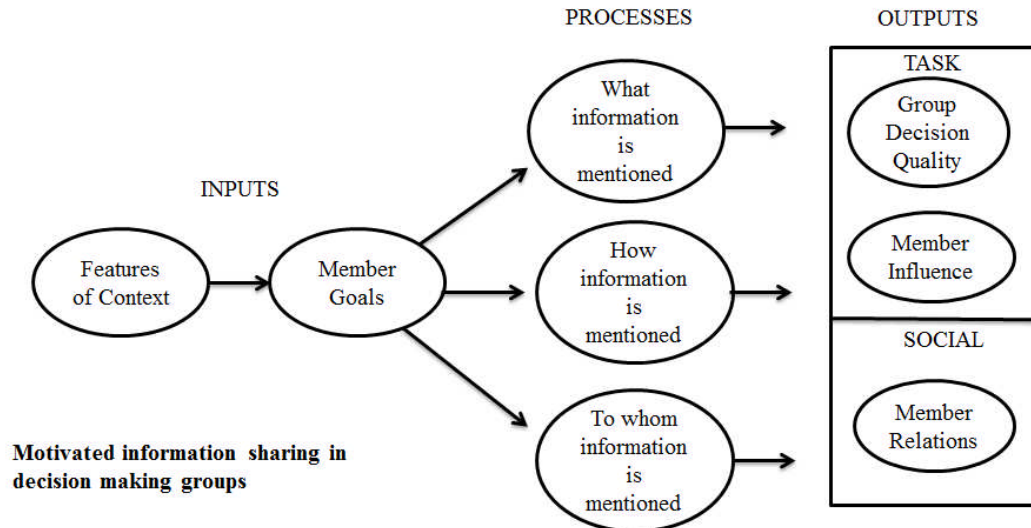
Figure 3 Information sharing in hidden profile vs motivated information sharing (adapted fom Wittenbaum et al., 2004)

In their model, they aim to investigate the different motives that shape the information-sharing activity of the group. Group members choose to whom they mention the information, what information to mention, and how to mention the information in the process. Members' preferences influence both task outcomes and social outcomes. Outcomes of the model are represented in two dimensions (task and social). The members influence the activity by using their historical knowledge (Klein, 2008). This point is challenging in the motivated information-sharing model.

In group meetings, the interaction between group members on the social side and the personal influence on the task side enable quality decisions for organisations. Corporate meetings are required to comprehend the phenomena and respond to the disasters or publish the news. The process starts with the description of the problem. According to the contexts features (news or emergency), organisational members' goals change. Relevant information is sought from sources and shared with the relevant members to

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carry out the tasks. Therefore, this type of information sharing lessens information overload and increases the speed and quality of the decisions.

2.4.4   Group discussion and decision making

Most organisations, government agencies and businesses generate small groups for important decisions (Kelly and Karau, 1999). Group discussions are the best places for the exchange of information among individuals. Recall, exchange and use of information are the three activities in decision-making groups (Dennis, 1996).

As group discussions are information-rich environments, mutual sharing of the members' unique knowledge, expertise or insight facilitates it. Then, participants become aware of the others and establish shared understanding (Paul and Reddy, 2010). Thus, decision-making groups are places for making a more informed decision through the exchange of initially unshared information, especially expert information (Gigone and Hastie, 1993). Decision-making groups have the advantage of benefitting from the pooled, collective information of all group members (Stasser and Titus, 1985) as opposed to one member bias (Stasser, 1992a), and of using more resources such as individual differences in knowledge, experience and viewpoints (Franz and Larson, 2002; Stasser et al., 1995). Therefore, groups are better decision makers than individuals (Scholten et al., 2007; Stasser and Titus, 2003; Gigone and Hastie, 1993; Stasser and Titus, 1985).

Stasser and Titus (2003, 304) assume that *"each knows some things that the other does not, their collective decision should be more informed than a decision made by either alone."*. This assumption stems from two information processes: *"First members can share the task of recalling information: one member may recall facts that others fail to remember. Second: each member may bring to the discussion information that others in the group never had. Therefore it seems obvious that a decision making group can, in principle, reach a more informed decision than can any of its members acting alone (Stasser, 1992a, 156)."*. Thus, Vroom and Jago (1988)

state that this case allows groups to make higher quality decisions than those made by individuals.

The effectiveness of group decisions gain important momentum in organisational settings, so organisations establish groups for any of the strategic, political or organisational decisions (Gruenfeld et al., 1996). During the discussions, there are so many distinguishing ideas that emerge, and the purpose of the group discussion is to facilitate the complete exchange of information (Dennis, 1996). Stasser and Titus (1985) assert that decision-making groups select from a set of alternatives and that these alternatives have been put forward by discussion of the various alternatives. Hence, one of the purposes of the group discussion is to reach a consensus and the other is to pool the expertise and the knowledge of the participants. In this regard, via group discussions, the members construct information by evaluating past events and the other group members' insight (Klein, 2008). Group members, who view the problem from a wider perspective and produce solutions for the group decisions, are more informed than individual decision-makers and evaluate much more the alternatives. In this context, group discussion is a social environment for exchanging information and creating new information to use for action. However, it is notable that the group composition plays an important role in the exchange of distinguishing expertise and knowledge in the discussion.

The composition of the decision-making groups has an essential role in the quality of the decisions. There are two perspectives that arise regarding group composition. The first one is the homogenous group that consists of members with similar expertise, background or knowledge. The second is the heterogeneous group that consists of members with diversified expertise, background or knowledge. Groups which are established by familiar and unfamiliar members, differ in some theoretical dimensions: interpersonal knowledge, interpersonal attraction and member diversity (Gruenfeld et al., 1996).

Both kinds have some advantages and disadvantages. Jackson (1992) mentions the high-quality decisions and viewing the situations from a wider

perspective as the advantages of the heterogeneous groups, while Greenfield et al. (1996) assert that these groups facilitate the learning of new things. The exchange of the unique and unshared information advantage is high in this kind of heterogeneous groups (Stasser and Titus, 1987). In this context, members bring different information and viewpoints for the solution of the problems. During the discussion, their unique information about the issues is communicated to each other. The unshared information that exists at the beginning of the discussion becomes obvious and all members become aware of it. On the other hand, if confidence is not established, the emergence of the unique information cannot exist. In this manner, the one disadvantage of the heterogeneous groups emerges. Another threat for the heterogeneous groups is the incapability of members to pool their unique insights and integrate them (Stasser and Titus, 1985). The integrity and pooling of information in group-discussion settings are essential to reach an unbiased and effective decision. As mentioned in the previous sections, these threats have to be considered in terms of pooling the relevant information effectively for making high-quality decisions.

Regarding the homogenous groups, Greenfield et al. (1996) deduces that such groups relationships with each other is of a high level. This situation facilitates group cohesion, but the threat is the redundancy of information due to familiar backgrounds (Jackson, 1992).

Organisations establish cross-functional groups, involving members from different organisational functions and departments to ensure that the group composition is heterogeneous by the diversified knowledge and expertise of its members (Gruenfeld et al., 1996). Thus, the threats of low-quality decisions and information bias can be avoided.

In this regard, a different background and different expertise facilitates group members in using each other's knowledge as delineated in the transactive memory theory of Wegner (1986). He argues that social groups involve specific domains of knowledge. These domains are the group members. These group members use each other as memory aids. Each group member has the responsibility of a specific domain. When it is required, his/her

knowledge is recalled for the benefit of the group. The feature of this theory is that groups are the repositories of unique information and this information is recalled to contribute to group decisions.

In a disaster context, a heteregeneous group approach is used in disaster manegement meetings to pool the different institutions' perspectives. This enables the organisations to comprehend the phenomena from a wider perspective. In the news context, the directors and editors of different divisions hold editorial meetings. The interaction between the divisions and the information exchange generate the news design and broadcasting policy.

2.4.5   Conclusion

Information exchange or sharing in groups has been discussed in many communication studies. Small group studies are mostly conducted in laboratory cases. Small group (three-, four-, six-person groups) behaviour is investigated under the hidden profile paradigm existence. Most of the studies searched for the effect of the shared and unshared information in decision quality. Other theories or paradigms used in communication studies and related to group discussion are the Collective Information Sampling (CIS) model of Stasser and Titus (1985), the Dynamic Collective Information Sampling (DCIS) model of Larson et al. (1994) and Wegner's (1986) trans-active memory theory. All these models and theories are used to observe information pooling, the use and exchange in group settings for evaluating the alternatives, and decision-making. They approach information pooling, sharing and using from the social side; however, they do not investigate real-life settings. This point is the main critique of the researcher on the communication literature review part of this research.

In disaster and news contexts, the researcher aims to comprehend the information exchange in real-life settings, and how time pressure influences the quality of information sharing and the decisions.

2.5 Organisational Tasks and Decision-Making Theory

In the existing literature, the use of information in organisational decision-making and the process of information in organisations are mentioned comprehensively in the work of Daft and Lengel (1983) and O'Reilly (1982). There are various sources dealing with the decision tasks and the purpose of decision-making in organisations (Mackenzie, 2005; Michailova and Husted, 2004; March, 1997; Cyert and Williams, 1993; Simon, 1987; Simon et al., 1987; Hickson et al., 1986). However, the information behaviour of the organisational members while dealing with the tasks and time pressure in the decision-making process in real-life settings in different contexts has not been mentioned much in the management literature. The use of information in the decision tasks and decision process is widely mentioned in communication studies. Most of the studies are laboratory cases and do not deal with real phenomena. Therefore, in the following sections, the researcher sheds light onto information behaviour while dealing with different tasks where time pressure and task complexity exist.

Organisations are divided into sub-units and social entities. Therefore, organisations are considered as inter-departmental systems and these sub-units involve different decision tasks to satisfy organisational needs (Hickson et al., 1986). Most of their works are on making decisions and problem solving. In this regard, they seek information that is relevant for the decision tasks to reach a high-quality decision.

Although information sharing is comprehensively discussed in communication studies (albeit mostly in laboratory cases, and the researcher has discussed them in the communication section of this thesis), resources mentioning the information behaviour of organisational members in different contexts are very scarce. In the decision-making tasks process, managers/organisational members tend to take collaborative action. In this context, they seek information from different sources or share their information with other managers and with their peers to reach a decision. Task performance affects the overall strategy of the organisation or its routine activities.

2.5.1 Tasks and information

Tasks are a purposeful set of activities. Every activity involves tasks and every organisational member's job consists of different tasks. *"A task is usually seen as purposeful set of linked concrete or cognitive activities performed by people (or machines); normally, it has a meaningful purpose as well as an identifiable beginning and end. ... A task seen from the latter point of view is a description of what is expected from a person (or a machine) (Byström, 2007, online).".*

In the information-seeking context, information-related tasks are categorised as complex and repetitive (routine) tasks (Byström and Jarvelin, 1995). The complexity of the tasks can be analysed through advanced pre-determinability. If the work process, the amount of information needed, the variety of the information sources and the expected outcome are determinable in advance, the tasks are categorised as less complex (Byström, 1999). Task complexity and the problem structure (structured or ill-structured) have a role on people's use of the information sources and their information behaviour (searching, seeking actions) in performing the tasks (Vakkari, 1999a). To perform a task, physical and cognitive actions are required. Tasks, especially complex ones, include sub-tasks which support the main tasks (Vakkari, 2003).

Byström and Jarvelin (1995) differentiate between task categories from simple to complex: automatic information processing tasks, which are determinable and repetitive; normal information-processing tasks, which are almost determinable; normal decision tasks which are quite structured and case-based; known, genuine decision tasks, which are *a priori* known information requirements and exist to perform the tasks; and genuine decision tasks which are unexpected, new and unstructured so that they are complex tasks. From this range, the task characteristics indicate whether the tasks are structured, repetitive and determinable, or unstructured and complex. Table 3 reveals the task categorisation and information processing inter-dependence.

Table 3 Tasks categories (adapted from Byström and Jarvelin (1995))

Task category	Description
Automatic information processing tasks	A priori completely determinable so that, in principle, they could be automated –whether actually automated or not. **Example:** computation of a person's net salary yields a real number in some known range and requires this person's gross and tax salary and tax code, and taxation table
Normal information processing tasks	Almost completely a priori determinable, but require some case-based arbitration concerning, for instance, the sufficiency of the information normally collected. Thus, part of the process and information needed is a priori indeterminable. **Example:** tax coding is mostly rule-based, but some cases require additional clarification (i.e. case-dependent information collection)
Normal decision tasks	Still quite structured, but in them case-based arbitration plays a major role. **Example:** hiring an employee or evaluating a student's term paper
Known, genuine decision tasks	The type and structure of the result is a priori known, but permanent procedures for performing the tasks have not emerged yet. Thus, the process is largely indeterminable and so are its information requirements **Example:** deciding about the location for a new factory or medium-range planning in organisations
Genuine decision tasks	Unexpected, new, unstructured. Thus, neither the result, the process nor the information requirements can be characterised in advance. The first concern is task structuring. **Example:** the collapse of the Soviet Union from the view point of other governments

Different types of information needs occur during performing a task: problem information, domain information and problem-solving information (Byström and Jarvelin, 1995). Problem information includes the structure, properties and requirements of the problem; domain information is the known facts, concepts, laws and theories in the domain of the problem; problem solving information is the methods of the problem treatment and the way the domain information is used to reach an effective solution about the problem (Byström and Jarvelin, 1995)

Regarding the information needs mentioned in the previous paragraph, information seeking, using and sharing exist to satisfy specific requirements. For instance: how many people to allocate for specific activities in the next 1-2 days, or how to increase the number of the teams in the specific region etc., or how to act instantly during a disaster to rescue people. All these activities consist of different tasks and their task types vary. By doing so, the information behaviour of the members who accomplish these tasks varies. Hence, the relation between this categorisation of the tasks and the research is to classify the organisational tasks into these types and investigate the information behaviour of the organisational members. Thus, Figure 4 The work chart structure represents the work task structure and how the tasks are performed inside the organisation. Figure 4 The work chart structure involves the situational factors, which will be reviewed during the research.

The work chart structure
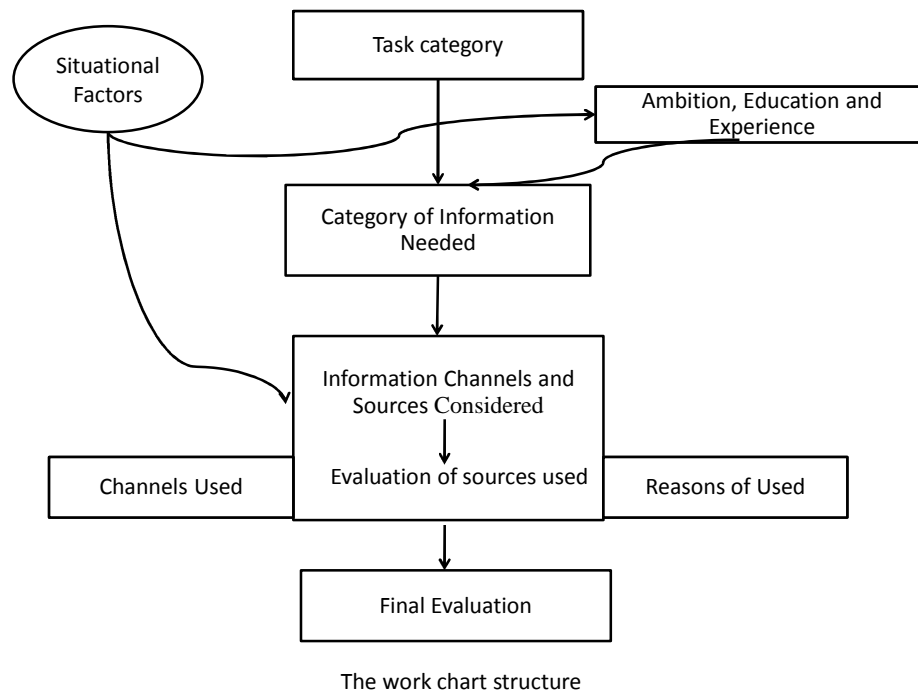
Figure 4 The work chart structure (adapted from Byström and Jarvelin, 1995)

Task completion requires team coordination and collaborative effort in organisations. Thus, if the tasks are accomplished by information exchange, members are considered to be in collaborative information behaviour activity. As task completion information is a mean, information seeking and information searching activities are a mean too (Kulthau, 2004). As cognitive settings, people are surrounded by different kinds of tasks in real life. These are work tasks, assignments for school etc., all of which are influenced by the task requirements, a timetable and information quality (Byström, 2007). Moreover, in real life settings, organisational members need information, subject to task complexity and time constraints, to solve problems and complete the tasks in a satisfactory way (Schrah et al., 2006).

Organisational tasks are real-life tasks bounded to situational factors. These situational factors are identified and considered to encompass the whole situation (Byström and Hansen, 2005). The performance of real-life tasks is influenced by the operating environment, the availability of information

sources and the timetable, and the fact that members cannot consider all the variables in a detailed way (Byström and Hansen, 2005).

Information behaviour can be perceived as a sub-task to complete the organisational tasks. Information seeking, sharing and using exist collaboratively between the organisational members and departments to complete the work tasks. Thus, *"information behaviour is a repertoire of actions and operations and judgements about timing and ethics brought into play across work cycles and routine (Widén-Wulff and Davenport, 2007, online)."*. However, it is notable that in the recent literature only information searching and seeking are mentioned as sub-tasks to carry out the work tasks (Vakkari, 2003), and only few resources exist in the literature about information sharing and task performing using the Activity Theory (Widén-Wulff and Davenport, 2007). In this study, the researcher investigates information sharing and information seeking while looking at work tasks. The information sources for the organisational tasks are institutional documents; expert inside information acquired from the external environment, and shared information between different divisions.

2.5.2   Time, uncertainty and task complexity

Task complexity is an important element for task performance. Task complexity is the task perception of the individual through his/her prior experience and knowledge (Hyldegård and Ingwersen, 2007). Task complexity is associated with the pre-determinability of, or uncertainty about, the task (Vakkari, 1999b). Thus, uncertainty has an effect on the types of information needed and which sources are supposed to be used (Vakkari, 1999b). As mentioned above, information behaviour of the people depends on their task's features, time constraints and characteristics of the problems arising during accomplishing them (Byström and Jarvelin, 1995; Savolainen, 2006).

Byström (2002) points out that task complexity increases the importance of the experts as information sources as opposed to other people and other documentary sources. In organisations, responsible managers/directors are

the experts who are responsible for making decisions. They use their domain expertise while searching for information and using that information in the decision-making process. The decision makers favour searching for expert advice when task complexity exists (Schrah et al., 2006). In this regard, expert information is used to reduce the effort for information search and ensure the accuracy of the decision. The advice of an expert is perceived as a recommendation and it is distinguished from task information, as mentioned in the previous section. In this situation, recommendations are the summary of the task information and consist of evaluations (Schrah et al., 2006). As a result, task complexity increases information need, the requirement for expert information and the required time to solve the problem, while it decreases decision quality and the quality of information seeking (Vakkari, 1999b; Byström and Jarvelin, 1995).

Another factor on task performance is time constraints. As time is embedded in all human activities, it is a temporal factor in human life (Savolainen, 2006). Time pressure exists in how the task is supposed to be completed (in minutes, hours or days) (Case, 2002). There are studies exploring time impact on information behaviour (Kulthau, 2004); however, they do not deal with rapid response cases. The existing models and theories discuss information processing via an analytical, sequential mode to find the optimal solution; however, dynamic situations and complex tasks force the organisational members to find the first working solution (Klein, 2008; Klein and Calderwood, 1991). The use of information to carry out real work tasks where time pressure exists in a dynamic environment is an unexplored area in the information behaviour field.

2.5.3 Judgement and decision making

Time pressure and stress impact on human cognition. Therefore, decision-making behaviour is influenced by these factors. The decision-making literature acknowledges that uncertainty, task structure, the availability of feedback loops and time constraints are factors that have an impact on decision makers' use of intuitive or analytical approaches (Allen, 2011; Salas

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et al., 2010). Recent information behaviour models and theories deal with the analytical processes of decision-making. The models involve the rational processes of searching and seeking behaviour (Allen, 2011). Information need is constituted by contextual (situation, social, task-related), affective and cognitive factors (Savolainen, 2012). Information seeking, searching and gathering behaviour exist in a sequential, conscious and rational way (Kulthau, 2004; Wilson, 1999b; Leckie et al., 1996)

The majority of organisational decision-making literature emphasises the rational, analytical and deliberative decision mode, which encompasses judgement via evaluating the alternatives (Simon et al., 1987; Simon, 1987; Simon, 1979). Simon and colleagues (1987, 76) define decision-making as a "*work of choosing issues that require attention, setting goals, finding or redesigning suitable courses of action, and evaluating and choosing among alternative actions. The first three of these activities … are usually called problem solving; the last, evaluating and choosing, is usually called decision making.*". However, under high uncertainty, decision makers choose less rational ways to decide on actions (Sadler-Smith and Sparrow, 2007). Table 4 indicates the dichotomy between the intuitive and analytical modes in information processing. Table 5 reveals the interrelations between intuitive mode of decision making and information behaviour considering the environmental factors, task features and decision maker.

Table 4 Information processing modes (adapted from Allen, 2011)

Intuitive mode	Analytical mode
Rapid information processing	Slow information processing
Simultaneous cue use	Sequential cue use
Formal rules unavailable	Formal rules available and used
Reliance on non-verbal cues	Reliance on quantitative cues
Raw data stored in memory	Complex organising principles stored in memory
Cues evaluated perceptually	
Vicarious functioning	Cues evaluated at measurement level
Pattern recognition	Vicarious functioning unnecessary due to use of organising principles
	Task-specific organising principles

Recent studies on decision-making in real-life settings emphasise that organisational members use their intuition besides using analytical methods (Salas et al., 2010; Hodgkinson et al., 2009; Hodgkinson et al., 2008; Sadler-Smith and Sparrow, 2007). The Naturalistic Decision Making (NDM) theory investigates the decision-making behaviour of managers/experts/professionals faced with complex problems in the field where uncertainty and time pressure exist, the environment is dynamic and information poor (Klein, 2008; Klein, 1993). NDM extends its boundaries from individual to group-based processing via investigating seeking, sharing and integrating information behaviour of team members to decide on a course of action (Lipshitz et al., 2001; Zsambok, 1997).

2.5.3.1 Intuitive vs analytical decision making

Intuition is the non-conscious processing of information via direct knowing (Sinclair, 2010). Hammond (2010) states that intuition is non-conscious, a *hunch* or a *gut feeling* that relies on *long-term memory* (Allen, 2011). Decision- makers recognise the patterns embedded in their mind through their past experiences and synthesise the current/relevant cues to take a

course of action (Simon, 1987). Experts intuitive ability in generated through use of long-term memory matching vast number of patterns (Hodgkinson et al., 2008).

It is not only past experiences that are used in intuitive modes of decision-making. Affects are another driving factor for confirmation or selection among the alternatives (Sinclair, 2010). Judgements can be changed affectively (Dane and Pratt, 2007). In organisational settings, affective judgement can be used as one kind of expert judgement.

Particularly in crisis/disaster management, expert intuition is used. Domain-specific information, the establishment of specific goals in mind and pattern matching are critical for crisis management where the environment is dynamic and the conditions are changing rapidly (Sinclair, 2010; Dane and Pratt, 2007; Zsambok and Klein, 1997).

As intuitive decision-making is carried out via non-conscious information processing, which is feasible for rapid decisions in time pressured/emergency situations (Salas et al., 2010), decision makers do evaluate their strategies through intuition and analytical processes (Lipshitz et al., 2001). In this case, obtaining information about changing environments supports the development of modified strategies and their implementation (Mishra et al., 2011c).

Table 5 Interrelations between the factors influencing intuitive decision-making and information behaviour (adapted from Allen, 2011; Salas et al., 2010)

	Factors affecting the use of intuitive decision making	Information behaviour
Environment		
Time pressure	Increasing levels of time pressure are associated with more reliance on intuition, as deliberative processing is a more time-consuming mode of cognition	Information-seeking models seldom discuss temporal factors explicitly. Savolainen (2006) identifies three conceptualisations of time: as a fundamental attribute of a situation or context of information seeking; as a qualifier of access to information; and as an indicator of the information seeking as a process
Uncertainty	High levels of information uncertainty (combined with other factors) can stimulate intuitive decision making	Uncertainty as an activator of deliberative goal-directed information seeking behaviour (Savolainen, 2012; Wilson, 1999a)
Task features		
Feedback loops	Both implicit and explicit memory development is facilitated by feedback	Feedback is viewed within short-term information seeking processes as "feedback loops" to stimulate further information seeking (Leckie et al., 1996)
Task structure	Intuition is more likely to be effective in judgemental tasks with large sets of cues to integrate. Intuition is key to completing successfully tasks that involve high complexity	Complexity seen as significant. Emergent findings on this topic, however, are underlined by linear deliberative decision-making models (Byström, 2002; Byström and Jarvelin, 1995; Sonnenwald and Pierce, 2000)
Decision maker		
Expertise	Extensive experience within a domain can produce automaticity and a large and well-organised knowledge base, affording intuitive pattern recognition capacities	

2.5.3.2 Naturalistic Decision Making and the Recognition-Primed Decision Model

Rational decision-making models do not deal with the critical aspects of the operational settings where the decisions are made within time constraints, complex and uncertain situations, and where there is no chance for optimisation (Lipshitz et al., 2006). Naturalistic Decision Making (NDM) contributes to the field via describing the way people make decisions in real-world settings (Klein, 2008). Four criteria of the NDM research distinguish it from the traditional laboratory-based studies: the characteristics of the task and the settings (real-world contexts); the nature of the research participants (professionals and experts); the intention of the research (observation and description of human behaviour); and, the point of interest within the decision period (situation awareness, sense making) (cf. Gore et al., 2006).

NDM draws attention from domain-independent to experience-based expert decisions via introducing the Recognition-Primed Decision Model (RDM) (See Appendix 8.10) (Klein, 1993). People use past experiences and match them in their mind to decide for their next action under time pressure, in changing situations.

RDM arose from the decision-making process of fire-fighters. It has a vast area of usage in emergency management and military contexts where the environment is very dynamic. RDM consists of intuitive and analytical parts. Pattern matching is the intuitive part, and mental simulation is the analytical part of the model (Klein, 2008). The trade-off between the intuitive and analytical modes of RDM illustrates the balance between avoiding the risks of flawed options and being a latent response.

In RDM, the decision makers are not assessing the different options. They are acting on the basis of prior experience via sense making (Weick, 1993) and modifying action plans to satisfy the situational needs at the time of acting (Klein, 1993). RDM encompasses three different cases of action according to the complexity of the situation. The simplest case is the recognition of the

situation and implementation, which is intuitive and unconscious; the conscious evaluation case is the use of mental simulations after the recognition of the situation, and the complex RPD strategy case is where the action is taken in a changing context (Klein, 1993). Complex RPD strategy is a conscious/analytic case where verification of the situation familiarity, seeking more information and mental simulation exist (See Appendix 10.9). *"The (RDM) simply illustrates several types of recognitional decision strategies. A person understands a situation in terms of its familiarity to a given set of prior cases, carries with it recognition of goals that are feasible, cues that are relevant, expectancies to monitor, and actions that are plausible. The decision maker can use experience to generate a likely option as the first one considered. The evaluation of the option is through mental simulation to see if there are any pitfalls to carrying the option out. If these can be remedied, the option can be strengthened. If not, the option is rejected. If no pitfalls are envisaged, the option can be used (Klein and Calderwood, 1991, 1021)."*.

2.5.4 Conclusion

In the literature, task-based information studies are used in group-based problem-solving studies (Hyldegård and Ingwersen, 2007; Kulthau, 2004) however, organisational tasks are not much mentioned. Organisational tasks are only mentioned in Leckie's (Leckie et al., 1996), and Byström and Jarvelin's (1995) model. On the other hand, information-seeking activity is mentioned but the information-sharing part is not discussed for task completion and problem solving. Here, however, it should be noted that in the recent literature only information searching and seeking are mentioned as sub-tasks to complete work tasks (Vakkari, 2003), while some scarce resources exist in the literature on information sharing and task performing using the Activity Theory (Widén-Wulff and Davenport, 2007). In this regard, this is one gap in the literature. Tasks are mentioned as isolated issues; however, they are supposed to be linked to contexts and real-life settings. Tasks are performed inside organisations by the collaboration of different

members. Thus, they are social and they are supposed to be investigated as social phenomena including uncertainty and time constraints. This is the second gap in task literature.

2.6 Disaster Management and News Production

This section of the literature review aims to understand disaster management and news production literature. The information-related sides of these two contexts are indicated.

2.6.1 Disaster management and information processing

Disaster management is a time- and information-dependent set of activities. The spatio-temporal and information management issues arose during disaster management. The aims of disaster management are: to save lives, to decrease hazards, injuries and losses, to facilitate response activities in a timely and effective manner, to assist the public to recover and resume their social life, to save the cultural and environmental heritage, to decrease the economic and social losses, and to use resources effectively (AFAD, 2012). The types of man-made or natural disasters are earthquakes, fires, explosions, floods, land slides, snow slides, storms, hurricanes, heavy rain and severe weather (AKOM, 2010). Four phases of disasters are generally accepted: preparation (preparedness), response (coping), recovery (aftermath) and prevention (mitigation) (Petrenj et al., 2011).

The increase of natural and man-made disasters in the last decades prompted researchers to focus on the disaster management field. Ineffective emergency response increases hazards and losses. The traditional approaches are widely criticised by researchers (Kapucu and Garayev, 2011).

The academic focus is mainly on the preparation and response phase. The studies mainly scrutinise the coordination of resources (Janssen et al., 2010; Chen et al., 2008; Faraj and Xiao, 2006; Kapucu, 2006; Kapucu and van Wart, 2006; Waugh and Streib, 2006; Kapucu, 2005; Drabek, 1985),

technology use (Bergstrand and Langren, 2009; Bharosa and van Zanten, 2009; Shklovski et al., 2008; Pack and Coleman, 2008; Langren and Nulden, 2007; Mendonca et al., 2007; Massimo, 2006; Harrison et al., 2006; Kyng et al., 2006; Graves, 2004; Cutter, 2003;), command and control decision making (Kapucu and Garayev, 2011; Baumgart et al., 2008; Kowalski et al., 2003), and public management (Kapucu, 2008; Naim and Montgomery Van, 2006; Becker, 2004). There is scarce number of studies (Allen et al., 2013; Lin et al., 2012; Mishra et al., 2011a; Mishra et al., 2011b; Bharosa et al., 2010; Reddy and Jansen, 2008; Sonnenwald and Pierce, 2000) that mention the subjects of the disaster management and their information behaviour.

2.6.2   Disaster phases

Disaster management is categorised in four main phases: preparedness during disaster (response) and post-disaster (recovery and mitigation) (AFAD, 2012; Petrenj et al., 2011; AKOM, 2010; IBB, 2010; Janssen et al., 2010). Figure 4 The work chart structure illustrates the four main phases of disaster management in cyclical format. It does not have a start and end point, as man-made or natural hazards occur unexpectedly. Therefore, responsible governmental or non-governmental institutions deal with sustainable disaster management plans.
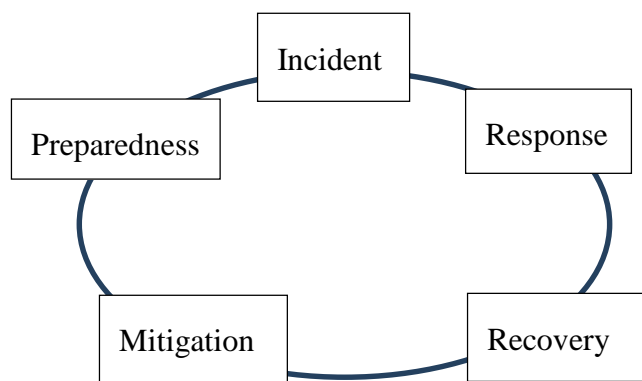
Figure 5 Disaster phases (adapted from Petrenj et al. 2010)

Mitigation involves any of the precautions to prevent disasters, and reduce the risks and losses of unavoidable/unexpected disasters. It is a long-term action to construct a sustainable prevention from the potential hazards of the disasters. Disaster insurance, fitting fire sensors, adapting emergency protocols and standard building codes are long-term actions for reducing the hazards of disasters.

Development of emergency response plans and coordination, training of the public and the emergency response services about what to do during disasters, and improvements on the response and communication equipment are key issues in the preparedness phase. Coordination plans of the disaster management institutions (governmental and non-governmental) play a crucial role in the preparedness phase.

At the response phase, more rapid actions should be taken compared to the other three phases. The response phase is very short-term and emergency response commanders (tactical level) are specialised to take response actions, such as save lives, decrease injuries and protect properties. Response activities include the assessment of risks, search, rescue, first aid and fire fighting. Therefore, the emergency trainings and response plans, which are applied/generated in the preparedness phase, are put into action in the response phase.

The recovery phase involves the coordination of the basic human needs post-response. The allocation of resources is made to protect vulnerable people and groups from the hazards of the disaster. Governmental and non-governmental institutions take social, environmental and economic restoration actions. Reports and evaluation databases are produced about the reasons and results of the disasters for further use by the disaster management institutions in the mitigation and preparedness phases.

2.6.3 Technology

The role of information management in disaster management has increasingly concerned academic research. Technology use is perceived as

the solution for an effective emergency response. Time- and information-dependent systems are used. Accurate information about a situation, such as the condition of the victims, traffic load and needs, is retrieved via the use of technological tools in disaster management (Horan and Schooley, 2007).

Cross-organisational information sharing systems facilitate effective emergency response, better planning, and support decision-makers with accurate and up-to-date information (Horan and Schooley, 2007). These kinds of information systems enable organisations to interact during the time of disasters (or all the time, before and after). Organisations share information or use the information found by other emergency organisations.

Information needs vary and contingencies exist during disasters. The ICT used for disaster management is expected to provide timely and relevant information. *"Technology, ... resource management technology, and geographic information systems, significantly aid the response efforts. Public managers, the media, and external entities are able to communicate throughout the disaster and thereby keep residents safe and ensure a return to normal living condition*s as soon as possible (Kapucu, 2008, p. 257).".

2.6.4 Coordination

During disaster times, disaster management institutions work in collaboration conceptualised as *knot-working* (Engeström, 1999b, Engeström, 2011) in the literature. Due to the presence of unpredictable cases and the dynamic structure of disaster times, inter-agency cooperation and coordination are established (Kapucu and Garayev, 2011). After disaster, the institutions unknot themselves and continue with their routine tasks.

Time is *lives* in emergency response. Effective coordination and inter-agency collaboration aim to achieve the timely response to decrease the losses to an acceptable level. To achieve timely response, integrated information systems are crucial for disaster management institutions. Integrated information systems facilitate the effective response via delivering timely and accurate information and lessening the existence of fragmented, isolated information

(Janssen et al., 2010). Failure in integrated information system design, which is established between the operating disaster management insitutions, causes interoperability problems.

Other than the role of technology, an additional issue influencing coordination is organisational culture. Flexibility of the organisational structure, culture, trust and relationship among organisational bodies has an impact on coordination (Kapucu, 2008). The habits of organisational members and the preferences of the organisations affect collaborative work while some tend to be more rigid or more flexible (Kapucu and Garayev, 2011).

For effective response and recovery operations, collaboration and trust should be established at all levels; ongoing collaboration establishes a strong relationship between the institutions and provides support to solve societal problems as they emerge (Kapucu, 2006; Kapucu, 2005).

2.6.5 News-production and information processing

News media is gaining importance in the social lives of individuals. The main objective of news agencies is informing the public. Within the emergence of the online news portal, the news production and gathering process altered. Technology plays a convergence role in the news production process. Therefore, the information behaviour of the news producers (editors, journalists, correspondents and technical news crews) changed. Besides, new roles and departments have emerged, such as audio-visual equipment and satellite news gathering (SNG) vehicles. The news content is richer than before via utilising more sophisticated equipment.

Audiences are less patient than before to access fresh and updated information about any events and incidents. To satisfy the audiences' information needs, news agencies structure themselves to access timely, fresh, relevant, accurate and high-quality information, and disseminate it to the audiences (Fernández et al., 2006).

2.6.6 News-production process and information behaviour

News agencies are operating in a dynamic context. Whether they are dealing with breaking news or daily news, they are bounded by strict deadlines. Time management is vital for news producers. As soon as the news centre or the correspondent receives the notification, news teams are dispatched to the site to collect information. In some cases, the news teams are already in waiting. This advanced planned case may occur for political press releases, concerts, matches etc. Otherwise, the news process is prompted by a notification coming from outside the organisation. It is notable here that it is not only notifications received from outside that have a key role in making people aware of breaking news, but also the radio cut offs of correspondents is an effective way of knowing what is going on.

In order to gather primary information from the site, teams need to access the site where the news is happening and collect the relevant information to use in the news production process (Paterson, 2011). The key point for effective news production is to be at the right place at the right time.

The format of the news varies: breaking, live, package, interview, phone conversations, debates, documentary or reader (Schultz, 2005). In this research, the focus is on breaking news and the daily documentary news scrutinising the influence of temporal issues. Breaking news are unscheduled: they could relate to fires, explosions, shootings etc.; however, daily or documentary news are planned in advance (Schultz, 2005). Breaking news is developing news (Hartley 2011). Daily or documentary news has already happened. There is no immediate action taken to disseminate the information to the public. These differences have effects on the process of these two different types of news. The daily or documentary news processes are: planning, writing, editing, source management and decision making (Schultz, 2005). Contrary to this situation, breaking news are prompted by a notification received from outside about an incident. Therefore, the process of the breaking news involves being prompted by stimuli from outside,

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accessing the site, collecting relevant information, transferring the information and immediate decision-making.

The major criteria for the quality of news production are timeliness, relevance, accuracy and consistency; and they are equally significant for quality news production.

Technology and human factors are important issues for quality news production. Teamwork, coordination, critical decision making and technological news production equipment are standing out (Paterson, 2011). All these four factors interact with one another. The newsroom is surrounded by technical equipment to gather and assemble information and create news contents, and it is perceived as the brain of a news agency (Keirstead, 2005). The users of these systems are the correspondents, editors and technical news production crews. The interaction between the human resources and the technological resources facilitate the quality of news production.

The raw material for news is information. The objective of the news agencies is informing the public. There is a substantial amount of studies discussing the information behaviour of news staff (journalists, editors, correspondents) and the information needs and seeking behaviour of journalists (Onal, 2008; Onal, 2007; Anwar Mumtaz et al., 2004; Attfield and Dowell, 2003; Chinn, 2001; Poteet, 2000; Nicholas and Martin, 1997). As journalism mainly relies on processing information to create the content of articles or news, there are quite a large number of papers investigating the information behaviour of journalists. The focus is on information needs and seeking behaviour.

Recent studies mainly approach the information behaviour of news professionals from an individual point of view. The main discourse is that information need is determined by cognitive functioning, and seeking activity relies on information needs via taking time constraints into consideration. Advances in technology, however, and the convergence in work roles make the news task more complex. This complexity forces news professionals to collaborate with each other more than before.

Constant communication exists during the news production process. Information is shared between editors and anchormen, and between editors

and correspondents. Two vital parts in this process are validation and accuracy check of the information that are completed by the editors (Schultz, 2005). Failure of validation and accuracy check leads to catastrophic losses for news agencies.

The documentary news process emphasises the journalistic type more than breaking news. The news idea is generated in the mind as cognitive functioning. At the initial stage it is individual attempt. The journalist seeks information about the phenomenon he/she would like to talk about. The information sources of the journalist are primary sources and secondary sources. Direct contacts with the subjects of the phenomenon or observations of the correspondents are primary information sources. Web search, content search and database search are secondary information sources for the journalist, used to produce documentary news. After the journalist finishes collecting relevant information for his/her documentary, the collaborative work starts. The audiovisual crews, the text editors, and other technical staff produce the content of the documentary. It is noteworthy here that for the documentary type news, news research staff are also used to assist the journalists (Keirstead, 2005).

Generally, news staff intend to choose more reliable information sources, access them faster and easier, work with the primary sources, and use information and communication technologies in the news process (Onal, 2008). It is notable here that web search is recognised as the most significant information source, and the web is used to seek and validate information in the news room (Garrison, 2000).

2.6.7   Technology and news

The quality and effective use of newsroom technological systems are essential for news agencies. The information gathering methods, values and media practices of the news agencies are affected by technology (O'Sullivan and Heinonen, 2008). The text and pictures are assembled by use of technological equipment. The content of the news (texts, audio, photos,

videos) are generated and assembled for further broadcast, though only text and photographs used to be the unique content of the news long before.

The main hardware tool in newsrooms is still PCs; however, challenging software are emerging every day (Keirstead, 2005). News staff (reporters, writers, journalists, editors, technical crews) is connected with each other for carrying out news tasks. Video, audio, graphics and text are shared among these staff during the news production process. Multimedia work is facilitated by digital technology (Klinenberg, 2005). The final product (news) is the integration of these entities. Therefore, news is produced by the collaborative efforts of the staff.

Out of the newsroom, news staff uses another technological tool to collect information in the field and share it with the newsroom. The technological equipment used out of the newsroom includes satellite news gathering (SNG) vehicles, cameras, audio recorders, radios and mobile phones. Improvements in technology altered the technological equipment; the pervasiveness of SNG, the challenges of the internet and the use of mobile phones to transfer news are basic examples (Boyd-Barrett and Rantanen, 2002). The use of the internet and mobile phones changed the communication methods of news staff who can respond to situations and communicate with the news room faster than before (Garrison, 2000). The work process has also changed: reporters use phones, online conversation applications and e-mails to conduct interviews, instead of face-to-face conversations (Russell, 2009). Another challenge of technology in the news production context is its facilitating role for collaborative work (Keirstead, 2005). Specialised information transfer systems and software are utilised by the news agencies. The news agencies are networked with their subscribers or with their staff through these systems.

As a summary, technology has changed the work process of the news agencies enabling the news staff to seek, share and filter information, generate rich content for the news, and disseminate the news to the public or subscribers faster. However, faster news are criticised for their accuracy and consistency issues. Live materials, especially SNG, lower the quality of the news when the consideration of the news staff is on fast dissemination of the

news to the audiences (Boyd-Barrett and Rantanen, 2002). The editorial phase of the news is skipped during live streaming via SNG, so that the final product, the news, become of low quality (Yu and Wen, 2005).

2.6.8 Management of media

Media organisations management is a dynamic process and focuses on both human and non-human resources. Media work does not only deal with exchange of information, but also deals with complex networks of information sources, market situations, advances in technologies and the structure of the industry (Deuze and Steward, 2011). Challenges in technology have a convergence role on the management of media organisations. The structure of the newsrooms, the networks and work process is shaped by technology; therefore, technology has an impact on spatio-temporal issues in media organisations. In terms of technological improvement information exchange is carried out through the ICT systems instead of face-to-face conversations or physical representations. Spatial proximity, however, is still a very important issue for communication and information exchange.

The rivalry in the market forces media organisations to be innovative. Large and open news rooms, transparent walls (no walls) between departments and flexible hierarchical structures stand out as issues for innovation (Meier, 2007).

2.7 General conclusion for the chapter

In this literature review, the researcher has discussed information behaviour in different fields. The main departure point for the current research is the information behaviour literature; however, the tasks and decision-making literature and communication literature are crucial areas in which information behaviour has been widely discussed. Communication studies mainly discuss information behaviour or information processing to investigate the way in

which group members reach quality decisions; management studies discuss information behaviour or processing to investigate the use of information while carrying out work tasks or decision-making.

Information behaviour research approaches information behaviour mainly as an individual action. It is worth noting here, however, that few resources discuss challenging themes, such as collaborative information behaviour in real-life or real-work settings.

In communication studies, information usage and decision-making are investigated in laboratory cases. Conversely, in management research, the information behaviour discussion focuses especially on information seeking and the information needs of organisations. Work tasks are discussed in few resources and researchers mostly discuss the information seeking behaviour for task completion but not sharing activity related to seeking activity. However in the work settings organisational staff work in social environment and collaborate to carry out tasks. When the researcher shed light onto the information behaviour of the organisational staff, the found information is shared with tema members and used.

The aim of the researcher regarding this gap is to find out the information needs of work tasks in real-life settings and investigate the information behaviour of organisational members in different contexts. The collaborative information actions of organisational members while carrying out work tasks are the main research aim of this research.

Another gap in the literature is the lack of real-life context in previous studies (Vakkari, 2003), which dealt with isolated tasks and laboratory cases There is a need, however, to consider tasks in real-life settings for effective use of information and decision-making in dynamic environments. In this context, investigating information behaviour through the lens of Activity Theory (with its links to the social context of activities and real-life settings) prevails.

CHAPTER 3 METHODOLOGY

3.1 Introduction

This research employs Activity Theory as a theoretical framework and an analytical tool. Activity Theory has been described as providing an overarching explanatory framework that enables the investigation of the information behaviour of humans in social settings (Allen et al., 2011; Wilson, 2008a; Widén-Wulff and Davenport, 2007; Spasser, 1999; Nardi, 1996a).

Activity Theory is one of the ways to understand the nature of human behaviour. Accordingly, it is a framework based on human consciousness in order to explain human behaviour (Wilson, 2006c). Activity theory has become an internationally known approach thanks to its capability to be applied in different domains. In its early phases, it has focused on the investigation of socio-cultural psychology, especially on the education and educational development of children (Vygotsky, 1978). Nevertheless, it cannot be regarded as only a psychological theory. It is also a multi-disciplinary approach in social sciences (Engeström and Miettinen, 1999). It is mostly studied in the education, work and technology fields (Engeström, 2000). Accordingly, it has been used in a broad range of studies: education and learning at work (Engeström, 1999c; Engeström, 2001), ergonomics and developmental work design (Meyers, 2007; Bedny and Karkowski, 2004; Bedny et al., 2001; Engeström, 2000), information system design and human computer interaction (Nardi, 1995; Bødker, 1989), application of technology in e-learning (Greenhow and Belbas, 2007; Mwanza and Engeström, 2005), distributed cognition (Salomon, 2001), and also in agricultural studies (Pereira-Querol and Seppanen, 2009). It has been discussed in information science research by Wilson (2006c), Nowe, Wilson and Maceviciute (2008a), and Widén-Wullf and Davenport (2007). Therefore, currently, Activity Theory is an approach providing conceptual and semantic tools for

methodology, and is applied in different areas of the social sciences (Engeström, 1999a).

The paper of Wilson (2008a) is a beneficial source as a review of the theory's origin, the fields of application and theoretical study, and for exposing the link to information science. It is worth noting here that Spasser (1999, 1136) argued that the theory is appropriate to *"provide information science with a rich, unifying, and heuristically valuable vocabulary and conceptual framework that will facilitate both the continual betterment of practice and the secure transferability of knowledge"* but the emergence of Activity Theory in information science occurred after 2005 as mentioned in previous paragraphs. Some studies use the philosophy of the theory, but, do not mention the theory explicitly. The link between the context, activity theory and information behaviour is discussed by Widén-Wulff and Davenport, and Allen and colleagues (Allen et al., 2011; Widén-Wulff and Davenport, 2007).

3.2   The origins of Activity Theory

As a concept, Activity Theory is the commonly approved name of cultural-historical activity theory that has its origins in German philosophy (in the works of Hegel, Kant and Marx) and in Soviet Union cultural-historical psychology (in the works of Vygotsky, Leont'ev and Luria) (Engeström, 1999a; Engeström, 1999b).

In the Soviet Union, Activity Theory emerged as a Marxist alternative to the Western psychological orthodoxy of behaviourism (Wilson, 2008a). It is a psychological paradigm that scrutinises the work behaviour of individuals (Bedny et al., 2000). In this regard, the theory originates in the investigation of human behaviour that is formed through activity, and so the theory explains the nature of human behaviour (Wilson, 2008a). In Marxist writings, the concept of *activity* is understood as the *change* that is attributed to *revolutionary practice* that has an impact on societal circumstances (Foot, 2001; Engeström and Miettinen, 1999). In this vein, Bødker (1989) asserted that the main idea of the theory is to understand society and culture on the one hand, and to understand human personality on the other. The analysis of

human activities through the lens of sociology, anthropology, historical materialism and psychology is the philosophy of the theory.

Activity Theory concedes that human cognition and behaviour are collectively organized, artefact-mediated social activities (Engeström, 1999b). As it is related to human behaviour, and the science of behaviourism, it relies on the consciousness of human beings and discerns their behaviour and that of animals as regards to consciousness (Wilson 2008a; Bedny et al., 2000). In this respect, Bedny, Seglin and Meister (2000, 168) pointed out that *"under the rubrics of AT, plans, motives, methods of performance and goal-directed behaviour as a whole can be formulated consciously or unconsciously, but the goal of an activity is always conscious."* The objective of the conscious activities is to transform something, and in the Russian origins of Activity Theory the term evokes the term *transform*, meaning to alter some features or characteristics or process of something by transforming it (Kuutti, 1996).

By grounding the theory on Marxism, Vygotsky's first generation of Cultural Historical Activity Theory formulates practical human activity from a psychological view, while the second generation of the theory is developed by Luria and Leont'ev (involving socio-historical and socio-cultural dimensions, which are not extensively mentioned in Vygotsy's work) where the activity of people occurs incorporating mental functioning (Roth and Lee, 2007). The third generation of Activity Theory discusses the interaction between activity systems. This point is the main focus of this research. Interacting activity systems and the third generation of Activity Theory are discussed in the following sections.

3.2.1   Principles of AT

Having engaged with the application areas and the origins of Activity Theory, we can move on to the generally approved principles of the theory. There are six widely approved principles of the theory: unity of consciousness and activity, object orientation, internalisation/externalisation, mediation, the hierarchical structure of the activity, and development.

a. Unity of consciousness and activity

The most essential principle of Activity Theory is the unity of consciousness and activity. Activity theory is a descriptive tool dealing with human practices rather than a predictive tool, so that its object is to understand the unity of consciousness and activity (Nardi, 1996b). Citing from Marx, Cole and Scribner (1978) stated that historical changes in society stimulate the changes in the human nature that expose the consciousness and behaviour of individuals. In a similar vein, citing form Hegel, Engeström (1987) asserted that consciousness is shaped by society and objectified by the instruments which are created by humans. Consciousness is the human mind, and activity is the interaction of human beings with their societal environment. Therefore, the emergence of the human mind is bounded to the context of the activity (Kaptelinin, 1996). Thus, consciousness is ingrained in the surrounding activity system, and the changes in conditions alter human consciousness. In doing so, the acts of humans change (Jonassen and Rohrer-Murphy, 1999). *"Consciousness is co-knowing, but only in that sense that individual consciousness may exist in the presence of social consciousness and of language that is its real substrate (Leont'ev, 1978, Ch. 3)."*

b. Object orientation

The principle of object orientation indicates that all human activities are steered by the reality of the object. Human activities are formed to transform the real, socially constructed objects (Wilson, 2008a). Transformation of that object drives the subject towards accomplishing its goal and this case (transformed object) is the motive for the activity (Allen, 2013; Jonassen and Rohrer-Murphy, 1999). Any activity stimulated by a motive ends with a final objective. The objectives give direction to the activities.

c. Internalisation/externalisation

This principle describes the mechanisms of the mental process. It supposes that internal activities cannot be separated from external activities, since internal activities (mental activities) are formed by external activities (Kaptelinin and Nardi, 1997). In view of this, this principle is linked to the first two principles. Mental processes are the consequences of human

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activities interacting with the external world through internalisation (Kaptelinin, 1996). Thus, man's consciousness is shaped by his/her actions upon real objects (Wilson, 2008a). In Vygotsky's (1978) *zone of proximal development*, it is assumed that internalisation occurs through the reconstruction of the external activity that involves a transformation by sign using, and the actual relations between human beings through transforming the inter-personal process by the longitudinal developmental events in which the process takes a long time to be internalised.

d. Mediation

Activity systems are composed of subject, community and object. They are indirectly communicated with each other and this communication is provided by mediators (Jonassen and Rohrer-Murphy, 1999). These mediators in human activities are used to transform the object. Mediating artefacts have a role on the activity as facilitators or inhibitors by assisting or constraining the individuals in the system (Wilson, 2006c). These tools can be external (concrete) or internal (discrete). Vygotsky (1978) presents the mediators in two types: signs and tools. In his representation, signs are the internal (language, symbols etc.) and tools are the external mediators (machines etc.). The subject(s) of the activity system act upon the object through the tools as mediators and transform the object. At the same time, tool utilisation has an impact on the subjects' psychic condition (Cole and Engeström, 2001). Citing from Vygotsky (1978, 54), Marx asserted *"man uses the mechanical, physical, and chemical properties of objects so as to make them act as forces that affect other objects in order to fulfil his personal goals."* In Vygotsky's work, mediation is discussed only with these two components (signs and tools) and the model is structured for individuals. Leont'ev (1978) discussed the rules, division of labour and community in the activity system of humans, but he does not represent the expanded version of the model. Engeström (1987) published the expanded version of the model including social relations, which is called the second generation, representing new mediating artefacts such as rules, community and division of labour. Furthermore, the model engages with societal phenomena, which is related to this research.

e. Hierarchical structure of activity

Leont'ev (1978) introduces the hierarchical level of the activity system. He explaines well the concepts of activity, actions and operations related to motives, goals and conditions which enable activity to be performed by individuals (Wilson, 2008a). Kuutti (1995) comprehends activities as long-term formations. The transformation to the outcomes cannot be done immediately; it can be achieved through processes or phases. Hence, actions and operations are the levels of activity. Leont'ev (1978) points out that activities are distinguished from each other according to their object, and that the object is the determinant direction of the activity. In this regard, he asserts that the object of any activity is the *true motive* for it, and activity is linked to the motive regardless of whether this is hidden or obvious. He expresses that activity cannot exist without a motive. For this reason, the motives are transformed objects that fulfil a need to achieve a goal (Kaptelinin, 1996).

The subordinate of the activity is the action that is held by conscious purpose. These are goal-directed processes and intermediate results in an activity system (Leont'ev, 1978). In other words, action involves the planning and problem-solving aspect to accomplish the goals of the activities; hence, it serves a functional purpose (Jonassen and Rohrer-Murphy, 1999). Actions are chains of operations, which are automated and well-defined routine behaviours used to respond to the conditions during performing the actions (Kuutti, 1995). With respect to this view, operations do not need to have conscious intentions (Jonassen and Rohrer-Murphy, 1999).

As a general consideration, viewing the hierarchical structure of the activity, this is composed of actions and actions are composed of operations. Motives generate activity, actions are directed by goals, and operations occur in certain conditions. Motives determine goals and goals are affected by conditions (Wilson, 2006c). Figure 6 illustrates the interaction between these components.
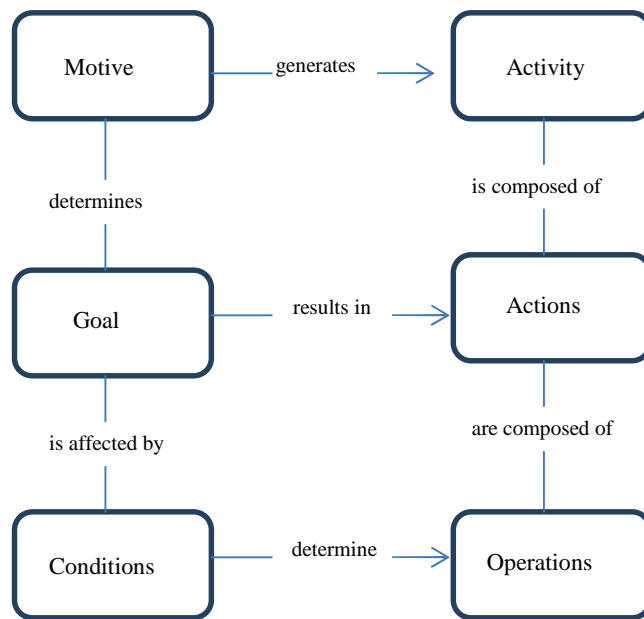
Figure 6 Activity, actions and operations (Wilson, 2006)

Leont'ev (1978) stated that the level of the hierarchy is not unalterable. He asserted that the level of the hierarchy could be altered if the activity loses its motive and becomes an action. If a breakdown occurs in any of the operations, the solution for the problem requires conscious praxis and the operation is altered to action. If the actions of human beings become automated, they are altered to operations. This case indicates the dynamic relations between the levels of the activity systems.

f. Development

Activities are not static. They are in continuous change and development, and their development can be understood through historical analysis by observing or evaluating the situation over time (Kuutti, 1996; Jonassen and Rohrer-Murphy, 1999). In this context, performing any activity can change in the historical context on account of incremental developments in the way things are done or the design of the instruments. This principle emerged in the work of Vygotsky (1978) dealing with the educational development of children: *"From the very first days of the child's development his activities acquire a meaning of their own in a system of social behaviour and, being directed towards definite purpose, … This complex human structure is the product of*

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a developmental process deeply rooted in the links between individual and social history (Vygotski, 1978, 30).". Development and changes in the activity system can be stimulated by internal tensions and contradictions (Engeström and Miettinen, 1999). In this context, Engeström argues that the development of mundane activity systems is achieved by synthesizing and crystallizing the already developed elements (1987). It is noteworthy here that development is not only one principle of Activity Theory, it is also the research methodology of the theory (Kaptelinin and Nardi, 1997). The theory focuses on monitoring changes and development through ethnographic methods (ibid).

3.3 Third generation of Activity Theory and interacting activity systems

The researcher uses the third generation of Activity Theory, which involves interacting activity systems. These activity systems are overlapping and shed light onto the collective and collaborative actions of the organisational members, institutions and departments.

The first generation of Activity Theory is developed in the work of Vygotsky (1978). In his work, the system demarcated individual actions and the model is composed of three items (mediating artefacts, subject and object).

The second generation of Activity Theory is represented by Engeström (1987), who based his work on Leont'ev's discussions. Leont'ev discusses mediation from a broader scope than Vygotsky, but he has not provided diagrammatic representation. Engeström (1999a) criticised the traditional representation of the theory, since it was explicating the activity from the individual side and concerned with the development of the individual from the individual's cultural-historical side. He stated that the traditional version does not embrace societal and collaborative actions or the interactions between the elements; hence, he expanded the model by adding new components (division of labor, community and rules) (Figure 7).

TOOLS

SUBJECT   OBJECT

RULES AND   DIVISION OF LABOR
NORMS   COMMUNITY
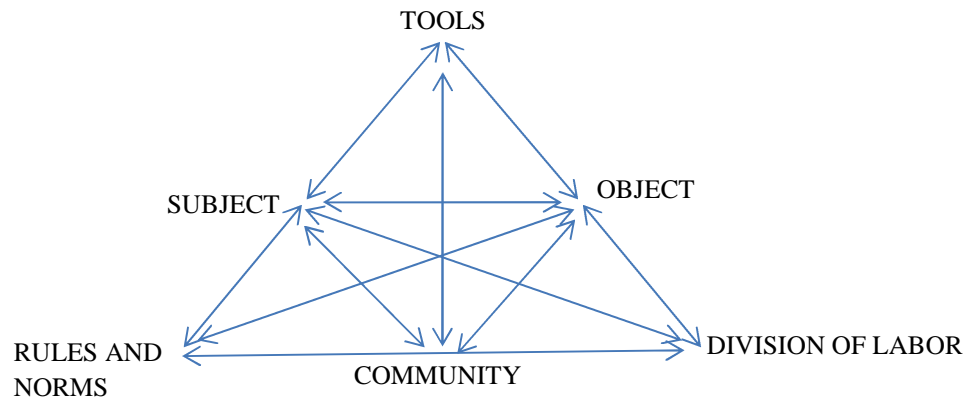
Figure 7 The structure of a human activity system

Additionally, he mentioned contradictions as stimulators of development and change in the model.

The third generation of the model indicates the overlapping and interacting activity systems. In this model, both activity systems have a shared objective but their functioning is different regarding the elements operating in their own system. The main purpose of this model is to identify the dialogues, networks and multiple perspectives between activity systems (Engeström, 2001). This research put the interaction between the neighbor acivity systems at centre stage. The activities of different divisions are discussed in terms of the Activity Theory. The collaboration among organisational members and ogranisations make the overlapping of activity systems apparent. All members and organisations in the system have the same objective; however, they are operating within different mediating artefacts.

3.3.1   Components of an activity system

After a brief elaboration of the three generations of Activity Theory, we can briefly describe the components of the activity systems.

a. Object: individual or collective activities are constructed to solve the current problem. In these cases the object of the activity system is the

purpose of the act of the humans. It is also the motive for the activity system.

b. Subject: the individual or collective component of the activity system. The individual uses the tool to fulfill his or her needs. In terms of the collective, division of labor, rules and the community play a role in achieving the goals of the activity system.

c. Tools: these elements have a mediating role between the subject and the object of the activity system. These tools can be signs, concrete materials, computer programs or language.

d. Rules: these are explicit or implicit elements such as regulations, conventions, norms or sanctions. They can inhibit or facilitate the system. They govern the community and how the collective work will be divided among different actors.

e. Community: it reveals the collective group which is affected by the object or the outcome of the activity. All members of the communities carry shared interests. This component is the contribution of Engeström to the collective perspective.

f. Division of labor: this component represents the distribution of tasks in the system that reveals the roles and the responsibility areas of the subjects,participating in the activity.

Mwanza's (2002) Eight Step Model (Table 6) translates the triangulation of the activity system and comprises open-ended questions to investigate the situation under scrutiny. This model simplifies the original triangle model and helps the researcher to interpret the situation more easily. During data analysis, this model has facilitated to comprehend the mediating artefacts and enabled the researcher to code more effectively.

Table 6 Example Eight Step Model presenting the organisational activity system, which emerges from the above discussion.

Table 6 Example Eight Step Model

Activity System of interest	Work Area (e.g. emergency response, breaking news production)
Objective	To complete the work tasks
Subjects	Individuals, decision makers
Tools	Language, physical and non-physical elements
Rules and Regulations	Organisations' procedures and rules are specific to organisations' operating sector and context
Division of labour	Departmentalisation enables division of labour and division of the responsibilities while performing the activities
Community	People who are influenced by the system
Outcome	To respond quickly or to reach quality decisions (according to context)
Actions	Work Task and related information behaviour

3.3.2 Tensions and contradictions in the activity system

Activities cannot be assumed to be isolated units. They are open to the spatio-temporal alterations of the external environment and also to other activity systems, which can change some elements of the activities by creating tensions between the elements (Kuutti, 1996). In other words, activity systems are complex and equilibrium is an exceptional case for the systems. Therefore, tensions and contradictions occur in the system, which drive innovations and transformations (Cole and Engeström, 2001). Contradictions can be classified as the breakdowns, ruptures and clashes that inhibit the functioning of the system; therefore, these obstacles need to be eliminated by the changes and developments of the cultural mediators of the system (Virkkunen and Kuutti, 2000).

Engeström (1987) categorises the contradictions in the activity systems in four levels. Primary contradictions are represented as inner contradictions within each aspect of the activity system (aspects are located at each corner of the triangle). For instance, each individual may have a distinguishing goal from the overall activity system; norms and values which govern the functioning of the activity system may be confusing; the system may be

constructed by the unobvious division of labour that constrains the effective allocation of tasks and responsibility. Secondary contradictions appear betweeen the aspects of the activity system, which is indicated as conflict between the corners of the triangle. For instance, flexibility or strictness of the rules to achieve the objective, the capabilities of the subject to use the tools or the features of the tools to achieve the objective. Tertiary contradictions are the tensions between two emerging interpretations. In this situation, there may exist two unoverlapping motives in the central activity due to the different interpretations of the subjects in the system. This can be explained by the tension between *culturally advanced motive* and *dominant motive.* Quaternary contradictions represent the tensions between the neighbour activity systems and the central activity system. Here, neighbor activity systems are the instrument products for the central activity.

3.4   Rationale behind using Activity Theory in this research

Information behaviour from a user-centric approach embraces human activities such as seeking, using and sharing information. The research intends to explore human information behaviour in different work contexts (disaster management and news production). In this regard, the attention is on theories, which focus on context: Situated Action Theory and Activity Theory. Situated action theory emphasises the emergent, contingent nature of human activity. Activity Theory is also suitable for routine human activities (Nardi, 1996a). The basic unit of analysis for situated action is *"the activity of persons-acting in setting (Nardi, 1996, 36)";* however, the subject is also engaged with the other components of the system in activity theory. Situated action emphasises the improvisatory nature of human activity and response to contingency (Lave and Wenger, 1991). As such, it de-emphasises more durable, stable phenomena that persist across situations (Nardi, 1996a). The situated action model intends to show that there is a one-time solution for a one-time problem (Lave 1988). Activity theory emphasises that activities are shaped and stimulated by motives and goals; however, situated action does not take goals as conditions for actions (Nardi, 1996a). In this context,

activity theory is more suitable than situated action theory with its nature of investigating the interaction of subjects with the other components of the activity system, taking into account both emergent and repetitive (routine) information behaviour in work settings.

The intention of the researcher is to observe human information behaviour in different work contexts. For this, emphasis was placed on the characteristics of human activities: they are directed towards an object, mediated by artefacts, historically developing, realized socially in a culture, and they embrace dilemma and contradictions (Blackler, 1995). These characteristics impressed the researcher, while investigating the information behaviour of individuals in group settings. In light of this discussion, Activity Theory studies these human behaviour related issues. This linkage of Activity Theory to the characteristics of human activities directed the researcher to Activity Theory.

Activity Theory's strength is in analysing object-oriented, collective activity systems, and is suitable for employing societal approaches in the research. In this regard, Activity Theory gives the researcher a different lens to investigate human activities in organisational settings and understand the outcomes from a broader perspective (Jonassen and Rohrer-Murphy, 1999). Wilson (2008a) reviewed the various fields exploring the applicability of Activity Theory and discussed it in the context of information science.

In the following section the researcher will discuss the rationale for using Activity Theory discussing the following five issues: individual and group-based human behaviour analysis, which illuminates the way people behave both in single activities and interacting activity systems; the hierarchical structure of the activities (activity, actions, operations); the context, motives and outcomes; mediation; its rich vocabulary on concepts to explain the activities; and, finally, as a systematic analysis tool.

Activity Theory discusses shared objective and interactive activity systems. As people carry out tasks alone, context and situations direct them and organisations to collaborate. In this research, the researcher investigates the collaborative information behaviour of organisational members. In the case

study organisations, teamwork and collective decision-making exist. AKOM rescue teams are composed of fire fighters and health care nurses. They work in collaboration with each other and with the logistics divisions. CIHAN Media's news desk operates through the networking of the journalists and news broadcasters. In this regard, the third generation of Activity Theory is a valuable tool for this research in order to understand the shared objective and overlapping activity systems.

Activity Theory enables the researcher to analyse the deconstruct activities and perceives that activities consist of sequential processes. Organisational activities are composed of actions; actions are composed of operations; human activities exist in a form of action or a chain of actions (Wilson, 2008a). Reducing activities in simple units facilitates the understanding of these activities even when they are complex.

In this research, whether completing the work tasks in divisions, managing disasters, coordinating team members or broadcasting the news, these activities are realised by the types of actions. In this regard, related information behaviour (seeking, sharing) facilitates the completion of work tasks or helps to accomplish any other work activities. Operations are automated components that promote actions. Within this sequential processing of activities, the researcher has gained a deep understanding of activity systems in real-life settings.

Human activities are controlled by people themselves and also by society. In this regard, mediation is the key idea in Activity Theory (Nardi, 1996a). Humans use mediating artefacts to realise the objective, and these artefacts consist of signs, and physical and non-physical tools (Kaptelinin, 1996). These artefacts are tools, which carry historical and cultural remains. Through these tools subjects transform the object (Kaptelinin and Nardi, 1997). *"These are instruments that both mediate and control human activities. These instruments are described as abstract tools and physical tools. Physical tools are material and mediate object-oriented activity, whereas signs are abstract and manifest in the form of language and mediate social intercourse (Allen et al., 2011, 654)"*. In Engeström's broad

classification (1987), mediating artefacts involves norms and rules, and division of labour. These mediating artefacts may assist or constrain activity (Wilson, 2008a).

In this research, the rescue teams, journalists and managers use abstract and material artefacts. As such, Activity Theory provides the researcher with a theoretical framework to investigate mediation. These artefacts influence human activity. For instance, during information sharing, language is one of the tools to realize the objective. Conversely, information sharing exists over electronic systems between the rescue team members and the logistics unit, or between the reporter and the news broadcaster.

One of the strengths of Activity Theory is that it takes the context into consideration (Kaptelinin and Nardi, 1997; Nardi, 1996a; Nardi 1995). The cultural-historical setting of the activity, the relationship of the activity to the external environment, goals and motivations, and artefacts constitute the context for human activities (Wilson, 2006a). This nature of Activity Theory makes it eligible for investigating information behaviour in real-life settings.

In this research, the subjects are the team members of different divisions. They are bound by regulations while realizing objectives or else the division of labour determines their role in the operation. They, as a team or individually, have a goal to satisfy. The goal of the journalist is to transfer the acquired information to the news desk as soon as possible, while the rescue teams' goal is to minimise the hazardous effects of the incident on the humans under time pressure. Contrary to the existing task literature (Byström and Jarvelin, 2002), the researcher investigates the tasks in their context, observing how changing conditions affect the way people behave to carry out the work tasks.

The rich vocabulary of Activity Theory facilitates the fragmentation of activities into sub-activities and the understanding of the whole activity system through the analysis of nodes. During data analysis, themes, codes and relations are generated according to these concepts. Activity Theory enables the analysis of human activities in a systematic way, the flow is in a

sequence. Mwanza's (2004) Eight Step model is applied to fragment the entire activity system in order to comprehend and analyse in a holistic way.

3.5   Research design

The qualitative approach has been used in this research. The rationale behind the use of the qualitative approach is the information type used to study the phenomenon (Blumberg et al., 2011). The qualitative approach deals with the meaning and nature of the phenomenon whilst the quantitative approach deals with the amount. In this research, the researcher aims to understand the nature of the organisational members' information behaviour in different contexts. For this reason, qualitative data are appropriate.

In the following sections, the participants and the features of the organisations are described.

3.5.1   Case study approach

The researcher chose to conduct a case study research as three conditions indicating the use of the case study approach were met: the formation of the research question *(how)*, the fact that control of behavioural events was not required for this research, and the fact that the researcher only intended to observe and explain behaviour, focusing on present activities in contrast to mining historical events (Yin, 2009). The case study approach is a research strategy to understand the natural settings and real-world phenomena. In a similar vein, Eisenhardt (1989) stated that the case study method facilitates the understanding of the dynamic present within single settings. The purpose of using case studies is to understand complex social phenomena (Yin, 2009). With respect to these conditions, the researcher decided on the case study approach.

Field study is a comparative study of two organisations, which operate in different contexts. It consists of cross-case analyses and is an explanatory study (Yin, 2009).

At the end of the case data analysis, the researcher's intention is to test the existing information behaviour models and to build new information behaviour models (inductive) for different contexts. In this situation (inductive), theory building exists with recursive cycling among the collected data, emerging theory and the extant literature (Eisenhardt and Graebner, 2007). The analysis of the case studies is investigated as to whether the information behaviour of the organisations includes contrasts to, or replication of, the emerging theories, or extensions to the emerging information behaviour theories (Yin, 2009; Eisenhardt and Graebner, 2007; Eisenhardt, 1989).

During the case studies, data collection has been carried out in various ways (Saunders et al., 2009), such as field observations, questionnaires, organisational documents and interviews. These data collection methods will be explained broadly in the data section.

In this research, the researcher conducted case studies in two organisations: the Disaster Coordination Centre of Istanbul Municipality (AKOM), and CIHAN Media Corporation (news agency). Both organisations are located in Istanbul-Turkey. The rationale for conducting case studies in these organisations is that both are information-intensive organisations. Both process information and act according to the information they have gathered from the field. Their decisions are shaped in a fast pace, since they operate in a fast-paced environment.

AKOM's tasks are bound to time pressure and uncertainty. AKOM's objectives are preparedness, mitigation, response to emergency cases and recovery (IBB, 2010; Albayrak, 2005). In the response to emergency case phase, the team members share information in collaborative settings and seek new information if uncertainty exists. AKOM operates in an unstable environment and most of the cases they come across are unique, which presupposes the existence of *anomalous states of knowledge* (Belkin et al., 1982) triggering uncertainty. In order to hedge this uncertainty they seek new information.

The news desk in CIHAN Media Corporation is another information-intensive unit that deals with time pressure while broadcasting the news. They aim to release the news as soon as possible and to check its validity. Especially when producing breaking news they rush to be the pioneer in delivering the news. They design information network systems to seek, transfer and validate information. As the intention of the researcher is to conduct a comparative study on information behaviour, both organisations are suitable since they are information intensive and consist of divisions, which are distinguished from each other by their time pressure, task complexity and operating environment (Table 7 Organisational Divisions).

Table 7 Organisational Divisions

Rescue Teams (AKOM)	Strategic Level Meetings (AKOM and CIHAN Media)	News Desk (CIHAN Media)
Uncertainty is high	Certainty is plausible	Certainty is plausible
Time pressure exists	Long-term planning	Time pressure exists
Genuine decision tasks	Normal decision tasks	Normal information processing tasks
Disaster Information Systems are used	Management Information System is used	Media Communication Systems are used
(Adopted from AKOM 2010; Cihan 2010; Vakkari 1999; Byström and Jarvelin 1995)		

3.5.2 Research Settings

3.5.2.1 Features of AKOM

The Disaster Coordination Centre of Istanbul Metropolitan Municipality (AKOM) is a governmental organisation. It was founded in 2000. The Golcuk Earthquake, which was a catastrophic disaster for Turkey, triggered the establishment of a disaster coordination institution to mediate disaster response actions and take precautions against potential disaster. The role of AKOM gains importance since Istanbul is one of the largest metropolitan cities in the world with a population of 13,854,740 (TUIK, 2013).

Effective disaster management requires the collaboration between geographically distributed public and non-governmental organisations for rapid and effective response to unpredictable disasters (Janssen et al., 2010). The operating environment of the disaster management organisations is unstable and dynamic, where conditions are changing rapidly; therefore, most emergency response tasks are genuine decision tasks (Byström, 2000; Byström and Jarvelin, 1995). For effective response in unstable environments, flexible organisational structures and less bureaucratic communication system are regarded as effective (Kapucu, 2008; Kapucu, 2006).

In order to cope with the complexity, information management is regarded as significant in disaster management. In this regard, the main role of AKOM is to ensure the multi-agency collaboration among geographically distributed organisations (governmental and non-governmental) in order to respond to incidents effectively and minimise losses by allocating resources and ensuring the healthy communication among them during disasters (AKOM, 2010; AKOM, 2007).

AKOM operations involve four different phases of disaster management: preparedness, during disaster (response) and post-disaster (recovery and mitigation). In the preparedness phase, AKOM coordinates research and prepares projects about latent Istanbul disasters. When the early signals of any large disaster (flood, heavy rain etc.) are received, other emergency response organisations and their teams are warned about the disaster (if

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predictable) and AKOM ensures that they are in red alert. In the response phase, emergency teams are in the field inter-operating with respect to the command of the remote managers who are monitoring the incident at the AKOM centre or with respect to the communication between the incident response managers at the site. In the recovery phase, the injured people are transported to clinics or hospitals and they are examined. In the mitigation phase, evaluation involves the searching for reasons and the interpretation of the results to develop precautions for future prospective disasters. These four phases of disaster management are circular and each phase's information requirements alter (Janssen et al., 2010). Mainly, AKOM coordinates the disaster management organisations through healthy communication during disaster and post-disaster times. Therefore, ICT system improvements and training of the crews dealing with information management tasks become crucial (AKOM, 2012).

3.5.2.2 Features of CIHAN News Agency

The preferences of audiences and innovations in technology transform the news agencies. CIHAN adapted to the new conditions to compete in the market and to accelerate their communication in broadcasting the news at the right time and in an accurate format (Mitchelstein and Boczkowski, 2009); however, the tension between tradition and novelty exists in the technology usage of the staff, the break-down in communication systems etc.

News agencies are operating in an environment, which is highly complex, and highly uncertain. Most of the information tasks they carry out are time critical because of strict deadlines, and the workflow of the news staff is not static. The correspondents or the editors are on call any time to produce news. And then they start producing news or breaking news.

The work of the correspondents from the incident or event site sometimes becomes too hard. For instance, war news and disaster news are the most difficult tasks for the news agencies, because of the risks correspondents encounter in the field. On account of the recent political conflicts between

Turkey and the Syrian President, Syrian soldiers kidnapped two Turkish correspondents and there is no information on their health conditions (Anadolu Ajansi, 2012).

News agencies compete in serving the right news as soon as possible, and competition is high in Turkey. There are some leading news agencies operating in the Turkish market beside CIHAN: Dogan News Agency, Anka News Agency, Anadolu News Agency. CIHAN is one of the leading news agencies in Turkey.

3.5.3 Data collection

The researcher has used four different data collection methods: observations, questionnaires, interviews and critical incident technique. The logic behind data triangulation is not the simple combination of different kinds of data. The researcher's intention in using this technique is to minimise the threats in the validation of the data (Berg, 2009). The aim for using triangulation is to verify the relevancy and accuracy of the data, to see if the collected data from different sources agree with each other, and to explore the discrepancies. There are three outcomes from the triangulation of the data. First is convergence, which explains the single proposition through various data. Second is inconsistency which does not confirm the single proposition when various data sources are used in the research, and the third is contradiction that indicates opposite views in the data (Easterby-Smith et al., 2008; Mathison, 1988).

3.5.3.1 Field observations

The researcher has carried out field observations to understand the phenomenon in organisations. The observation has been held in specific times (when the information transferring between the journalists and news broadcasters occurred, and when information sharing occurred between the rescue team members and the logistics members), in certain locations (at the news desk of CIHAN, at the disaster information system room of AKOM).

The rationale behind using observations in this research is to comprehend the transfer of information processing at the news desk, or how communication occurs in emergency cases, or what are the tools for seeking and sharing task-specific information in routine organisational activities. Observation reveals that the contextual effects are independent of a person's bias, and yields new insights; however, it is also time consuming, has low reliability, may reflect observer bias, is hard to report, and may affect the people observed (Berg, 2009). Nonetheless, observation enabled the comprehensive analysis of the phenomenon.

3.5.3.2 Hand response cards

Hand response cards are one of the data collection techniques used in this research. The researcher took the basic rules into consideration while designing the questions: namely that the instructions to the questions were clear, that the language was unmistakable and that the questions were simple so as not to bore the respondents (Walliman, 2009).

The hand response card method is cheap and quick to administer, the researcher's influences on the questions is eliminated (such as tone of voice, gestures while asking the questions in face-to-face interviews), and respondents have enough time to fill the forms (Walliman, 2009, Berg, 2009).

Hand response cards are applied to collect information about the tasks and the task features. Conversely, they may have a no-response risk, and may not be suitable for sensitive issues (Berg, 2009; Bickman and Rog, 2009).

3.5.3.3 Interviews

Interviews are one of the data collection techniques that the researcher mainly used in the current research. The researcher has used structured and semi-structured interviews in the research. Interviews have the advantage of gathering rich information for the research; however, sometimes their complexity is underestimated (Easterby-Smith et al., 2008). Besides their

advantages, interviews are time consuming and if much time passes after the incidents, the reliability and the completeness of the data can be judged (Walliman, 2009).

In structured interviews, the researcher used standardised and predetermined questions (Saunders et al., 2009). Questions in the structured interviews were prepared before starting the fieldwork. The interview questions focus on the investigation of complex and time-pressured tasks, information sources and information tools in order to understand the information behaviour of rescue teams, journalists and managers in different contexts. The aim of the questions is to shed light on the distinguishing parts of the information behaviour of these three different types of organisational members, and to find out the effects of these factors.

The questions have been asked in the same tone to all respondents in order to avoid bias, since the interaction between the respondent and the interviewer could influence the objectivity of the answers (Easterby-Smith et al., 2008). Another interview technique that is used in this research is semi-structured interviews. The interviewer addresses additional questions to the interviewee according to his/her responses to the predetermined questions (Easterby-Smith et al., 2008). The researcher may find some missing points in the predetermined interview questions and may add some new questions during the interview according to the responses of the interviewee. Interviews have been held at the premises of the organisations.

The interviews have been recorded and transcribed for analysis. The interviews have been conducted face-to-face with the members of the relevant departments. In the analysis period, the recorded interviews were coded using the Vivo 8 program (Richards, 2010). Detailed information about the interviews is provided in Section 3.5.5.

3.5.3.4 Critical incident technique

The critical incident technique is a method to collect the direct observations of the individuals who participate in the action (Flanagan, 1954). It is a useful method for activity analysis. Incident in this method denotes the observable human activities that enable the observer to draw inferences and predictions about the situation and the phenomenon (Easterby-Smith et al., 2008). According to Flanagan (1954), this technique delves into the heart of the problem and avoids information overload.

This technique coincides with the researcher's aim because this research relies on qualitative research techniques. This technique has been used in conjunction with the interviews. Conversely, this technique has several advantages for this research: it is a flexible method, it does not force the participants by directing them to respond to multiple choice questions, and the process of the technique is like story-telling. Also, it is not only used in conjunction with interviews, but is also a useful technique for questionnaires. Two disadvantages of the technique are: the respondents' unwillingness to respond to the questions, and the higher likelihood of recalling recent activities rather than past activities.

3.5.4 Participants

The participants for the questionnaires and interviews have been determined in collaboration with senior managers and they have been informed about the research objectives and the research process through an informant form, and the consent form that they signed. Both the informant and consent form samples are attached in the Appendices section. In what follows, the researcher summarises the organisations and the participants.

3.5.4.1 AKOM

The participants for the first case study are the rescue teams and the logistics staff from the Disaster Coordination Centre of Istanbul Metropolitan Municipality (AKOM). The research link to their work characteristics is that their work is related to the information processing in a context where time pressure and uncertainty exist. These two types complete their work tasks by using information systems. The rescue teams are the operation units of AKOM. They are sent to incidents to intervene and decrease their hazardous effects. They work in collaboration with other team members and with the logistics units. Their work tasks are information intensive. They share information with or seek information from the logistics units when they come across unexpected situations or in dealing with the uncertainty caused by the lack of prior knowledge. They also deal with the lack of inadequate experience about the situation or in ensuring collective action while completing work tasks. While dealing with the situation, they have to process information by using physical and non-physical tools to communicate with each other. Time is a constraint for them in order to accomplish their goal. Thus, they require information systems to satisfy their information needs while dealing with incidents.

In a context where time pressure is not perceived as a significant factor influencing behaviour, the managers and line managers from the human resource division and the finance division will participate in interviews. Approximately 20 organisational members will participate in the interviews. (The elements of the research proposal that require organisational support are outlined in Section 3.5.4.1 and have been agreed by AKOM's Assistant Director Ramazan Yahsi in telephone conversations in November 2010 and March 2011.)

3.5.4.2 CIHAN

The second group of participants is from CIHAN Media Agency (CIHAN). They selected according to their work role in the organisation. The first set of interviews is conducted with reporters and news broadcasters. In this context, time is a constraint. The reporters are supposed to transfer acquired information to the news desk. At the same time, the information has to be validated before it is broadcast. In this situation, the information is transferred through the agencies' systems and is prepared to be broadcast by the news broadcasters. Within these steps, the following actions are considered: purposive information seeking by the reporter, the transfer of information to the news broadcaster and the checking of the validity of the information before releasing it to the public. Within these work activities, time constraints and the speed of the information transfer are important. In this regard, the prospective interview participants from CIHAN Media are reporters and news broadcasters from the news desk. Other participants are selected from the human resources, finance and marketing divisions. The purpose of the latter is to investigate the information behaviour in divisions where time constraints do not exist, quite unlike the news desk. (Section 3.5.4.2 refers to the mail exchange between the CIHAN News Director, Abdulhamit Bilici, and the researcher.)

3.5.5   Pilot studies

3.5.5.1 Pilot Study 1 – Disaster Coordination Centre of Istanbul Metropolitan Municipality (AKOM)

Dates: 25-26-27 April 2011

On the first day, the researcher held meetings with the Director and the Assistant Director of the Disaster Coordination Centre of Istanbul Metropolitan Municipality (AKOM).

The Assistant Director introduced the departments to the researcher. The researcher gathered information about the other institutions which inter-operate with AKOM, and are commanded by AKOM during disasters. The

other institutions inter-operating with AKOM and commanded by AKOM are: the Fire Brigade, the Emergency Aid and Rescue Service and the Emergency Medical Service of Istanbul Metropolitan Municipality. The researcher met the directors of these institutions on 25 April 2011.

The researcher presented the project to the directors of all four institutions and the directors signed the institutional consent form. The researcher has submitted the consent form to the Research Office.

On the second day, the researcher gathered information about the information and communication technology (ICT) systems utilised during the disaster times and during the preparation period. The Assistant Director has accompanied the researcher to observe these ICT systems and has given information about the use of the systems. The researcher has observed the different ICT systems used in different departments.

The researcher has interviewed the director of the department of Research, Planning and Coordination of the Fire Brigade Head Department.

On the third day, the researcher interviewed the Director and Assistant Director of AKOM. The interview questions were not the same as in the final version. They dealt with general emergency response topics and the information and communication systems used in their institutions during disaster. The questions have been open-ended and the critical incident technique has been used in these two interviews.

3.5.5.2 Pilot Study 2 – CIHAN Media News Agency, Istanbul

Dates: 15-16 September, 20-21 September 2011

On the first day, the researcher held meetings with the General Manager and General Assistant Manager of CIHAN Media News Agency, Istanbul. The researcher presented the project to them.

On the second day, the Assistant of the General Manager presented the departments of the institution to the researcher. The researcher gathered information on the information and communication (ICT) systems. The

researcher made some observations in the newsroom. The researcher chatted with the editors and addressed to them some questions about their work processes.

On the third day, the researcher interviewed the Deputy General Manager. The interview questions were not the final version. They involved the tasks they carry out and the ICT systems they use during news making and news casting. The critical incident technique was used.

On the fourth day, the researcher interviewed the Domestic News Production Director. The interview questions revolved around his experience of the production of news and information sources during news making.

3.5.6 Fieldwork

Dates: 31 January - 25 February 2012

Initially, the researcher planned to start in 18 January; however, AKOM's reports indicated that heavy snow would occur after 20 January. Thus, AKOM was in red alert in operations. For this reason, the researcher postponed their work and travelled to Turkey on 31 January 2012. The researcher interviewed 34 organisational members in total and made observations in ten different institutions/departments.

3.5.6.1 The AKOM Case

3.5.6.1.1 Observations

The researcher had observations in seven different institutions/departments: the AKOM Central building located in Kagithane, Istanbul, the Fire Brigade Head Department located in Nurtepe, Istanbul, the Fire Brigade Central Command Centre located in Kagithane, Istanbul, the Fire Brigade Head Department of the Anatolian Side located in Uskudar, Istanbul, the Fire Brigade Kayisdagi Department located in Atasehir, Istanbul, the Emergency Medical Service located in Atasehir, Istanbul, and the Emergency Aid and Rescue Directorate located in Eyup, Istanbul.

AKOM Central building: the presentation of the ICT systems used during disaster and during the precaution phase took place. The researcher observed the displays at the operation room. There were LCD, plasma and cubic displays. These are designed as a video wall and 128 different live recordings/images can be viewed at the same time in different volumes. The recordings/images are transferred from cameras all over Istanbul. These cameras are called MOBESE and Traffic Control Cams (TKM) and more than 4,000 cameras are set. In some circumstances, the Live Broadcast Team goes to the incident site, camcords the incident and sends it to the operation room. Also, in some incidents security cameras of other governmental institutions are used to comprehend the incident if the MOBESE and TKM cameras do not include all the areas of the incident.

Another observation took place in the call centre and command centre. The days the researcher was in the AKOM central building were the last two days of the heavy snow in Istanbul. The call centre operations are carried out through phone conversations, GPS systems and quick discussions inside the room before commanding the teams.

The operation centre includes the meeting tables and during disaster times, the Governor, Mayor, General Manager of AKOM and Directors of the related departments manage the rescue teams, medical teams and fire brigade teams from this room. All the time they gather information from the incident site and command the teams. They ensure the inter-operability with the other relevant institutions.

Fire Brigade Head Department: the researcher observed the equipment used during disasters. Also, the new projects of the Research, Planning and Coordinating department about intensive coordination during disasters were watched (simulations).

Fire Brigade Central Command Centre: the researcher observed the equipment used in the command centre and gathered information about the ICT used.

Fire Brigade Head Department of Anatolian Side: the researcher observed the equipment used during disasters. Another call centre for fire disasters

exists here. The researcher gathered information about their ICT and GPS systems used during disasters.

Fire Brigade Kayisdagi Department: this department operates with the information coming from the Head Department of Anatolian Side. The researcher observed the ICT equipment of the fire fighters.

Emergency Medical Service: this service is located in the building of the Fire Brigade Kayisdagi Department. They operate with the information that comes from the Emergency Aid and Rescue Directorate and also accompany the fire brigade teams at the incident. The researcher has observed the ambulance vehicle of the team and gathered information about the ICT systems they use.

Emergency Aid and Rescue Directorate: this department is the centre for the emergency aid and rescue operations. This department manages all medical rescue teams. The researcher observed and gathered information about the ICT equipment and the building of this department.

During the observations in these seven different institutions/departments mentioned above, the researcher observed the behaviours of the organisational members and took notes. Observations continued during the interviews also.

3.5.6.1.2 Interviews

The researcher interviewed nineteen staff members from AKOM. Interviews were conducted at the working place of the interviewees. The researcher did not intend to make the interviews in a separate meeting room. The rationale behind this way was to discuss with them while they were carrying out their work tasks at their desks. When emergency occurred, the researcher stopped the recorder and let the interviewee carry out their task.

The exception was the fire fighters and paramedics as they operate at the incident site. Thus, it was not possible to follow this approach for their interviews. The researcher met them in a meeting room at an arranged time; however, in some cases the researcher has postponed the interviews.

Initially, the questions in the interview schedule (8.11) were addressed to the interviewees. In this way the work tasks they carry out during disasters were determined. Then, the interviewees filled in the relevant response cards provided by the researcher. According to the results of the responses, the researcher highlighted the complex, time-pressured tasks. In Sections B and C (open-ended questions), the interviewees have explained one of their experiences focusing on the tasks they have filled as complex and time-pressured.

The responses have been recorded via an IC recorder, and also the note-taking technique was used during the interviews.

AKOM Central building: the researcher interviewed four staff members from this institution. The interviewees were the Live Broadcast Department Director, the Meteorology Department Director, and two staff from the call and command centre.

Fire Brigade Head Department: the researcher interviewed one staff from this department. He was the chief of the fire fighters team.

Fire Brigade Central Command Centre: the researcher interviewed one staff from this department. He was the chief of the Central Command Centre.

Fire Brigade Head Department of Anatolian Side: the researcher interviewed five staff from this institution: the chief of the fire fighters team, the deputy chiefs of the fire fighters (2), fire fighter staff and a call centre operator staff.

Fire Brigade Kayisdagi Department: the researcher interviewed two staff from this department: the chief of the fire fighters team and a fire fighter staff.

Emergency Medical Service: the researcher interviewed three staff from this department: paramedics (3).

Emergency Aid and Rescue Directorate: the researcher interviewed three staff from this institution: rescue crews (3).

3.5.6.2 The CIHAN Media case

3.5.6.2.1 Observations

The researcher had observations in three different department/institutions in CIHAN Media: CIHAN Media News Agency Central building located in Yenibosna, Istanbul, CIHAN TV Network Department located in Yenibosna, Istanbul, Zaman Newspaper located in Yenibosna.

CIHAN Media News Agency Central building: the researcher observed the location of the staff/departments in the newsroom and the location of the displays. The ICT systems, mobile cameras, SNG vehicles and live broadcasting rooms and equipment were observed. Also, the researcher observed the newsroom traffic during news production and news castings. The editors presented the Toros news transfer system.

There are so many different departments located in the central newsroom and directors and editors manage each. How the information is gathered from correspondents and news is produced in the newsroom has been observed. The collaboration of different departments from information gathering to the final version of the news castings has been observed.

The structure of the correspondents all over Turkey and abroad and how they send information to the newsroom were discussed with the editors.

CIHAN TV Network Department: the researcher observed the live broadcasting equipment and the stages of the live news casting.

Zaman Newspaper: the phases of news production were observed along with how different departments collaborate in producing a news story.

3.5.6.2.2 Interviews

The researcher interviewed fourteen organisational members from the CIHAN Media News Agency. The researcher did not intend to make the interviews in a separate meeting room. The rationale behind this way was to discuss with them while they were carrying out their work tasks at their news desks. If the breaking news display on their computer screen needed to be

processed, the researcher stopped the IC recorder to let the editor edit the text or send it to the relevant department.

The exception has been the correspondents who gathered information on the field. The researcher could not arrange a time with the correspondents. The interviews were done spontaneously. The researcher has waited at the newsroom to interview any available correspondent. In one case, the researcher has postponed the interview, which had already started, since the correspondent had to go on account of breaking news.

Initially, the questions in the interview schedule (Appendix 8.12) were addressed to the interviewees. In this way, the work tasks they carry out during disasters have been determined. Then, the interviewees filled in the relevant response cards provided by the researcher. According to the results of the responses, the researcher has highlighted the complex, time-pressured tasks. In Sections B and C (open-ended questions), the interviewees have explained one of their experiences focusing on the tasks they filled as complex and time pressured. In the open-ended questions part, if the researcher understood that the information mediating artefacts had not been discussed much, they would asked a question, such as "What is the technical equipment or tools you use to transfer and gather information in the news making period?"

The responses have been recorded via an IC recorder and also the note-taking technique was used during interviews.

CIHAN Media News Agency Central building: most of the interviewees were working in this building. The researcher has interviewed thirteen staff: the Deputy General Manager, the Domestic News Production Director, the International News Production Director, the Video News Production Director, the Istanbul Intelligence Director, the Local News Production Director, the International News Deputy Director, and correspondents and journalists (5).

CIHAN TV Network Department: the interviewee in this department was the Director of the TV Network.

Zaman Newspaper: the interviewee in this institution was the International News correspondent. Also, some of the editors from the CIHAN Media News Agency are working for the Zaman Newspaper.

3.6   Ethical issues

The logic behind research ethics is to conduct the research in a moral and responsible way (Blumberg et al., 2011). In this research, the researcher has taken the following ethical issues into consideration: benefits/harms to the community/organisations, consent, privacy and the confidentiality of the data, and limiting personal bias (Berg, 2009). The participants were organisational members (rescue team members, journalists, news broadcasters, senior managers and line managers). As the research was conducted with these members, some ethical issues stood out in the process of contact with the organisations, data collection and data analysis (Saunders et al., 2009).

The research's benefit has been presented to both AKOM and CIHAN (please see Appendix 8.13, 8.14 and 8.15). In the informant sheet the nature of the study, the research methods and the objective of the research have been presented to the potential participants. The intention of the research, which is aiding the organisations in designing context-specific information systems as a practical contribution to the organisations, was discussed with the senior managers. The researcher was sensitive to ensure that no deception would occur after engaging in the case studies (Blumberg et al., 2011). The social norms and rules were considered while collecting data in the organisations. The questions in the interviews and the hand response card questionnaires have been sensitively produced to avoid embarrassing the interviewees.

The potential participants have been informed before the start of the fieldwork about the process of the study, the purpose of the study and its relation to their work role by providing the informant form. Potential participants were given a timeframe of about two weeks to respond. The consent form has been collected after confirmation. The participants have had the right to withdraw from the research at any stage.

The collected data during this research has been protected and it is/will be only used for academic purposes. The private data of the participants will not be shared with third parties. The confidentiality of the data is ensured via uploading it to the University of Leeds' data storage, which is private to each user. The research will adhere to the University of Leeds code of practice under the Data Protection Act 1998.

While interpreting and analysing the collected data, the researcher has avoided forming personal biases. The personal objectivity of the researcher has been ensured, and through triangulation the objectivity of the collected data can be confirmed.

Additional to these issues, the Ethical Review form has been filled and submitted to the Ethical Committee of the University of Leeds for evaluation. The Ethical Committee has reviewed and approved it under ethics reference number AREA 10-113.

3.7 Data analysis

Data sources include field observations, interviews and institutional documents. The interpretive paradigm, discourse analysis and content analysis techniques are used for this research (Berger and Luckman, 2014; Burrell and Morgan, 1991). Activity Theory is used as an analytical tool for conceptual data analysis.

As a first stage, the field observations from the pilot studies are used. The notes and videos/photos taken during observations are analysed. The ICT systems and institutional departmental structure are introduced during the observations. The notes are taken during the observations for further use. The main objective is for the researcher to comprehend the phenomena through field observations and to structure the interview schedule. The details are discussed in the pilot study sections for both the disaster management and news-production contexts.

The researcher establishes a relationship between the departments, the tasks carried out and the information-related tasks as well as information behaviour, through interpretation of the organisational staff talks conducted during the pilot studies.

The second stage of the data analysis is the transcription of the interview records. The interviews are originally in Turkish. The interview records have been uploaded to the NVivo 8 computer program. The transcripts are recorded in Turkish and then translated into English. Categories and themes are generated and uploaded to the program.

In the third stage, the tasks are categorised by the organisational staff during interviews from *fast-paced* and *complex* to *slow-paced* and *less complex*. The tasks, which are ranked more than 3 in the hand response cards, are determined as complex, and the rest as less complex. The organisational staff is asked to include in the hand response cards whether they are under *time pressure* during carrying out these tasks. Thus, the time-pressured tasks and less time-pressured tasks are determined. Then, the *significance of the tasks to sort out the issues* and *frequency* are determined. At the end of the third stage, the fast-paced tasks that are filtered as *significant to sort out the issues*, *frequently occurring* in work settings are determined as *time critical* and *complex*, while slow-paced tasks that are filtered as *significant to sort out the issues*, *frequently occurring* in work settings are determined as *less time critical*, *complex* and *less complex* in the disaster management context. Contrary to the tasks' determination in disaster management, fast-paced tasks that are filtered according to their significance and frequency level also involve *less complex* tasks in a fast-paced situation in the news production context. The determined tasks are listed and discussed in the Activity systems and data analysis chapter (CHAPTER 4).

After task selection, the fourth stage involves the generation of themes and codes and establishing relationships between tasks and themes. This stage is the most comprehensive of the data analysis as well as forming its longitudinal stage. This stage involves the interpretation of the transcripts, discourse and content analysis, and analysis of the field observation notes.

The themes generated are called *information sharing, information seeking, information use and collective/collaboration* for the information behaviour category, and *intuition, deliberative, naturalistic, information seeking* and *information sharing* for the decision-making category. The codes are generated through interpretation of words, concepts and sentences of the interview transcripts. For example, codes for information sharing theme are: *"... exchange information ... "*, *"I give what I know ... "*, *"I send what is in my hand ... "*; for collaboration theme are: *" ... help each other ..."*, *" ... team mates work together ..."*, *" ... other institutions join for response ..."*, for decision making themes are *"... past experinces in my mind ..."*, *"... sometimes you feel what to do at that time."*, *"... put everything together for next actions..."*, *" ... every clue should be considered before decisions."*, *"No time to wait and think ..." etc.* After the coding process, relationships established.

Through the use of Activity Theory as an analytical tool, tasks are accepted as activities and information behaviour and decision-making are accepted as actions. Utilising Mwanza's (2004) Eight-step model, the researcher reveals the mediating artefacts, motive, objective and outcome of each activity system. The analysis of relations between subjects, and between subjects and other artefacts are analysed. After the relations are established for single activity systems for each task, the researcher shed light onto the relations between neighbour activity systems.

As the third generation of Activity Theory (Engeström, 2000) indicates that different activity systems are generated around shared objectives, organisations/people carry out tasks in a collaborative manner. Discourse analyses of the interviews reveal that inter- and intra-organisational collaboration occurs. Information sharing establishes the link between organisations and members, so that organisational staff share and use the information found during work tasks.

Another analysis is conducted on the relation between time, task complexity and information behaviour. Discourse analysis reveals how organisational

members behave when they encounter time-critical and complex tasks, namely whether they work in a collaborative/collective manner or not.

Triangulation of the data analysed has been performed to avoid biases and establish the relevance and validity of the data. Three different data collection methods (field observations, interviews and content analysis) facilitate the triangulation. The researcher checks the validity of the data and fills any information gaps in one of the methods used in the case studies.

The last stage of the data analysis is the presentation of the findings and the categorisation of the differences and commonalities between fast-paced and slow-paced situations and contexts. As an outcome of the data analysis, comprehensive information behaviour models are revealed through the interpretation of information behaviour while carrying out selected tasks, and through different decision-making practices under different situations.

3.8   Gap in the literature and research problem

This section of the research consists of the researcher's critique on the recent information behaviour theories and models in regards to their linkage to real-life settings, uncertainty and time pressure, and the real-life problems caused by ineffective information sharing. At the end, the research question emerges concerning these criticisms.

The aim of the researcher is to conduct a research to explore the information behaviour of organisational members regarding task complexity and time pressure through the lens of Activity Theory. This addresses some significant gaps in knowledge.

The research broadens our understanding of information behaviour, integrating and developing our understanding of information sharing in collaborative settings. It extends our understanding on collaborative information behaviour by focusing on contexts, which are under-researched. It also uses a methodological model, which compensates for the weakness of the task-based approach to information behaviour. Work tasks are discussed

in limited sources, which mostly discuss information-seeking behaviour for task completion but not sharing activity related to seeking. Most of them are isolated cases and do not consider temporal issues in real-life settings; however, all human activities are bounded by temporal issues (Savolainen, 2006). The aim of the researcher regarding this gap is to find out the information needs of work tasks in real-life settings, observe information behaviour when the task is uncertain or certain and when time pressure varies, and to investigate the information behaviour of organisational members in different contexts where the work tasks are carried out in groups.

Initially, the researcher reviewed the information behaviour literature, and especially the information sharing and collaborative information-sharing models. There are various information behaviour models in the information science literature. Most of these models focus on the information seeking and searching behaviour of individuals. Cognitive approaches are commonly used to explore human information processing; however, organisations are social environments. Therefore, the work tasks are carried out in collaboration, and team working surrounding the work settings makes communicative actions stand out.

The aim of the most prominent information behaviour models is to reduce uncertainty and fill the information gap to fulfil physiological, cognitive and affective needs or complete the work tasks. Models expose the behaviour of the user through gathering relevant information from information systems, such as technological or from the environment etc. Commonly, information seeking, search and retrieval are triggered by information need.

Wilson's (1999a; 1997; 1981) models of information seeking behaviour, Krikelas' (1983) information seeking model of scientists, Dervin's (1983; 1992) sense-making approach; Ellis' (1993) process-oriented information strategies of scientists model, Kulthau's (1991; 2004) information search process model, and Leckie, Pettigrew and Sylvain's (1996) information-seeking model of professionals are the most cited models in the information behaviour field. These models represent the information behaviour of the user in different contexts. None of these models, however, exposes the

collaborative information-seeking and sharing behaviour of the user explicitly. Only Wilson's (1981) model mentions the information transfer between individuals, while Krikelas' (1983) model mentions information giving. This is one gap in the literature.

The most holistic model of the above is Wilson's (1997) model. It underwent some improvements by adding new variables to comprehend user behaviour in the seeking period. The 1996 model of Wilson (1997) is a holistic model for comprehending information seeking. It represents new variables incorporated from other fields such as psychology, decision making, health communication and consumer research (Wilson, 1999b). The model encompasses two constructs: information seeking, and information process and feedback (Wilson, 1997). The emerging point of the model is the recognition of the information gap and it mostly focuses on this aim by seeking information. A critique for this model is that it does not expose the interactions between information users and information sharing behaviour in the model. Wilson only mentions the information exchange of individuals where the user seeks information from other people instead of seeking it from systems, as in his initial model (Wilson, 1981).

To explore the models sequentially, Krikelas' (1983) model mainly focuses on the information gathering of scientists while processing a project or writing a paper. In the model, an attribution was made to the dissemination of information by exposing information-giving constituents. This is a communicative action, meaning that the work of the scientist can be communicated to others but Krikelas did not elaborate on this point comprehensively enough to elicit how this occurs.

The other model that emerged from the recognition of the discrepancies in the knowledge to satisfy the task is Dervin's (1992; 1983) sense-making approach. The model deals with the human use of information and human communication. This approach is based on four constituents: situation, gap, outcome and bridge (Dervin, 1983). Her model mainly focuses on gap-defining and gap-bridging in problem-faced situations. It basically engages

with how people comprehend what is going on in their surroundings. Thus, there is no attribution to collaborative information behaviour in this model.

Ellis and colleagues' (1993) information seeking of scientists and Kulthau's (2004; 1991) information search process represent the stages and strategies of information seeking. Leckie, Pettigrew and Sylvain's (Leckie et al., 1996) information-seeking behaviour of professionals model explores the behaviour of professionals related to their work roles and the task features but no attribution to information sharing or collaborative information behaviour during task completion is made.

These models, however, are widely recognized in the information behaviour field, yet they contain only two weak attributions to information exchange (one in Wilson's (1981) model and the other in Krikelas' (1983) model, which discusses the information giving notion albeit only partially). Neither of the models, however, mentions the social context or collaborative information actions.

Thus, the researcher sought information behaviour models in conducted research, mentioning communicative actions such as information sharing. The result was not very different than the previous search. The studies attributed to information sharing are very scarce. Erdelez and Rioux (2000) mentioned the sharing of encountered information on the Web. The main theme of this model is the acquisition of information and its subsequent sharing with others as needed by recalling the acquired information. This model, however, does not introduce a generaliseable model to use in organisational settings. Pettigrew (1999), and Sonnenwald and colleagues (2008) discussed information behaviour in a health care context. McKenzie (2003b) mentioned information sharing in an everyday life context. Fulton (2009) discussed sharing activity during leisure activities. Hershberger, Murray and Rioux (2007) discussed the online information exchange. Widén-Wulff and colleagues (Widén-Wulff et al., 2008; Widén-Wulff, 2007; Widén-Wulff and Davenport, 2007; Widén-Wulff and Ginman, 2004) discussed the information sharing motives, social capital and social exchange theory in their studies. Sonnenwald (2006) discussed information sharing in a dynamic

group work context. A similar work exploring collaborative information behaviour in team work was conducted by Reddy and Jansen (2008) and discussed collaborative information behaviour in a health care context. Widén and Hansen (Widén and Hansen, 2012) also had a theoretical discussion about the interaction between collaborative information-sharing behaviour and organisational culture.

Subsequently, none of the above studies, exploring information-sharing behaviour or collaborative information behaviour, proposed a conceptual model investigating social aspects except Karunakaran et al. (2013). Karunakaran and colleagues derived a collaborative information behaviour model via extracting from recent dominant information behaviour models.

Then the researcher moved their attention to communication studies in order to explore research that refers to the information-sharing notion. When the researcher diverted their concern to the communication field, it was found that there were various studies dealing with the information-sharing notion. These studies investigated information sharing in group settings. They explored the decision quality, which is related to the interests of the researcher. Stasser and Titus (1985) argued that group decisions are more unbiased and more informed than individual decisions. By this argument, they prompted the discussion on the role of the unshared and shared information in group discussions. They investigated the reflection of these situations in the quality of the decisions. Consecutive studies based on their hidden profile paradigm investigated the role of information sharing in group discussions through laboratory cases (Stasser et al., 2000; Larson et al., 1998; Winquist and Larson, 1998; Larson et al., 1994; Stasser and Titus, 1987; Stasser and Titus, 1985).

The aim of information sharing in a group discussion is the pooling of unshared or unique information. In this regard, some models have emerged in the communication field: the Collective Information Sampling Model (CIS) (Stasser and Titus, 1985) and the Dynamic Collective Information Sampling Model (DCIS) (Larson et al., 1994). The main concern of these two models is the making of objective, unbiased decisions in a collective way. A

challenging model was introduced by Wittenbaum, Hollingshead and Botero (2004). In their model they perceived information sharing as a motivated process and presented some criticisms to the traditional collective information-sharing models in the hidden profile. Their model indicated the nature of information sharing in the decision-making groups. In the model, information sharing is motivated by the members' goal that is stimulated by the context. In this process, information sharing among individuals is deliberative and selective.

Subsequently, in the communication field the models intend to explicate the role of shared and unshared information in decision quality. In hidden profile studies, laboratory cases were initiated by the distribution of information (shared or unshared or partially shared) before the discussion. The motivated information-sharing model, which is an extended version of the earlier ones, explores how group choices and the information-sharing behaviour of group members changes according to the group members' goals and the features of the context (Wittenbaum et al., 2004). This challenging version, however, is comprehensive in the communication field; it does not represent how information is acquired before the discussion period. As can be understood, organisational members make decisions by using information, which is relevant to the solution of the problem. They seek information and then communicate the information possessed among each other (group-based or team-based) to evaluate the alternatives and select the best alternative. Overall, it can be suggested that behind the information-sharing behaviour, seeking behaviour has to take place. In this regard, the models in communication studies have discrepancies that do not provide both an information-seeking and information-sharing model. Thus, there is no opportunity to explore information processing in decision-making periods.

As a summary of the recent literature and the outstanding theoretical models, models from the information behaviour field commonly deal with the information seeking and searching behaviour of individuals. In communication studies they are exploring the role of shared vs unshared

information (early models), and motivated information sharing (see Wittenbaum et al., 2004) to increase decision quality in naturalistic settings.

Following the discussion on the recent literature, the researcher shed light on real-life problems, which impressed the researcher to conduct this research. Organisations design information systems based on uncertainty, task complexity and time pressure. These systems consist of practices and technology. The discrepancies in these systems result in lack of communication and processing of poor information. Thus, this leads to failures. There are various practical examples in Turkey in recent years. 653 people died in the 1992 Erzincan earthquake, 61 people died in the 1995 Izmir flooding, 420 people died in the 1997 Adana earthquake, more than 30.000 people died in the 1999 Golcuk earthquake (Durduran and Geymen, 2006), 31 people died in the 2009 Istanbul flooding (Sabah, 2009). Large-scale fires destroyed approximately 50% of the forests in Turkey between 1950 and 2010 (Cevre ve Orman Bakanligi, 2010). Every year more than 200 people die because of malpractice in emergency surgeries caused by discrepancies in the information systems of medical centres (Celik, 2010).

Disasters are not determinable; however, the losses may be minimised by effective team coordination and an effective information system design (Kapucu and Garayev, 2011). The role of disaster coordination teams includes: preparedness, mitigation, rapid response to emergency cases and recovery (Albayrak, 2005). In this regard, the role of information behaviour (sharing and seeking) increases in the rapid response phase of disaster coordination.

Integrated disaster coordination centres were founded after the 1999 Golcuk Earthquake. Until that time, disaster teams were not integrated and could not act effectively to a disaster. The rescue teams would reach the disaster area five hours after the incident, and that is why the results of this earthquake were so serious for Turkey (IBB, 2010). This case was unique for Turkey considering the magnitude of the earthquake, so that the disaster coordination system was not able to mount a rapid response to this kind of incident. The 17 August Golcuk Earthquake showed that information systems are vital for

rapid response to incidents and the coordination of the information is vital for minimizing losses. Unfortunately, so many people were lost and died on account of the discrepancies in our disaster information systems (Dinler et al., 2007). Another recent example indicates that time pressure and uncertainty existed in March 2009 at the helicopter crash of Muhsin Yazicioglu (political party leader). The accident took place on a mountain with snow. The government report highlighted that *"Our rescue teams' technical capacity and administrative capabilities are insufficient to respond to this kind of incident; however, so many rescue teams from different governmental institutions participated in the operation. ... The existing problem is caused by the design of search and rescue activities, combined with errors and deficiencies in disaster information system (CIHAN, 2011, online)."* Four people died in this accident due to freezing.

Apart from the emergency units mentioned above, the newsdesks ensure the flow of information ASAP in regard to the time pressure to release it to the audience. Sometimes, however, the validity of the news is judged (Attfield et al., 2008). For instance, the Danistay Attack in May 2006 (Scribd, 2006) existed and most of the breaking news channels were manipulated by misinformation under an anomalous state of knowledge and uncertainty (Attfield et al., 2008). In this incident, the journalists did not judge the relevance of the information and the news channels broadcast misinformation, which had serious setbacks for the institutions. Considering Savolainen's (2006) information-seeking process, the news agencies did not take into consideration the information's relevance from multiple sources. They stopped information seeking from various channels when they were constraint by time pressure. It is understandable that this was an extreme case and that they had little time to do that. They did not consider, however, that breaking news involves time pressure and is an effective tool to speculate the community (Arslan, 2001).

In elections days, news channels compete to release the most relevant and accurate results to the audiences. Thus, the news agencies are supposed to broadcast the voting results in an ongoing process by gathering information

from the elections staff while they are counting. CIHAN Media has broadcast the results earlier than the other agencies in the last four elections (2002 and 2007 general elections; 2004 and 2009 local elections) (Aydin and Soylu, 2009). The reason for this is the transformation in the information and professional reporter network of the agency, and the context-based designed information system to validate the gathered information from different sources in little time (Ugur, 2009; Porras and Silvers, 1991).

In the former case (emergency response teams operations) failure results in concrete losses (people are injured or die) (Sabah, 2009); in the latter case (breaking news) failure results in abstract losses (reputation) (Merkezi, 2010). In addition to these rapid response activities, routine activities are held in organisations. Information is transferred among departments to ensure integrated decision-making. Communication inside organisations results in an increase of organisational efficiency and a decrease in the waste of resources (Moenaert and Souder, 2009). In this regard, the human resources department collects information about candidates using interview forms. Equally, it assesses the performance of organisational members by seeking information from other departments or by allocating human resources in collaboration with other departments. Human resources departments seek information from documentation and databases, which they acquire from or transfer to the other departments for developing strategies on human resources for long-term planning (Dessler, 2000). In this context, emergency information is not required; however, the lack of communication between divisions will lead to the failure of organisational activities (administrative failures) (Goodman, 1993; Dessler, 2000). For long-term activities, information is not emergent. Thus, information behaviour actions are held in regard to this situation, while the design of the information system varies from one emergent case to the next.

As a result, there is a need for comparative study to test the existing information behaviour models in an organisational context, and to build new models (inductive) from case studies data concerning the fact that work tasks are bound to their context where time pressure and uncertainty vary. In this

vein, the research questions emerge as follows: *How do task complexity and time pressure influence information behaviour (seeking and sharing) in organisations in different contexts?* and *How do task complexity and time pressure influence information processing and decision making?*

3.9 Research questions

How do task complexity and time pressure influence information behaviour (seeking and sharing) in organisations in different contexts?

How do task complexity and time pressure influence information processing and decision making in dynamic environments?

3.10 Conclusion

This chapter has presented the theoretical framework and the rationale behind employing Activity Theory in this research. The comparison between situated action theory and Activity Theory indicated that the use of Activity Theory in this research is preferable. The research methods and the organisations' features are presented. Conceptual data analysis techniques are discussed. The gap in the literature and the real-life problems related to information behaviour issues are addressed in regard to the research questions.

CHAPTER 4 ACTIVITY SYSTEMS AND DATA ANALYSIS

4.1 Disaster management

This section of this chapter is about information behaviour in the disaster management context. Two different operating environments of disaster management organisations, their activity systems, and their collaboration referring to their information management systems and their respective staff are explored.

Activity Theory is employed as a theoretical framework and analytical tool for the data analysis. The researcher discusses activity systems and the interacting activity systems of disaster management organisations that are operating in fast-paced and slow-paced situations through the lens of Activity Theory. The objective of the data analysis is to identify: how time pressure and task complexity influence emergency response and long-term disaster planning tasks; how the information and communication systems change in fast-paced and slow-paced situations; and what are the differences and commonalities in two different situations concerning collaborative information behaviour and decision making.

The tasks mentioned in this chapter have been selected from the hand response cards filled by the interviewees. The tasks have been ranked by the interviewees according to the *"amount of information to be absorbed"*, *"number of decisions to be made"*, *"number of people to communicate with"*, and *"difficulties in communicating the information absorbed"* criterias. Any of the tasks ranked 3 and above in any three of these categories have been accepted as complex and others accepted as simple. The interviewees were given the question of whether they feel time pressured while carrying out these tasks.

A final filtering has been done through the categories, namely whether the tasks are *significant to resolve the problem* and *occur most often.* The hand response cards can be found in Appendix 8.11.

4.1.1 Context

Disaster management is divided into two sub-situations considering temporal issues: emergency response and long-term disaster planning. The emergency response phase is time critical and the tasks, which are critical for the resolution of the problems, are more complex than the recovery, mitigation and preparedness phase of disaster management. The emergency response decisions are supposed to be made in a fast-paced situation. The reliability and availability of the relevant information is problematic. The tasks are ill-structured. The action should be taken as soon as possible after the incident occurs. There is scarce time to obtain the most plausible amount of information and validate it. Therefore, uncertainty is high and the results cannot be determined in a fast-paced situation (Byström and Hansen, 2005; Vakkari, 1999a). A slow-paced situation involves tasks, which are significant to solve the problem and most often occur in long-term disaster planning. The uncertainty is acceptable and the timeline is not as tight as in emergency response tasks.

As activities are composed of tasks, and the tasks are sub-activities, the organisational members are expected to carry out these tasks making the deadlines or time constraints (Byström, 2007; Savolainen, 2006; Kulthau, 2004). Mostly, the tactical level commanders take the actions while carrying out the information processing and decision tasks in the emergency response phase. According to the response of the interviewees, the emergency phase tasks are perceived as more complex and time pressured than long-term disaster planning tasks. It is noteworthy that the emergency staffs engaged in response have already had training to operate in a fast-paced situation (Appendix 8.11).

For the recovery and planning phase in a disaster management context, the time constraints are not as strict as in the response phase. The decisions are made in a larger timescale than in the response phase. The strategic level commanders' actions stand out. Long-term planning is realised by pooling a reasonable amount of information and processing the information in large-

scale time. The actions are taken in a slow-paced manner. Therefore, the recovery and planning phase is not as time-pressured and complex as in the response phase. Since gathering reasonable information lessens the uncertainty, the tasks are determinable and the deadlines for taking actions are not as strict as in the response phase (Appendix 8.11)

Table 8 The contexts of the information behaviour inspected, and their features

Contexts	Features of the contexts	Fieldwork organisations/divisions	Subjects involved
Disaster Management			
-Emergency response phase	Fast-paced, time critical, more complex	AKOM, Police, Fire Brigade, Ambulance Services, Rescue teams, case-based other institutions	Tactical level commanders (fire crews, command and control crews, paramedics)
-Recovery and planning phase	Slow-paced, less time critical, less complex	AKOM, Police, Fire Brigade, Ambulance Services, Logistics Department, Rescue and First Aid, and other governmental and non-governmental institutions	Strategic level (province governors, mayors, general managers of emergency response institutions)

Table 8 summarises the various contexts, the features of the situations, the organisations where the fieldwork has been done and the subjects involved in information processing to make sense of the wider picture. The data analyses have been done to investigate the information behaviour of the subjects mentioned in the table above. The data analysis indicates that information behaviour is influenced by the time and complexity of different situations, which impress the subject of the actions to behave in different ways as the conditions change.

4.1.2 Shared objective and interacting activity systems

The collaboration of AKOM, the Fire Brigade, the Ambulance Service and Rescue Teams to realise the shared objective (disaster management) is analysed using Activity Theory as the theoretical framework and analytical tool. The motive behind this objective is to facilitate public safety. In this regard, timely and relevant information sharing becomes crucial.

In Istanbul, during a large-scale disaster, the province governor, mayor, the general manager of AKOM, the director of the Fire Brigade, the director of the Ambulance Services and Rescue Teams are responsible for managing the disaster. The illustration below (Figure 8) shows the interacting activity systems by using the third generation of Activity Theory (Engeström, 2001).

At the initial state of the large-scale incident, emergency response teams are required to be dispatched to the incident site by the Command & Control (C&C) centre of AKOM. The initial step of the large-scale emergency response is the establishment of *knot-working* (Engeström, 2011; Engeström, 1999d). Initially, AKOM communicates the incident to the C&C centre of each emergency response institution (Fire, Ambulance, Rescue Teams, etc.). The rules and regulations do not allow AKOM to directly command the emergency teams. The decision should be made that the disaster is large-scale and the central command should be processed. However, the Police should still be coordinated through its own C&C centre. AKOM communicate with the Police C&C centre and then actions are taken. Adhocracies exist while communicating information except with the Police department. However,

police officers share information with the other emergency teams operating at the incident site.
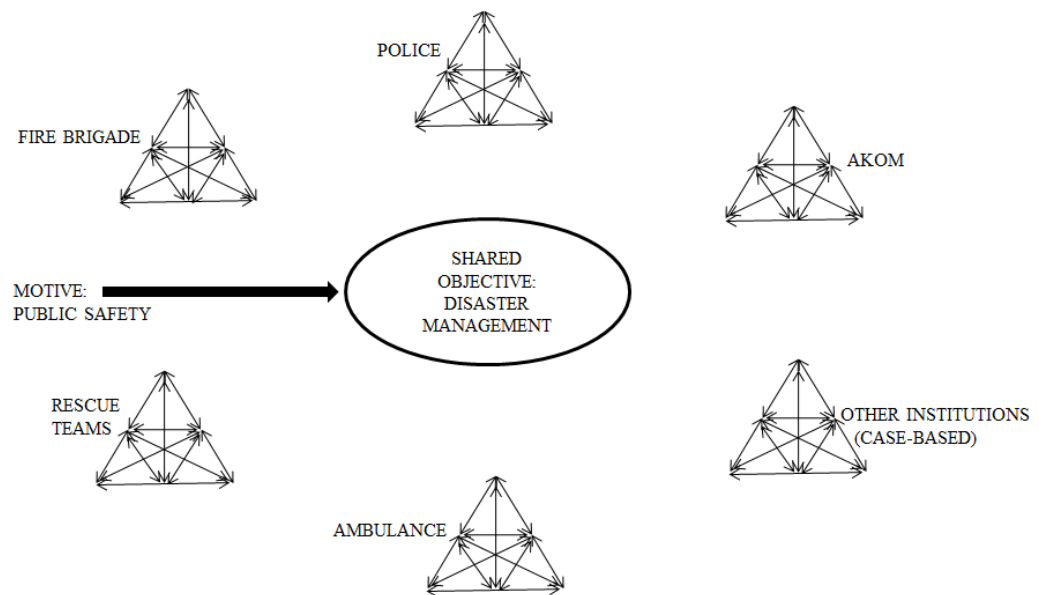
Figure 8 Disaster management context activity systems and shared objective

In the meantime, AKOM gathers data and information from the incident site and the data and information are processed at the C&C centre. Then, updated information is shared with the emergence response teams' leaders (Fire Brigade, Ambulance Services, Police) operating at the incident side. Figure 8 summarises the interacting activity systems of disaster management and the institutions that play a role during disasters.

The C&C crews are supposed to make immediate decisions (such as dispatching more emergency teams to the incident site, or allocating different equipment for responders etc.). The decision is made according to the information gathered from the site. The C&C centre communicates with the Fire Brigade, Ambulance Service, Rescue Teams and Police by supporting the teams through relevant updated information. On the other hand, these emergency response teams report to the C&C centre in a continuous manner.

The information sharing between these emergency teams occurs at the incident site too. The Police communicate with the Fire crews and paramedics about their initial security concerns, risk assessment and their

impressions about the incident site. The impressions of the Police emerge via the evidence they found or intuitively, the Police officers utilise their past experiences (Klein 1994; Klein 1998). Referring to this information, a risk assessment is made by the team leader of the Fire Brigade to ensure the security of the crews and the public.

During the response, fire crews provide information about the people they rescue to the paramedics via face-to-face communication. This information helps the paramedics to comprehend the needs of the patient in a better and faster way. Then, the paramedics report to the C&C centre about the situation or their requirements. The reporting action is done by radio or telephone. At the incident site, emergency response teams share information with each other and with the AKOM C&C centre to establish effective disaster management. The communicative actions mentioned above are performed to achieve the shared objective, after the emergency response teams are *knot-worked*.

When we turn our attention to the slow-paced situation activities of the disaster management institutions, establishing collaborative work between governmental and non-governmental organisations, collective information pooling, and collaborative decision-making are other activities for effective disaster management. The shared objective is the same as in the fast-paced situation; however, the temporal aspect alters the tools used, the community involved in the activities, the rules and regulations, and the division of labour.

The motive behind gathering to carry out the slow-paced tasks is to ensure public safety, the same as in fast-paced situations. The responsible directors of the disaster management institutions have contingent or regular meeting to lay out long-term planning for the preparedness, recovery and mitigation phases. As the activities are done in a slow-paced manner, it is mostly the strategic level commanders that are involved in the slow-paced tasks, and the tactical level commanders' reports support the strategic level commanders in reaching long-term planning and decisions (AKOM 2010).

4.1.3 Collaboration and coordination

During large-scale disasters (such as major fires, floods, earthquakes, heavy snow etc.), several disaster management agencies act as emergency responders. During both recovery and routine times they collaborate with each other for long-term planning in Istanbul. The disaster management agencies are: the Disaster Coordination Centre of Istanbul Metropolitan Municipality (AKOM), the Fire Brigade of Istanbul Metropolitan Municipality (Fire Brigade), and the Medical Aid and Rescue Service of Istanbul Metropolitan Municipality (Ambulance Service and Rescue Teams). All these four different agencies are composed of different activity systems within the shared objective (disaster management): AKOM manages and coordinates all these emergency agencies at a time of a large-scale disaster. AKOM is the leading coordinator of large-scale emergency responses; however, the aforementioned organisations have their own coordination units in routine times.

The coordination of these agencies is generated by AKOM at the presence of the Mayor and the Province Governor. Information management facilitates coordination. Initially relevant and significant information should be possessed, and then relevant information should be shared at the right time with the right agency or people. Then, this information should be used to take action.

During major man-made or natural disasters, the emergency management and the coordination of the emergency agencies are challenging since uncertainty exists. Avoiding unpredictable hazards and risks, saving lives as soon as possible, and contributing to public safety objectives are facilitated by effective emergency response management. For effective emergency management, the key notion is the effective coordination of the emergency agencies, supported by effective information management and communication (Chen et al. 2008).

Coordination entails integrating and linking the different parts of the organisation to realise shared objectives (Kapucu and Garayev, 2011; Ven et al., 1976). The coordination role of AKOM occurs in three levels: individual,

agency and interagency (Bharosa et al. 2010; IBB, 2010). On the individual level, human cognition and perceptions are taken into consideration during the emergency response; on the agency level, organisational norms and rules, and division of labour; and on the inter-agency level, power relations between the agencies, inter-organisational interdependencies and collaboration procedures. AKOM's coordination responsibility for the other emergency agencies is established by the "Duty and Work Regulations of the Disaster Coordination Centre of Istanbul Metropolitan Municipality (AKOM 2012)."

The coordination role of AKOM is discussed from the information management side since this research scrutinises in this section the information behaviour of emergency responders. Under the coordination of AKOM, several emergency response teams collaborate. As a notion, collaboration involves coordination, cooperation, networking and partnership for realising the shared objective (Kapucu and Garayev, 2011). By virtue of its coordinating role, AKOM becomes the leader of large-scale disasters response, and enables the collaboration between several emergency agencies by information use and share.

The emergency response crews emphasise that during disasters they feel extreme time pressure and the uncertainty prevents them from acting smoothly. To hedge the uncertainty, effective information management stands out. For effective information management, AKOM uses ICT systems. This will be discussed in the next sub-sections. As subjects of the tasks for this research, tactical level and strategic level staffs are investigated as part of the emergency response agencies' information behaviour, since they are responsible for information management.

4.1.4 Fast-paced environment tasks and mediating artefacts

The coordination role of AKOM makes it an information exchange and decision-making station while responding to large-scale disasters.

Information-related, time critical, and complex tasks are carried out through using tools in a fast-paced environment. The tasks discussed in this part are highly ranked in terms of time pressure after the analysis of the interview transcripts and the hand response cards. These tools and tasks are categorised and widely analysed using Activity Theory in the following sections.

4.1.4.1   Gathering information from the incident site

Emergency response starts after the C&C centre receives the emergency calls. These public enquiries may be the call of an eyewitness or the observation of the C&C crews through disaster information and technology systems, such as early warning systems, MOBESE cameras etc.

When the emergency notifications are received from an eyewitness via his/her phone, the crews at the C&C centre ask basic questions about the incident. These basic questions are "What is the incident?" and "What is the proper address?" This conversation takes approximately 10-15 seconds and the C&C crew announces the incident through the closed circular microphone. The emergency response teams get ready to be dispatched to the incident site.

After the announcement of the initial details of the incident, the C&C crew continues communication with the caller on the telephone. Initially, the C&C crew ask the witness/caller whether he/she is at a safe place. According to the response, the crew tries to ensure that the caller is settled in a safe place till the emergency response crews find him/her.

In some cases, the C&C crew may need to calm down the caller. The caller may be in panic, stressed or terrified. Another case is that the caller may have health problems that prevent him/her from providing relevant information. The C&C crew understand this kind of situation mostly from the voice of the witness (IDM 06).

> IDM 06: *"In some cases, I receive incident enquiries from the witnesses. After we respond and start to ask "What is the iii.." , the witnesses shout at us: 'Help, help, fire!' Then they hang up the phone. In this situation, there are two possibilities: first the witness is a panicked person, terrified at that time; second, and worse, the fire burns him/her and prevents him/her from talking to me!"*

The behaviour and psychology of the caller/eyewitness influence the information gathered from him/her and so the performance of the emergency responders is affected by this situation (IDM 03; IDM 04; IDM 06). When we discuss the situation above from an information behaviour perspective, the information needs of the C&C crews are not fulfilled by the caller, so the C&C crew is in a dilemma and use their previous experience for how many teams to dispatch to the incident. Furthermore, cases similar to the case mentioned above cause delays in dispatching the teams and the information needs for the initial phase of the emergency response: "What and where?" questions are not answered by the caller (IDM 06).

> IDM 06: *"When I come across this kind of case, I call back the witness. If he/she responds, I feel fortunate and try to calm them down. And then I try to ask details of the incident to dispatch the relevant teams with the relevant equipment. ... But if I cannot reach him/her via phone, that time I feel horrible!"*

After the C&C crews become sure of the safety of the caller, the crews keep communicating with the caller calming him/her down to gather as much relevant information as they can. The questions directed to the caller become a bit more complicated to learn as much information as possible about the incident. The information sought in this next step is "catching the details about the incident and incident site". The questions are "Do you know how it happened? Are there any trapped people? Do you know the reason of the incident?"

The purpose of seeking this information is to fill the information gaps, reduce uncertainty (Savolainen, 2012; Wilson, 1997) and update the emergency teams dispatched to the incident site. The concern at this stage is the deficiencies surrounding the reliability of the information gathered from the caller at the incident site. Two reasons emerge for this concern: the knowledge of the caller about the incident, and the psychological and emotional condition of the caller/eyewitness (IDM 12).

> IDM 12: *"Mostly, the information people give us on the phone is full of mistakes, because they are scared and panicked. ... Three years ago, the teams (fire and ambulance) were dispatched to a fire incident where there*

were lots of people (kids also) trapped. The eyewitness did not give the right information. The building she described on the phone was not an apartment; it was a detached house. However, after the command and control crew checked it from the local electronic map, they understood that the house was a 7-flat apartment block. The command and control crew updated us and we changed our equipment, but this had cost us several minutes to initiate the response."

Another source for gathering information from the incident site is face-to-face contact with the public around the incident site. After the emergency teams' arrival to the incident site, the team leader has observations to make about the incident and the hazards. The team leaders have limited interaction and communication with the public around. The team leader's purpose in this stage is to assess the risks before initiating the response. Meanwhile, the emergency response crews prepare the equipment to respond to the incident. The team leader assesses the risks initially and then shares his/her impressions with the team members. They then report to the C&C centre via radio or mobile phone. In this case, the team leader asks details for the incident from the public; however, the information may be suspicious since the public may not know the details (IDM 11).

> *IDM 11: "After we arrive at the incident site, if we are the first team on site, I initially observe what is happening for 20-30 seconds and communicate with the command and control centre about my initial impression. In the meantime emergency response crews make the fire suppression truck and equipment (such as pipes, masks etc.) ready. I do also communicate with the public around; however, most of the time people around arrive at the site after they see the smoke or they hear about the incident. Therefore, mostly, the public do not help me much.*
>
> *In some cases, I ask detailed questions (Do you know if there are any trapped people? How did it happen? What is the reason?) Very few people give me the information I need. ... In some cases, it is a waste of time; however, every second of mine is valuable to save lives."*

The reliability of the information is questioned by most of the emergency responders due to similar concerns with IDM 11. It is time consuming and involves deficiencies; however, the team leaders should question to mine any relevant information to use during the risk assessment, in order to respond and report to the C&C centre.

Conversely, team leaders accept the site managers as reliable sources, since they know the structure of the incident site or the building very well and provide valuable information to the team leaders. The team leaders ask about other exits or any other accessible entrances to reach the trapped people.

All the information possessed by the team leaders, leader of the Fire Brigade team, head paramedic of the Ambulance Service, and Police officer is shared with the C&C centre for their consideration. It is notable here that, in some cases, the jammers avoid radio and mobile phone communication. The team leaders complain about this situation. This deficiency influences effective emergency response.

The other information sources are the ICT systems' video recordings, such as MOBESE cameras and SNG vehicles. MOBESE cameras are live cameras that can be remotely controllable by the C&C centre. The recordings of the cameras may be broadcast live on the C&C centre and AKOM operation centre. The cameras are located in different locations in Istanbul, and the C&C crews can control them remotely and support the decision makers (tactical or strategic) at the operation centre by videos and photos. These MOBESE cameras have deficiencies including the fact that they are newly fitted to most of the locations, and while they are helpful for monitoring the motorways in severe weather conditions to avoid accidents, however, they are scarce in numbers in industrial zones. Industrial zones are potential threats in Istanbul since most of them are now within residential areas as a result of rapid and unplanned urbanisation (IDM 03).

> IDM 03: *"The MOBESE system is one of the best things the Municipality insists on. However, they are mostly for viewing cars, buses, trucks, motorways... It is good to monitor the motorways in severe weather, but we do not effectively use them in other incidents. Limited use in fires, floods. ... The number should be higher and they should be fitted in industrial zones. Industrial zones are like picking bombs as you watch on TV every day."*

Other live information sources are the SNG vehicles. SNG vehicles are live stream trucks and in some cases helicopters. The C&C crews report to the live stream department of AKOM about the disaster. If the director of AKOM or the director of the live stream department determines that they

should dispatch the SNG vehicles to the incident site, the live stream team would get prepared to get to the incident site.

The average time for an SNG truck to get ready to record the incident is 10-15 minutes according to the distance from the AKOM centre. The live video records are uplinked via satellite to the C&C centre and operation centre of AKOM. The tactical level commanders process these live recordings to update the emergency response teams operating at the incident site. Strategic level commanders monitor the videos at the operation centre. The subjects engaged in these live stream processes are experienced cameramen and press crews. In some cases, helicopters are used to record the incidents if access to the incident site is not available via SNG truck or where the incident site is very large (IDM 01).

> *IDM 01: "Live videos and photos from the incident site help to combine the parts of the puzzle. The chunks become smooth and the decisions are easily made. Also, we use these videos as training materials for further use. Also, our managers, the Mayor and Province Governor or any other emergency response institutions, request these recordings from us to use in planning for the disasters. In my opinion, the challenging thing about emergency management is the live stream facility of AKOM. Sometimes, I feel I am in a simulation game during the emergency response."*

The live stream facility is very reliable since the commanders comprehend the situation in all its aspects. They do not need to think about the expressions of the witnesses or the public. Besides, the advantage of the live stream video and photo support of the SNG is that the live recordings do not show the reason of the incident; they just capture the ongoing situation.

4.1.4.2 Relevant data and information support to the emergency response teams operating at the incident site

Strong, well-established inter-organisational communication systems facilitate effective collaborative work during time-critical emergency tasks, and result in effective emergency response and the saving of lives (Horan and Shooley, 2007). The AKOM operation centre becomes active to respond to

large-scale disasters, such as earthquakes, floods, landslides, fires and severe weather disasters.

The live recordings of the SNG and MOBESE cameras are displayed on the video wall at the operation centre. During large-scale disasters, the C&C centre moves to the operation centre to gain spatial and temporal advantages. These video recordings and photographs are monitored continuously. The C&C crews provide updated information to the emergency responders operating at the incident site. The dispatches of the new teams or the new allocations are briefed to the teams. The information is communicated via phone, radio or satellite phones. The information gathered from the incident site via live equipment, from the public via inquiries and from site managers is pooled at the operation centre. The objective to pool information at the operation centre fulfils the information needs of the emergency response teams. The C&C crews and strategic level commanders comprehend the holistic picture. After the processing of a large amount of relevant information, the decisions become more rational and the information provided to the emergency response teams becomes more relevant (IDM 01; IDM 03; IDM 04; IDM 19).

> *IDM 19: "The operation centre is established to pool real-time information. ... The directors of the different emergency teams come together to integrate and process the information they watch on the displays. They determine the next step and the command and control centre shares the decision with the emergency team leaders operating at the incident site. ... Sometimes the decision may change for strategic reasons, dispatching new teams. The display screens show you reality, and how you behave in a rational way, you trust what you see, there is no proximity, or paraphrasing of the expressions."*

Weather forecast systems are also used to support the emergency response teams operating at the incident site. Large-scale disaster response stretches for more than several days. The changes in the weather and the potential hazard of those weather changes to the emergency response operations are communicated with the teams.

4.1.4.3 Risk assessment

The major role of the emergency response teams is to save lives. Then, they should save properties and commodities. Initially, the emergency responders should be working safely and securely. The risks should be assessed very well. Otherwise, while the fire crews are present at the incident site to save people, the fire crews would need to be saved as well.

The team leader of the fire crews is responsible for risk assessment, ensuring the safety of the crews and the other people around the incident setting. To carry out this task, the team leader needs relevant information to hedge the risks at the incident site. The initial information provided to the team leader is the *type of the incident* and the *property address*. In some cases, the C&C crews communicate with the team leaders, while they are on the way to the incident site, and provide updated information. The information includes the reason of the incident and information about trapped people. This kind of relevant information, however, does not exist all the times (IDM 14).

> *IDM 11: "We should know as much as we can about the incident. Are there any trapped people inside the building? What is the reason for the fire?*
>
> *… We accessed the site manager; he told us that the building staff could not access the chemicals at the basement floor. There was a small illegal chemical production atelier. … If I did not have access to the site manager, I would do the initial risk assessment, the gas and electricity were cut down by IGDAS and AYEDAS, and two crews were sent to rescue the trapped people."*

The formal information gathered from the governmental reports or from the municipalities' reports (such as building structures, the type of the buildings etc.) may be irrelevant. Manmade alterations and illegal structures constrain the emergency teams to operate via utilising the information and data from formal documents. At the risk assessment phase, the team leaders should concern themselves about this issue.

Alternatively, the team leaders use past experiences to make quick, effective decisions in complex situations. The Recognition-Primed Decision (RPD) model (Klein 1998) is used by most team leaders during the risk assessment phase of the emergency response (IDM 08, IDM 09, IDM 10).

Risk assessment is an ongoing process, not only done prior to the emergency response. During the response, at least two crews enter the building or the rooms; the second crew, which enters the building or the room to rescue the victims is responsible for the local risk assessment (IDM 10). In addition to the overall risk assessment carried out prior to the response, using the observations, information shared through the radio and the RPD decision model, help in making the local risk assessment.

4.1.4.4 Identifying the needs of the patient

The Ambulance Service and paramedics are mainly responsible to carry out the task of "identifying the needs of the patient" according to the responses of the paramedic interviewees. At the initial phase of the emergency response, the fire or rescue crews access the victims or trapped people. They check the health condition of the injured people. The observations of the crews or the face-to-face communication between the crews and the injured people exist. The condition of the injured people is the information source for the crews. The RPM exists during the evaluation of the health condition of the injured people. The experience of the crews stands out during this process. They process the information they have internalised via the observations and communication. The process is cognitive. In some cases, the crews cannot decide on an action individually. Then, the crews communicate the situation of the victim with the remote commanders.

Every victim is perceived as a vertebral fracture; a collar case is fitted and they are carried on a stretcher. This basic information is gained via theoretical training. After the first aid application of the crews, the victims are swapped to the paramedics. The paramedics are not involved with the rescue teams that are responsible to enter into the collapsed buildings or, if compulsory, the paramedics enter into the disaster sites under the supervision of the fire or rescue crews.

After the injured people are transferred to the Ambulance Service, the fire or rescue crews communicate with the paramedics about the situation of the

injured people. Information on what actions have been applied to the injured people and how first aid has been performed are shared with the paramedics. The paramedics communicate with the C&C centre of AKOM and the Ambulance Service the situation of the injured people. The Ambulance Service C&C centre try to access the health information of the injured people if they can identity him/her. The communication continues regarding the nearest or most relevant health institution selection for the injured people. In most of the cases, the most relevant is the nearest one; however, the specific health problems or the capacity of the nearest health institutions affect the rational choice of the C&C centre of the Ambulance Service. The decision is communicated to the Ambulance Service's head paramedic and the injured people are conveyed to the health institutions. Continuous communication exists via radio or mobile phones between the C&C centre and the Ambulance Service. The health situation and complications of the injured people is reported to the C&C centre.

4.1.5   Slow-paced environment: Tasks and mediating artefacts

4.1.5.1   Establishing collaborative work between governmental and non-governmental organisations

AKOM coordinates emergency teams via data and information support, and collaborates with different major emergency institutions related to the incident. Major institutions are governorship, municipality of cities, hospitals and central government emergency institutions, the Fire Brigade, Ambulance Services, the Police, other relevant non-governmental disaster management institutions, universities, research councils, the military, electricity, gas and water supply institutions, and other voluntary organisations which take a role in rescue operations.

AKOM informs all these institutions about the scale of the incident, needs for disaster preparedness, response, recovery and mitigation. AKOM communicates with the hospitals that are closest to the incident site to share

information about the injured people and their needs while the Ambulance Service is en route to the hospital. AKOM communicates with the Metropolitan Municipality of Istanbul Logistics Department about the shelter and food packages for the large numbers of refugees because of flood, earthquake etc. at the recovery phase of the disasters.

The information needs are: "How many people were affected?" "What are the basic needs of the refugees and injured people?" This information is continuously updated by gathering information from the incident site. Further, AKOM C&C crews share updated information with the emergency institutions mentioned above via phone.

The information sharing and communication tools used for this task are phones; however, satellite phones are usable at the time of deficiencies.

> *IDM 04: "During large-scale disasters, any information we received from different sources is being processed by the emergency commanders at the centre. … During the 2009 Istanbul flood, landslides occurred; the living areas and the motorways were invaded by flood. As you know we lost lots of people. … We continuously communicate with the other institutions about the logistics, to establish mobile kitchens and serve food for the refugees. The vulnerable places were discharged and some of the sports halls were used as shelters."*

The needs of the injured people or refugees are determined through evaluating the information gathered from the incident site. Communication of this information among disaster management institutions accelerates mitigation (IDM 03).

> *IDM 03: "Cooperation and collaboration is so crucial for us. Conflict between institutions or directors causes severe hazards. In recent months, the conflict between our institution and X institution caused a traffic accident. We monitored the disaster via our remote cameras, and then shared what we were concerned with with the Command & Control centre of X. They said they have dispatched their teams to sort out the problem. The teams did not go to the place where we reported; however, the Command and Control centre of X reported that the problem was sorted.*
>
> *I said 'I monitor the problematic area, and still nothing is done.' X commander said that 'we did, and I do not get instructions from you. Your institution regulations are not binding to my institution or me. I am responsible to my boss!'*
>
> *Then, the tragic result: traffic accident!"*

Each of the emergency management institutions mentioned above has their own rules and regulations. Adhocracies exist during emergency responses and the hierarchical structure is not much discussed. However, the regulatory base of AKOM's coordination is not well-established, and in some cases, personal attributes have catastrophic effects.

4.1.5.2 Information pooling

The team leaders produce emergency response reports. These reports are submitted to the group leader or the director of the emergency response institution. These reports involve the details about the incident (type, location, how the crews intervened) and the results (people, commodities saved, hazards). These reports are archived to be used for training purposes or to be used at strategic level meetings for disaster management planning. They are archived for further needs.

MOBESE camera recordings are streamed at the C&C centre for 24 hours, and these recordings are monitored in the operation centre and C&C centre. The video recordings and the photos taken by the SNG vehicles are archived for further use too.

Other information pooling tools are the AKOMAS and HAZTURK disaster recording systems. AKOMAS records real-time data about disasters occurring in any other region of the world and transfers the data to the AKOM centre. The geography and mapping department of AKOM continuously monitors the disaster data. HAZTURK monitors and reports the potential earthquakes near Istanbul and the system calibrates the potential hazards. The most significant information about the disasters or potential hazards is reported to the AKOM Manager.

Another information pooling system is the signs from the weather forecast stations located between Corlu/Tekirdag and Gebze/Kocaeli. The weather forecast data is pooled and the processed information is utilised in the preparedness phase of severe weather disasters.

The above mentioned technological systems recordings and the incidents reports are archived to be used for training purposes and, also, they are used to support the decision-making process of strategic level managers.

4.1.5.3   Disaster management meetings

Group meetings and the discussions at the operation centre of AKOM are the best place to exchange information. The meetings held at the operation centre are information-rich environment. The directors of the disaster management teams share unique information, expertise and insights to sort out the problems encountered during the emergency response and recovery phase. The decisions are more informed (Gigone and Hastie, 1993).   The main advantage of the meetings is the use of the pooled data/information, which is provided by different disaster management parties. Another advantage of these meetings is that the groups (which are generated by experts in the field) are better decision makers than the individuals. Dynamic sequential information processing (Larson, 1994) managed to make the best decisions (IDM 02). The directors continuously gather information from the incident site and the displays are used to monitor the incident sites.

> *IDM 16: "Operation centre meetings are so important for us. Different directors and managers come together to determine long-term planning. Every one of us has different expertise. ...*
>
> *Different emergency institutions have different problem-solving techniques. So, we learn many things from each other. We produce the scenarios and get prepared for the prospective disasters."*

The archive is also used to prepare long-term disaster planning. Strategic level meetings are held at the operation centre to decide the needs for the post-response or preparedness phases.

4.1.6   Summary and conclusion

Emergency response institutions do *knot-work* at the time of large-scale disasters. Inter-agency level collaboration is established during large-scale disasters; however, for the single disasters mostly agency level collaboration

is established. The flexible coordination of AKOM is generated during large-scale disasters after AKOM communicates to get permission from each of the organisations' C&C centres. Though the rules do not permit AKOM to coordinate, customs permit AKOM to coordinate the emergency teams effectively. Rivalry has been noted between emergency response organisations and has resulted in disaster management errors.

AKOM's coordination role is vital for large-scale disasters. However, the institution is not politically as powerful as it is supposed to be. Therefore, tensions between emergency response organisations arise. The rules binding AKOM do not allow it to coordinate the Fire Brigade and Ambulance Service without permission. The Fire Brigade, the Police and the Ambulance Service have different C&C centres. They are bound by different rules and regulations. This restricts effective information sharing. It is notable here that this tension sometimes causes fatal errors.

It is observed that the staff at the C&C centre are not well trained on information management during incidents. The consensus of the interviewees' is that C&C crews are not well trained on disaster management. Therefore, deficiencies occur while the crews are dealing with information from the incident site. Also, one of the complaints is that the public call the Police for every incident. Then, the Police notifies the Ambulance Service, Fire Brigade or AKOM about the incident. The police cannot conduct enquiries on the incident well, so that latent responses increase damage and losses. In some cases, the information shared by the Police is full of errors and this prevents effective response since the needs of the emergency tasks cannot be identified at the right time.

Uncertainty is too high at the initial stage of the incidents. The incoming emergency calls prompt the C&C crews to seek answers for "what type of incident and where?" questions. After the teams are dispatched, communication between C&C crews and the caller, and between C&C crews and the emergency teams continues to assess the changing conditions to update the emergency response teams. Information seeking and sharing among C&C crews is conversational. Accessing relevant information about

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the incident lessens the uncertainty and enables the responders to generate effective response tactics.

Time pressure drives the emergency responders to find the first working solution that satisfies the immediate needs. By doing so, the information sought is shaped to answer the basic questions, which provide short-term benefits rather than long-term ones. Time is counted as lives, because late response results in deaths. So, the information provided to the responders is intended to avoid information overload and save time while processing information. C&C crews do know what information to share with whom.

Time pressure and spatial proximity is a barrier to access relevant information. In order to access relevant information sources, team members or emergency response institutions collaborate with each other. Every situation has its unique information needs and these needs are determined through a sense-making process. After the needs are determined, information seeking from various sources and continuous sharing between team members and institutions occurs.

The tasks of *gathering information from the incident site* and *providing relevant data and information support to the teams operating at the incident site* are supporting activities (actions) for the tasks of *risk assessment* and *identifying the needs of the patients.* The complexity of the tasks varies. The *gathering information from the incident site* and *providing relevant data and information support* tasks are normal information processing tasks which are determinable according to the structure; *risk assessment* and *identifying the needs of the patients* are genuine decision tasks which involve many unpredictable parameters.

For the *risk assessment* and *identifying the needs of the patient* tasks, emergency responders use intuitive expertise as well as analytical processes to save time during response. But, they turn to seek information from other parties when they feel a situation is unfamiliar and when the conditions change in a rapid manner. The tactical level commanders at the incident site make decisions. The decisions are made after the observations are done by

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the emergency team leaders and the information which is gathered from the C&C centre is integrated.

The information sources used vary during the incident. The caller, eyewitness, and signal comes from early warning systems that are the initial information sources. During the incident, formal information sources take precedence over the informal information sources. Emergency responders most likely rely on formal sources, but do not ignore gathering information from informal sources (people around the incident site, eyewitnesses etc.).

Radio, mobile phones and satellite phones are widely used for oral communication among the emergency teams and C&C centre. Additionally, live stream videos via SNG and MOBESE cameras are used to gather information from the incident site to make better sense of the situation. Live stream equipment is a challenge supporting AKOM with real-time information. Integration of photo, video and audio facilitates comprehension of the situation better. Also, the recordings are archived for further use as are the incident reports, and used in the slow-time recovery and long-term planning phases.

Slow-paced tasks such as "collaborative work with other governmental or non-governmental institutions" and "information pooling" are normal information-processing tasks which support the long-term planning decisions of the strategic level staff at AKOM. The deadlines are not strict as the emergency response. The emergency response reports, which are produced after the response, are used for producing disaster action plans. These reports are valuable information sources for strategic level staff. During meetings, these archived sources are utilised.

Using common ICT systems facilitates collaboration between the disaster management institutions. However, it is worth noting here that more investments should be made for establishing inter-connectivity of ICT systems between these institutions. Conversely, the rules and regulations are supposed to be flexible in order to permit central and quick information sharing during large-scale disasters.

4.2 News-production

This section of the chapter is about information behaviour in a news-production context. Fast-paced environment, news-producing tasks and slow-paced environment, news-producing tasks are investigated. Fast-paced environment is mainly based on breaking news, while slow-paced environment is based on daily or documentary news.

Activity Theory is employed as a theoretical framework and analytical tool for the data analysis. The researcher discusses activity systems and the interacting activity systems of news-production organisations and departments, which are operating in fast-paced and slow-paced environments through the lens of Activity Theory. The objective of the data analysis is to find out how time pressure and complexity influence the information behaviour of news-production staff while carrying out breaking news and daily or documentary news tasks, how the information and communication systems differ in fast-paced and slow-paced environments and what are the differences and commonalities between the two different environments concerning the information and communication equipment used.

The tasks mentioned in this chapter have been selected from the hand response cards filled by the interviewees. The tasks have been ranked by the interviewees according to the *"amount of information to be absorbed", "the number of decisions to be made", "the number of people to be communicated",* and *"the difficulties in communicating the information absorbed"* criterias. Any of the tasks ranked 3 and more in any three of these categories are accepted as complex and the rest accepted as simple. The interviewees were also addressed a question *"Do they feel time pressured while carrying out these tasks?"*

Finally, one more filtering was done in the categories concerning whether the tasks are *"significant to resolve the problem"* and *"occur most often"*. Hand response cards can be found in Appendix 8.11.

4.2.1 Context

News production is an event-driven activity. The production of breaking news is time critical and the tasks are more complex than the production of daily news or documentary news. The time constraint during the broadcasting of breaking news, because of the rivalry in the market, prevents the correspondents from validating the initial information they gathered from the event site. The actions are taken in a fast-paced manner. Editorial judgements and decisions are made under time pressure whether to share or suspend the news. Therefore, the lack of a reasonable amount of information and the time to take action creates a time-pressured and complex environment for the media crews while broadcasting breaking news.

For the broadcast of the daily news in news bulletins several times a day, the time constraint is not as strict as for the broadcast of breaking news. The information gathered from the field and the information received from the correspondents is validated. For the validation of information, variable internal and external networks are utilised. All the relevant and available data are received in the meantime, so uncertainty diminishes to a plausible amount.

Information-rich environment facilitate editorial decisions. Therefore, the production of the daily news is less complex and less time critical than the broadcast of breaking news. Table 9 summarises the contexts, the features of these contexts, the organisations/departments where the fieldwork has been done and the subjects involved in information management in order to comprehend the whole picture. The data analysis investigates the information behaviour of the subjects mentioned in the above table. It indicates that information behaviour is influenced by the time, complexity and the different contexts impressing the subject of the actions to behave in different ways since the conditions change.

Table 9 The contexts and features of information behaviour inspected

Contexts	Features of the contexts	Community	Subjects involved in information management
News-Production			
- **Production of breaking news**	Fast-paced, time critical, complex, unpredictable	CIHAN News Agency, CIHAN TV Network	Correspondents, SNG crews, news editors, subscribers/clients
- **Production of daily and documentary news**	Slow-paced, less time critical, less complex, planned in advance	CIHAN TV Network, Local TV channels, CIHAN News Web	General manager, directors of the divisions (geographically dispersed, subject-based established etc.), news editors, video-mounting crews, anchormen, subscribers/clients

News-production is becoming more complex than before due to the increasing rivalry in the market and challenges in technology. The use of

online portals, video and audio materials changes journalism practices and media organisation structures (Erdal, 2007). Improvements in technology, from digital communication to satellite, forced news producers to deal with large amounts of information in limited time (Schultz, 2005). The critical decisions to be made, the relevant information to be sought, obtained and shared in scarce time make the news production tasks more complex. Also, news producers are supposed to generate a large communication network of institutions and people to contribute to the news. The establishment and running of this kind of network is another complex assignment.

CIHAN News Agency is a geographically dispersed news agency as mentioned in Section 3.5.2.2. The information sharing occurs through use of the ICT tools by the subjects (correspondents, editors, news crews), who are engaged with the news-production tasks.

4.2.2   Shared objective and interacting activity systems

News production is an event-driven activity and generated in a dynamic environment. News-production tasks are carried out in group-based settings. The divisions of CIHAN are engaged in the news-production activity system. Correspondents, cameramen, editors, audio-visual news crews and other news agencies (case-based) are involved in the news production process. The motive of the news production objective is informing the public.

The key role in breaking news is held by the correspondents. They mobilize to cover an important event or a severe incident as soon as they receive notification. Correspondents are always alerted to the events happening around them (INP 04). They collect the information from the field and information is really the main input for news agencies. News agencies process the information through collecting, analysing and producing the news via using this information (Attfield et al., 2008; Attfield and Dowell, 2003). Editors are the second most important subjects engaged in breaking news production. They edit the oral representations received from the field and they produce smooth text to inform the audience.
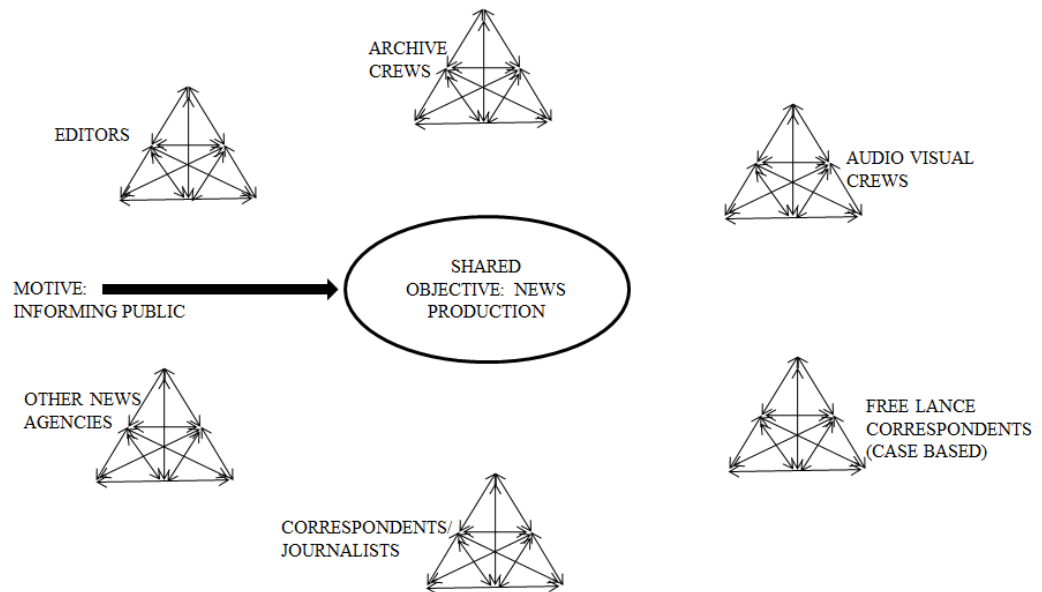
Figure 9 News-production context activity systems and shared objective

The other subjects for breaking news are audio-visual news crews working in the CIHAN news centre. The shared objective is news production and the motive is informing the public. The behaviour of the news producer agencies differs between slow-paced and fast-paced environments. Though the shared objective is the same in both situations, the time scales differ. The deadlines for documentary-based news or daily news are not as tight as for breaking news. Figure 9 illustrates the interacting activity systems of the news-production process.

In a fast-paced environment, the production of breaking news mainly answers the questions "what and where." It does not fill all information gaps. The information about the events or incident collected from the field is transferred to the relevant department at the CIHAN news centre (e.g. Istanbul intelligence, economics, sports). The department (responsible editor) checks the text and sends it to the CIHAN TV network to be released and broadcasted. At the same time, breaking news is shared with the clients via the TOROS news sharing system to be casted in the clients' online portals or TVs. This transaction takes approximately 2-3 minutes after the CIHAN

news centre receives relevant information from the field. It is notable here that editors judge the source of the information and decide on sharing with the subscribers or suspending for verification (INP 01, INP 11, INP 14).

In a slow-paced environment, in terms of the production of documentary or daily bulletins news, the news answers the questions: "what, where, why, how, who, when." Timelines are not as strict as for breaking news. The news is discussed comprehensively and video/audio is utilised to support the attractiveness of the news. The accuracy check of the news has already been done via double-checking with correspondents. Besides this, responsible locals or government people (who are engaged in the event) are another source to check the accuracy of the information. In extreme cases, the correspondents or editors contact other news agencies.

Information seeking and sharing exists between all the parties mentioned above. The amount of information shared is large while producing the news on a daily basis. This is different than producing the breaking news. The tools to share information are phones, radios, SNG vehicles, 3G, the TOROS sharing system, tablets and laptops.

Collaboration occurs among the divisions of CIHAN rather than other news agencies. By doing so, the researcher mainly discovered agency-level collaboration. Inter-agency level collaboration is limited. Commonly, inter-agency networks can be used for foreign news where CIHAN does not have correspondents or bureaus.

The competition in the market and the business nature of the news agencies prevent them from producing news through inter-agency collaboration. Partnership can be established through subscription.

4.2.3   News processing and networking

Correspondents are the main subjects of the news-production tasks. Referring to the traditional news-production stages, the initial input stage is newsgathering. The second stage is news publishing and the third stage is commentaries. To initiate news publishing or newscast, newsgathering from the incident or live-event site is required. Therefore, the correspondents are becoming the main subjects of the news-production tasks to initiate the production process by collecting information from the incident or the event site.
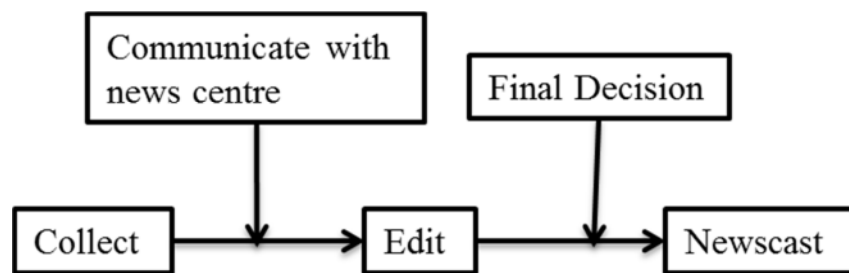
Figure 10 Information process during news production

Figure 10 illustrates the news production process. The collection phase is not as easy as seen. There are restrictions and constraints to access the relevant information. To hedge these kinds of constraints and restrictions, the formal and informal relations of the correspondents play a key role (INP 04). The correspondents are supposed to establish a large and diversified network to easily access the relevant, accurate and timely information while producing news (INP 10).

The strength of the network is perceived as a headstone for CIHAN (INP 01). Geographically dispersed news bureaus and partnership with prominent international news agencies are maintained to gather accurate and timely information. Besides agency-based networks, correspondents establish networks of their own with gatekeepers. One of the interviewees' expressions, who is a foreign correspondent, convinced the researcher about the strength of networks to gather the most accurate, unbiased information.

> *INP 10: "These days, the common opinion about Syria is that Esad is the end of the road, the game is over... But according to my news sources from Syria, Esad can resist these attacks. The regime is much stronger than it is perceived by international public opinion. The victory of Esad is not a surprise for me, I trust my sources!"*

The strength of the ties has a role on sharing information (Widén-Wulff, 2007). Relationships are social capital for the correspondents and the overall news agency to access timely, accurate information. By doing so, a news agency with a diversified large information network stands out in the news market. The networks rely on trust, and trust between agencies generates mutual interests for both parties (Bibb and Kourd, 2004). The quotation below indicates the mutualism between the correspondent (new agency) and the news source. By casting the news the governmental bodies become aware of the situation or cannot ignore it.

> *INP 08: "The families are so emotional when they come across crimes. ... Last month, I produced news about a 6-year-old child that was killed during the severe snow. ... The car hit him due to the icy snow.*
>
> *To inform the public, and get the attention of governmental bodies, I required a photo of the child and some background information. I could not approach the family! As you know.*
>
> *I accessed an uncle of his using my network. I published his photo and put some background information about the family and him. My aim was realised. The governor and mayor and other responsible parties accessed the family to help them. That day, the family also called me and thanked me for the news."*

Correspondents gather information from open sources in open societies; however, closed societies force correspondents to maintain strong relationships with high-level bureaucrats, governmental bodies etc. By doing so, accurate information about events can be gathered. Otherwise, the news is released according to the thoughts and beliefs of the governments and, thus, news becomes biased. INP 10 summarises this phenomenon.

> *INP 10: "I am working abroad. I am bound by the rules and regulations of the country where I am working. Monarchs rule most of the Middle Eastern countries. It is not easy to ask questions to people in open areas. People are afraid of providing the information you requested. They are scared of their future. To accomplish in my work, I require strong relations with*

SOMEONE or SOMEONES in these countries to produce accurate news. The news we are served by the governments are biased. ... I communicate with the people and, most of the time, they are very high level at the government. ... Unless doing this, I will only serve what the monarchs serve to the world. To add value and contribute to the public, I feel I must do this."

The dilemma here is that CIHAN approaches with suspicion the news coming from closed societies, especially the news released from governmental bodies. The geographically dispersed correspondent bureaus verify the news (that are released by governmental sources) by utilising their relationship with the gatekeepers. Breaking news editors are alerted of the information received from low-trust networks. CIHAN editors suspend some of the breaking news when they suspect the source and the accuracy of the information, even if they lose the advantage of being pioneers in broadcasting the news.

4.2.4   Fast-paced environment tasks and mediating artefacts

4.2.4.1   Collecting information from field (regional, national and international events)

The objective of the correspondent is to collect relevant information from the field. Then, they transfer it to the editors who work at the CIHAN Centre to produce and serve it to the clients. The correspondents go to the field after they receive a notification from an eyewitness, the police or emergency radios.

As soon as the incident notification is received, the CIHAN Centre produces text news of approximately 1-2 sentences just indicating the keywords. The initial newscast just consists of "what happened" and "where". However, in some cases a quick validation process exists between the editor, correspondent and eyewitness, and most times the editor responsible intuitively decides to broadcast the news. The trust and relation between the source, correspondent and the editor influence fast editorial decisions (Winquist and Larson, 1998; Witte and Davis, 1996) (INP 05). It mostly takes 1-2 min and the newscast occurs in 2-3 min. Conversely, market

competition forces the agencies to cast the news very quickly; however, CIHAN policy is casting the reliable news in a timely fashion (INP 02, INP 04, INP 06, INP 09, INP 11).

The news process is prompted via casting the received notifications on TV or on the online portals. The correspondents are mobilised to the incident site to collect as much information as they can. With cameramen, they explore people involved in the event or witnesses and ask questions about the incident or any newsworthy events. Mostly, the important and impressing breaking news are emergencies, disasters, explosions etc. Other social and political events are newsworthy for the news agencies as well.

As soon as the news team arrives at the site, they start to record videos. Initially, the cameramen record a 5-20 sec. video. The recording is transferred to the CIHAN centre via laptop. In some cases, however, Internet signal is weak and it takes 20 minutes to send a 5-10 sec. video or audio. Within the video recording the correspondent adds some text.

> *INP 04: "At the news agency, the most intensive work is done by our department. In the daytime we work with 5 teams (15 people) and at nighttime we work with 2 teams (6 people).*
>
> *I can say that the heart of the agency is our correspondents and cameramen. Information obtained from the field is the raw material for us. If your raw material is valuable and processed with talent, the output will be valuable. Hence, the critical stage of news-production is obtaining the right and timely information."*

Social capital facilitates the faster collection of information. Personal contacts have a critical role on the exchange of information (Witte and Davis, 1996) (INP 11). During emergency incidents, the correspondents face some constraints. The police officers have no permission to share any information with the correspondents. Only the chief officer or prosecutor can give detailed information about the incident. For health and safety issues, the correspondents are not allowed to approach very close to the incident sites (INP 05). All of the press staff is bound by press laws which came into force in 2004 (Kanunu, 2004).

INP 05: "In crime incidents, we come across too many difficulties. The rules of the police do not allow the sharing of any details with the news agencies. According to the producers, we should wait for the chief or the prosecutor to provide details about the crime. However, if we wait till the formal transaction is done, there will be no breaking news. The formal transaction results in at least 45 minutes.

Therefore, we use our most valuable asset: social capital and our links. We obtain detailed information and share it with the News Desk of CIHAN centre. I know it is a dilemma, but it is the only solution to stand out among the rivals."

The subjects of the information collection phase are mainly correspondents. They share via phone, email or using the TOROS system through their laptop with the CIHAN News Desk. To update or validate the information during news-production at the centre, the editors and correspondents communicate with each other through mobile phones (mainly) and through radio.

The tools to collect information from the incident site or event are voice recorders and cameras, and the tools to share with the centre are SNG, 3G and phone audio.

4.2.4.2 Accuracy check and editing for breaking news cast on TV and online portals

After the relevant information gathered at the site and received (text, video and photo format) by the CIHAN centre, the editor responsible checks the text first. While the editors are dealing with the texts, the videos and photos are transferred to the audio-visual graphics department. The videos and photos are mounted. If there is need, news-related photos or videos are retrieved from the archive. The video, text and audio are required to be in a consistent pattern for alluring the audience.

The editors insist on the accuracy of the text. For example, an explosion took place in the morning and the correspondent reported that four people died. The editor double-checked via communicating with the correspondent since the lost cannot be decreased after casting breaking news indicating there were four people dead. The key point here is the misunderstanding or disinformation or misinformation. The duty of the editor is to avoid

deficiencies in the news and sending relevant and accurate news to be published. Unless this is the case, the clients and CIHAN's own reputation will be affected in a negative way. Besides, the Basin 2004 regulation prevents news agencies from publishing or casting news that involve disinformation and misinformation. Such cases cause bias on audiences' or readers' minds (INP 14).

> INP 14: "I received a notification. The news was so important. I received some pictures as well. I hesitated to send the news to be published in an online portal and to send it to clients via the TOROS sharing system. ...
>
> I referred to my experience and I just double-checked it with another source. The information received was absolute disinformation. ... It was provocative. Unfortunately, most of the news agencies published those materials."

In some cases, correspondents validate the information after they gather it from the field. At this point, the formal and informal relationships of the correspondent gain importance. The governors, mayors, politicians, and any of the gatekeepers may be the people that the correspondent uses for validation. The most trusted sources are formal sources, such as governmental institutions or people who have domain information about the topic (INP 10). Besides, the primary sources have higher value during the validation process.

> INP 10: "My information sources, most of the time, are the politicians and governors in X country. I should be so careful while I am collecting information for any of the events or incidents. And if I want to send breaking news to my editor, I should be careful twice. Instant and emergency cases are always fully operational. ... The aim is misinforming the public and the media of other countries. ...
>
> What I do when I encounter such cases is I communicate with one of the persons in my network to validate the information. I know it is time lost sometimes, but I send the accurate information."

After validation is done, the correspondent shares what he/she has with the CIHAN centre editors.

4.2.4.3 Checking the consistency of the news

The editors and the audio-visual graphic crews work on the text and visual consistency of the news. The audio-visual graphics crews are prompted to produce videos, photos or graphs for breaking news. The information received from the correspondent through phone or radio consists only of a couple of words. Then, the cameraman starts recording. These video recordings are sent to the CIHAN News Centre via laptop (mobile network). The recordings are immediately shared with the audio-visual graphics crews. The crews mount the videos and the audio-text-visual consistency is realised. It takes 20 minutes approximately for the audio-visual graphic crews to mount the videos or photos after they receive the video-photo recordings. But, if it is breaking news, the graphics crews can accomplish that in 5 minutes (INP 3).

> *INP 03: "The better thing is doing your job without time pressure, but the nature of my work does not allow me to do this. When we (department) receive a request for graphic production or video mounting for breaking news, we rush to search and retrieve photos, videos from the archive if the breaking news does not come in FTP format. We find a consistent video or photo from the archive, or produce graphics to be broadcast on TV or in online news portals."*

In some cases, video and photo recordings are unavailable. In this situation, audio-visual graphics crews produce graphics. The news are created with graphics and texts.

4.2.5 Slow-paced environment: tasks and mediating artefacts

4.2.5.1 Collecting information for daily news bulletins and documentary news

The news editors plan the news on a daily basis. The news editors and journalists work on the news stories and try to find out answers to the questions: "what, where, when, why, who and how". The news is being detailed by the journalists to be cast in the news bulletins.

At the initial emergent phase, the news agency cannot put emphasis on the details due to the aforementioned time constraints. The other reason is the lack of available information at the early stages. If the editors are not sure about the accuracy of the breaking news, these are not shared with the clients (INP 02). The sharing activity is suspended till the validation process is accomplished. Most times, it is less stressful and flexible to fill the information gap via relevant information collected from trusted sources (INP 01). The news reporter grabs the details as much as he/she can to enable the CIHAN Centre to produce information-rich, comprehensive news.

> INP 02: "The severe snow in Istanbul affected our lives deeply. For instance, traffic accidents, suspension of basic services etc. In the morning, we broadcast the news about the snow in a detailed way. One day before, the snow was the breaking news but in the morning news, we had lots of details about it. ... The discussion at night was whether the schools would be closed or not. ... Now, we know about the schools' closure. We recorded the press release of the governor. We produced video news and enriched our news with photos that show the children playing in the snow, and conversations with the public."

To produce documentary style news, the journalists prepare themselves on what will be discussed in the documentary. Documentaries do not have strict deadlines. The journalist seeks information from different sources to detail the news. He/she uses his/her network to access the relevant sources or people to gather information. The tools to gather information for documentary style news-production are: web search, communication with formal bodies or institutions, cameras, audio recorders. After the journalist is satisfied with the amount and quality of information gathered, the gathered materials are shared with the editors. The texts, video recordings and photos are processed at the CIHAN Centre. One of the journalists working at the economics division shared his experience on information sources and the process of documentary news.

> INP 12: "Documentary news is distinguished from breaking news. I am less stressful and feel myself confident. I do not rush; initially, I decide what to search for. I conduct an initial search on the web, archives or our agency's networks. Then, I try to access the relevant people to obtain information about my documentary news. ... The information sources vary and I am able to triangulate what I have collected. ... It is so common for me to come across opposite views from different people on the same topic."

Journalists encounter some problems while approaching people to gather information. The public do not rely on news reporters and avoid giving information on any topic. It is so usual that people suspect news reporters in Turkey (INP 07).

> *INP 07: "They are anxious for their family or future actions, in some cases for their lives. They know what happened but the pressure prevents them from expressing the things in their mind. It is not easy to convince people that their name will not be revealed in the newscast. They do not trust us because in the past the information sources were revealed and the trust of the people was abused."*

At the documentary news production, journalists may work as a team to divide the main topic into sub-topics. Therefore, each journalist deals with the sub-topic that he/she is good at. This approach aims to produce a more knowledgeable documentary and be more objective in interpretations.

4.2.5.2 Coordinating the text editors, photo archive and graphics division crews to design the news stories

Synchronisation at the news centre is important. All departments collaborate to accomplish the final product. The editors produce the texts; the video recordings and photos received from the field are shared with the audio-visual department. The departments produce video news and check their consistency. Deficiencies in neither audio-visual materials nor text will fail the output (news-production) (INP 01).

> *INP 01: "When news is to be cast, I check the text, video, photo and graphics consistency. If we do not have fresh videos or photos from the event field, the audio-visual crews retrieve materials from the archive, or produce relevant graphics for the news."*

When the editors decide on the topic of the news, the relevant information is sought from the archive besides being gathered from the field. The text is enlarged and detailed by the archive materials. Not only is the text enriched, but the videos are enriched too. The editors request materials from the

archive, and audio-visual crews retrieve relevant news materials from the archive. The deficiencies in the texts and audio-visual materials are eliminated through communication with the other departments at the CIHAN centre.

4.2.5.3 Editorial meetings

The General Manager and the TV Network editor determine the daily news bulletin format at the editorial meetings. The editor checks all the news received from the different departments, such as politics, economics, foreign affairs, sports etc. The timescale is generated. To allure the audience, today's news are presented at the beginning. If any breaking news exist during the TV newscast the control editor lines them up and the anchorman reads the breaking news on the prompter.

During editorial meetings, the news stories and videos are checked for consistency. The news are sent to the TV Network if they passed; if not, the editors work on the material and amend.

> *INP 2: "For every kind of news we decide to broadcast or not, 95% results with a pass and 5% results with a fail. The reason for fail is that we are unable to validate the information. During production, the correspondents access and double-check the information; however, during the day if we feel it involves disinformation, we do not broadcast the news. We wait for fresh information to reproduce the news. There is no U-turn after we broadcast it. As you know."*

Editors of different departments in CIHAN gather for editorial meetings on a daily basis. They discuss about that day's news and the overall news process for that day. Documentary-based news to be broadcast on TV are discussed. The domain expertise of the editors (economics, sports etc.) plays a role on the decisions. Meetings are a habitat for sharing information about the daily news process and encountering different opinions about the news before it is broadcast (INP 11).

INP 11: "Documentary news involves so many different aspects. For example, when we produce a documentary about a person or event, we should take its reflection on the community into account. If we broadcast it without discussing this in editorial meetings, most probably we may miss some points. Meetings are expertise and insight exchanging environments."

The aim of information exchange during editorial meetings is to prevent biases or subjectivity in the news. As the meetings take place in an information-rich environment and different insights and domains are presented, biases in the news are eliminated or minimised.

4.2.6 Summary and conclusion

The main raw material for news production is information. Thus, both input and output of the news process is abstract. News content especially is information and news production consists of information tasks. These information tasks consist of sub-information-tasks, such as information searching, seeking, retrieval and sharing.

The news-production environment is very dynamic when breaking news production is taken into consideration. Therefore, uncertainty is high. The flow of updated information has influence on the development of breaking news. Information seeking and sharing is an ongoing process in breaking news production. Documentary-based news or daily news production environment is not as dynamic as in breaking news. The conditions are more stable; therefore, uncertainty is not as high as in a breaking news production situation.

Rivalry in the market forced CIHAN to improve the quality of ICT systems for transferring or communicating the information collected from the incident or event site. The interaction between the effective use of technology and the capability of the correspondents or journalists to collect newsworthy information facilitates precise news production. The correspondents are always in the ready to be dispatched to any breaking news.

Failure in the rapid dissemination of information influences the reputation of the news agency. Therefore, this situation has a negative impact on subscribers or clients.

Temporal issues also have a considerable impact on the information behaviour of news staff, the structure of the news agency, the ICT systems used and the decision-making types of the editors.

The information needs of the correspondents vary according to the type of news, but, at the initial stage, the correspondent seeks answers for "what and where" questions. Then, detailed information is collected to establish comprehensive news. The correspondent communicates the type and the venue of the incident with the news centre.

The journalist's information is more detailed. The "what" "where" "how" "who" and "when" questions are answered comprehensively during the production of daily or documentary news. While the correspondent's information needs are deserved, the journalist may seek domain information, the definition of concepts, background to the news and biographies of the people involved in the news story.

Information sources vary, such as internal and external. Editors seek out trustworthy sources before making decisions on disseminating the news. Internal sources are more trustworthy then external ones. Information coming from internal sources is shared without putting much effort on accuracy checks; however, editors check the information that comes from external sources if necessary. Otherwise, the editors suspend the news not to risk the reputation of CIHAN through disseminating manipulative information.

Free-lance correspondent teams follow geographically distributed events. The sub-centres pool found information and share it with the CIHAN Centre to be published on TV.

4.3   Differences and commonalities comparing two contexts

Situational factors (time pressure and complexity) have significant role in the way the staff carry out the tasks in both the news production and disaster management contexts. In the fast-paced situation of both disaster management and news-production contexts, information is shared on an agency and interagency-level. Collaborative information behaviour occurs. The information sought and found is used by other agencies (departments for news-production contexts). Information gathered (collected) from the field is processed at the AKOM and CIHAN centres. AKOM shares information with the teams at the incident site during emergency response, in contrast to how information is served to the clients and subscribers after being processed at the CIHAN centre in a breaking news situation.

When the tasks are getting more complex, the staff collaborates more and then carry out normal tasks. In particular, genuine decision tasks are carried out through collaborative information seeking and sharing. Different experiences or insights are used during decision making for genuine decision tasks. Intuition is used more during repeated tasks; however, the deliberative mode is used through pooling information from various sources.

For disaster management, information is shared among teams of different disaster management institutions. These institutions collaborate to seek and share information. In a news production context, departments collaborate to check the accuracy and consistency of the information coming from the field. Information is shared with case-based teams in both contexts.

Information systems in both contexts are common. Radio and mobile phones are common tools in fast-paced situations. Similar to a news agency, SNG vehicles may be used in some emergency situations to record and send live videos (photos) to the AKOM Centre. SNG vehicles are widely used for breaking news to uplink the videos from the field during processing breaking news.

Information sources vary in fast-paced and slow-paced situations in both contexts. Incident notifications are a common starting point. However,

emergency responders prompted to the incident site after they receive notification means that the correspondents not only wait for the notifications, but also get ready to follow some of the programs that are already scheduled. So, correspondents send information to the CIHAN Centre about the breaking news.

Gathering and collecting information from the field are both common tasks for both contexts. These tasks are basic in comprehending the situations. The decisions are made and the ensuing actions are done through processing the information gathered from the field. As such, both institutions value gathering relevant information from the field. It is notable here that the result of inaccurate information is the loss of lives in emergency response. This has resulted in the loss of reputation for a news agency.

The information gathered from the field is then reported by team leaders and used for training purposes for emergency responders. Also, in strategic-level meetings these reports are used for long-term disaster management planning. The archived breaking news is used for both daily news and for documentary news.

Staff training for effective information management is a weak point for AKOM. According to the interview analysis, AKOM staff does not give adequate importance to the organisation of teams with information. So, in some cases two or more teams contradict each other at the incident site during response. News staff is very well trained about information sharing. Since information is the main raw material for them, they are all educated on a high school and university level to process information making for attractive and accurate news.

4.4 General conclusion for the chapter

This chapter of the research discussed activity systems of both disaster management and news-production contexts. The way information is shared in collaborative manner and the interactiong activity systems are the main points that the researcher considers. Information behaviour of the organisational members, how they collaborate, how they carry out work task through use of information have been discussed and this discussion has been enriched through presentation of relevant quotations from interview transcripts.

Under varying task complexity and time pressure, organisational members behave in different ways. To hedge time barrier and task complexity collaborative information behaviour occurs to gain advantage to carry out work tasks and making quality decision. The analysis sheds light onto interacting activity systems where more than one team/organisation work on shared objective.

There are commonalities and differences between disaster management and news-production contexts. Both organisations process information under time pressure and in unpredictable environmnets, however, the way they process information has different aspects. The prospective results in failure of effective information process has role on this issue.

CHAPTER 5 DISCUSSION

5.1 Introduction

The aim of this chapter is to shed light onto the research contributions via discussing the links between the research literature and the findings. The thesis provides two contributions to the existing literature and one in the area of methodology.

The existing literature and information behaviour models and theories deal with individual information behaviour, as mentioned in Section 2.2. A small number of articles discuss collaborative information behaviour, as mentioned in Section 2.3.2. The individual information behaviour models do not emphasise situational factors, such as time pressure and complexity, in a comprehensive way; and collaborative information behaviour research has mainly been investigated in time-pressured environments. Organisational tasks, however, are carried out in group settings, and temporal factors and complexity influence the way organisational members process information. Hence, the gap in the literature centres on the relatively few extant studies on collaborative information behaviour (Karunakaran et al., 2013; Reddy and Jansen, 2008; Reddy and Spence, 2008; Sonnenwald et al., 2008; Sonnenwald, 2006); however, it is mostly organisational members that work in teams whilst carrying out the work tasks and are bound by situational factors (complexity and time pressure).

Investigating the collaborative information behaviour of the organisational members under varying task complexity and time pressure in different operating environments is the first contribution of this research. At the end of this first effort, two collaborative information behaviour models emerged taking into account temporal issues, varying task complexity and the features of the different operating environments (please see Figure 12 and Figure 13). The second contribution of the research is the illumination of information processing and the decision-making types of organisational staff in dynamic environments that involve complex work tasks and which are carried out under time pressure. The aim of this effort is to provide a rich description of

collaborative information behaviour, and the influence of time and task complexity on information behaviour and decision-making in real-life work settings.

As an outcome of these contributions, two collaborative information behaviour models have been devised through interpreting the findings from the AKOM and CIHAN contexts. As these models are used to understand the situation in two different operating environments, they draw attention to factors for use in system design and further research. Illumination of the information-processing types during decision-making in dynamic environments provides awareness about the expert base and affective base intuition used by the organisational members while carrying out decision-making tasks in dynamic environments.

The research also has a methodological contribution. The application of Activity Theory for collaborative information behaviour research is a relatively unexplored area. It has already been used in psychology, education, ergonomics, HCI and individual information behaviour research contexts (see Section 3.2). Activity Theory is used as a theoretical framework and an analytical tool to analyse the activity systems in this research.

Activity Theory is a useful tool to analyse the activity systems in a comprehensive way. The activity systems of both contexts are constitutes sub-activities (actions and operations); therefore, activity systems could be investigated deeply through scrutinising motives, shared objectives and mediating artefacts (Allen et al., 2011; Engeström, 2011). Also, the rich vocabulary and conceptual features of Activity Theory are used to understand the phenomenon in both contexts (Spasser, 1999). By doing so, information behaviour relating to activities and tasks in disaster management and news-production contexts has been analysed.

In the following sections of this chapter, the above-mentioned three contributions are presented. The researcher discusses how the behaviour of organisational members changes while carrying out time pressured and complex tasks (Section 5.2.1), what factors push the organisational members to collaborate and how they collaborate while carrying out work tasks

(Sections 5.2.2 and 5.2.3), and how information is processed to make critical decisions in dynamic environments (Section 5.3)

5.2 Investigating task complexity and collaborative information behaviour from temporal aspects

In this section, the researcher discusses the AKOM and CIHAN contexts through investigating the information behaviour of organisational members in fast-paced and slow-paced situations while carrying out tasks of varying complexity and under varying temporal factors. Temporal issues have a significant role to play in carrying out tasks since time is embedded in every human activity (Savolainen, 2006). Temporal factors are constituted of situations and contexts in this research. Perceived time pressure is the situation where organisational members carry out the work tasks and access relevant information in a limited time. However, limited time does not involve set deadlines while carrying out emergency response and breaking news tasks. Conversely, the tasks carried out in the slow-paced environment involve set deadlines.

An individual's information behaviour, while carrying out work-related tasks, is extensively reported in the literature as discussed in Section 2.2. There is relatively little research, however, that scrutinises the societal side of information behaviour in organisational settings in which time pressure, task complexity and the nature of the organisational tasks drive organisational members to process information in a collaborative manner while carrying out organisational tasks and reaching shared organisational goals Section 2.3.2.

The case studies reported here, which have been conducted in two different environments; provide specific examples of the influence of situation and time pressure on the information behaviour of organisational members. Particularly, collaborative information behaviour facilitates overcoming the time pressure barrier and provides immediate access to the information required (domain information and other information sources) to reduce uncertainty in fast-paced situations (Figure 12 and Figure 13). Collaborative

information behaviour also helps to generate an information-rich environment, where quality decisions can be made in slow-paced situations (Figure 12 and Figure 13).

Starting point for looking for relevant information to be used to carry out work tasks is the determination of the information need. Then, information need becomes the motive for information-seeking behaviour (Wilson, 1981). Similar to Byström's (2002) findings, sense-making of information needs activates information-seeking behaviour, and there are many other factors that determine the types of information needs, which vary according to task complexity and the nature of the tasks. Information seeking exists to hedge uncertainty and fill information gaps in context (Savolainen, 2012). As interpretation of the research findings indicate organisational members common understanding and sense-making of a situation determine information needs (please see Chapter 4). This research has revealed that information need is shaped by the structure, time and complexity of the tasks carried out in both disaster management and news-production contexts.

After the evaluation of the research findings and data analysis, the tasks, which are *significant in solving the problem* and *most often occur*, are perceived to be more complex in emergency response situations than those in breaking news-production situations. This is because the interviewees' complexity rating score on the CIHAN hand response cards was less than in the AKOM context. Similarly, the slow-paced tasks in the AKOM context were perceived to be more complex than the slow-paced tasks in the CIHAN context (see Section 4.3). This indicates that the work of the AKOM staff is more complex than that of the news staff since the former's responsibility is heavier, as interpreted from the hand response cards and interviewees' responses.

5.2.1   Temporal issues

Temporal issues have a significant role in both the disaster management and news-production contexts. In order to minimise losses and overcome the disaster, emergency response is initiated as soon as possible. Therefore, time

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limits at the initial stage of the emergencies drive the C&C crews to seek answers to questions such as *"what is the type of the incident?"* and *"where is it?"* The content of the information is not rich at the initial stages. Conversely, at the initial stage of breaking news, the correspondent only seeks answers to *"what and where?"* questions in order to line up the breaking news to the subscribers.

After the initial actions are taken, such as dispatching the pioneering emergency teams to the incident site and line up breaking news on TV or online news portals, uncertainty triggers additional information needs. Information needs arise due to the need for detailing the situation regarding the incident or the content of the news. Additional information-seeking actions facilitate the comprehension of the situation. Information needs rise according to the characteristics of the operating environment and tasks at hand (Byström, 2007).

Emergency responders cannot wait until all the relevant information is gathered by the C&C centre. The results become catastrophic if response is late. For instance, the number of deaths and potential hazards to vulnerable groups will increase. Waiting to gather all relevant information about an event results in losing the advantage of being pioneering in disseminating breaking news.

High time pressure forces the emergency and news staff to limit the information content at the initial stage in both emergency response and breaking news situations. However, additional information actions are taken to gather more relevant information. Gathered information is continuously shared with the relevant teams, which are operating at the incident site or en route to the incident site. This strategy has two advantages: to initiate the response as early as possible, and to avoid information overload through sharing relevant information with relevant emergency teams. Similar to the discourse of Wittenbaum and colleagues, as presented in Section 2.4.3, it is a motivated information-sharing process, which considers the teams' task goals before sharing information (Wittenbaum et al., 2004). Motivated information sharing considers *what to share*, *how to share*, and *with whom to share* in

order to avoid information overload and shorten the time spent on information processing. Emergency response teams need information at the right time and at the right place (Bao and Bouthillier, 2007). In the news-production context, after the initial breaking news text is disseminated, additional information is needed to detail and interpret the news in order to enrich the news content.

If emergency responders cannot make sense of the new conditions, cannot match them with their past experiences (Klein, 1998) and face uncertainty at any stage of the emergency response, they seek new relevant information and have to find it in little time. In this situation, emergency responders turn to other teams operating at the incident site to communicate the new conditions and potential solutions or turn to the C&C centre to seek information in order to hedge the uncertainty arising out of the changing conditions (please see the feedback loop at Figure 12). For instance, while Fire Crews were supressing a fire at a plastics factory, the weather conditions started to threaten the fire crews (IDM 08). The wind changed direction and the new condition became dangerous for the responders and the people living around. The fire crews had already ensured the safety of the chemical tanks; however, the wind caused the fire to spread and penetrate the tanks. Therefore, the responders turned to C&C to communicate the new conditions and, in turn, C&C communicated with the factory manager about the amount of explosive chemicals. At the same time, the weather forecast department shared the next hour's weather forecast information. By doing so, the C&C crews made sense of the situation and communicated the information to the emergency responders; hence, the fire suppression tactics were changed.

Seeking and sharing in a collaborative manner enables the AKOM emergency teams to save time where time is vital for emergency response. Agency level and inter-agency level communication facilitate access to needed information in limited time (Bharosa et al., 2010; Kapucu, 2005). If the disaster is large-scale, the importance of the inter-agency level collaborative information behaviour is advantageous in decreasing losses through accessing the relevant information on time. Also, it contributes in

avoiding information overload, which is another time-consuming issue for emergency teams.

Shifting attention to a breaking news-production situation, news of the event or incident is shared with audiences mostly through the CIHAN news centre. Collaboration exists between audio-visual graphics crews, text editors and correspondents during the news dissemination process. The objective of collaboration is to gain the advantage of being a pioneer in breaking news broadcasting. Editors request news materials from the audio-visual graphics department to generate consistency in the news text, graphics and photos to allure the audience while presenting the breaking news. Graphics crews retrieve consistent materials from archives or produce them while text editors are dealing with the redaction of the news texts. This collaborative information behaviour gives temporal advantage to CIHAN through integrating information from various sources in a fast-paced manner (please see Figure 13).

In time-pressured environments, in the existing information behaviour literature, triggers of collaborative information behaviour have been categorised in four different areas: lack of domain expertise, need for immediate access to relevant information, fragmented information sources and complex task needs (Karunakaran et al., 2013; Reddy and Jansen, 2008; Reddy and Spence, 2008). The findings presented here, however, suggest that *lack of domain expertise* and *complex task needs* are a sub-set of *fragmented information sources*, and that these two triggers are a sub-set of the need for *immediate access of relevant information* (Figure 11).

Collaborative information behaviour enables emergency responders to access relevant information sources rapidly [incident site live-stream videos, weather forecast database, disaster database, disaster plans, static maps, people, traffic load, hospital slots, experts (case-based) etc.]. The organisational coordination structure of AKOM and ICT tools, used during large-scale disasters, give a temporal advantage. This advantage supports AKOM in significantly reducing the losses caused by large-scale disasters.
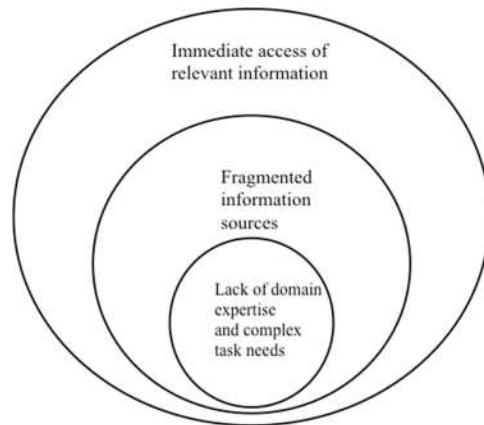
Figure 11 Triggers of collaborative information behaviour (adapted from Karunakaran et al., 2013; Reddy and Jansen, 2008)

Time pressure prevents emergency responders from filling the information gaps after they make sense of the situation (Figure 12 Collaborative information behaviour in the AKOM context). Time spent in seeking information will result in a late response. Conversely, response without adequate information will result in low sense-making of the situation. In both cases, this could increase the losses arising out of the emergency. This problematic situation, however, is encountered in almost every disaster. To overcome the time pressure barrier for effective emergency response, inter-agency or agency level collaborative information behaviour is an advantage in gathering relevant information from various sources through the information-processing actions of different staff and institutions, as discussed in the activity systems and data analysis chapter (see Chapter 4). According to the research findings, hedging the time barrier via collaboration echoes the existing literature (Karunakaran et al., 2013; Reddy and Jansen, 2008; Sonnenwald et al., 2008; Sonnenwald, 2006)

As interpretation of the CIHAN case findings indicates that breaking news tasks are not perceived to be as complex as AKOM's fast-paced tasks. This is because the *information to be absorbed, decision to be made* and *the people to be communicated* categories have been rated with a lower score than the AKOM tasks. Time pressure, however, is still the main issue in accessing relevant information and in disseminating the news. For breaking news-production, the activating mechanism or trigger is the information need about

the events or incidents alone. Because of the nature of CIHAN's tasks, there is no need to integrate the information from various sources to broadcast breaking news. Equally, it is not likely that fatal consequences take place, such as death or catastrophic hazards, except in unusual circumstances. An example can be found in broadcasting weather news that enables people to take action against the possibility of life-threatening floods. There is no need to access experts (domain) at the initial stage of breaking news. Domain expertise information and various information sources are only used during documentary or daily news production (Onal, 2008; Onal, 2007).

Parallel information-seeking by different teams exists for geographically distributed events, such as national elections. Continuous information-seeking and sharing exists among freelance correspondents, CIHAN's local elections centre and CIHAN's news centre. The number of freelance correspondents is high. Several correspondents are responsible for each elections venue and continuously seek balloting results and share it with CIHAN's local elections centre. The CIHAN elections centre shares the pooled information with the CIHAN news centre and results are entered into the elections database to be presented on TV. This strategy gives a time advantage to CIHAN. Similar to an emergency response situation, CIHAN overcomes the time pressure barrier through collaborative information behaviour while broadcasting continuous breaking news about geographically distributed events.

The contrasting factor between the AKOM and CIHAN cases is the need for sense-making (Figure 13 Collaborative information behaviour in the CIHAN context). The structure of the task is already determined and correspondents' tasks are routine in the CIHAN case. With effective collaboration, tasks become structured and only case-based alterations are needed to carry out the task quickly. Conversely, uncertainty is high at every stage of a disaster. Information needs are determined after sense-making. The tasks are ill-structured and genuine decisions need to be made in a timely manner to avoid catastrophic results. Therefore, data analysis indicates that collaboration is necessary for almost every case in the disaster management context in order

to make sense of the situation and identify its information needs in a timely manner.

5.2.2 CIB in a disaster management context

This section aims to illuminate how disaster management staff process information while carrying out fast-paced and slow-paced tasks, and how organisational members collaboratively seek and share information to hedge situational barriers. The disaster management context is an information-intensive area. Similar to the existing disaster management literature (see Section 2.6.1), coordination of the emergency teams is enabled through effective information sharing. Disaster management consists of tasks and these tasks consist of sub-tasks. The overall activity system of the disaster management context is discussed in Section 4.1.2. Public safety is a motive for both fast-paced and slow-paced situations. The objective of a fast-paced situation is emergency response, while the objective of a slow-paced situation is long-term disaster planning.

Following the analysis and interpretation of the research findings, collaborative information behaviour in a disaster management context is shown in Figure 12 below.
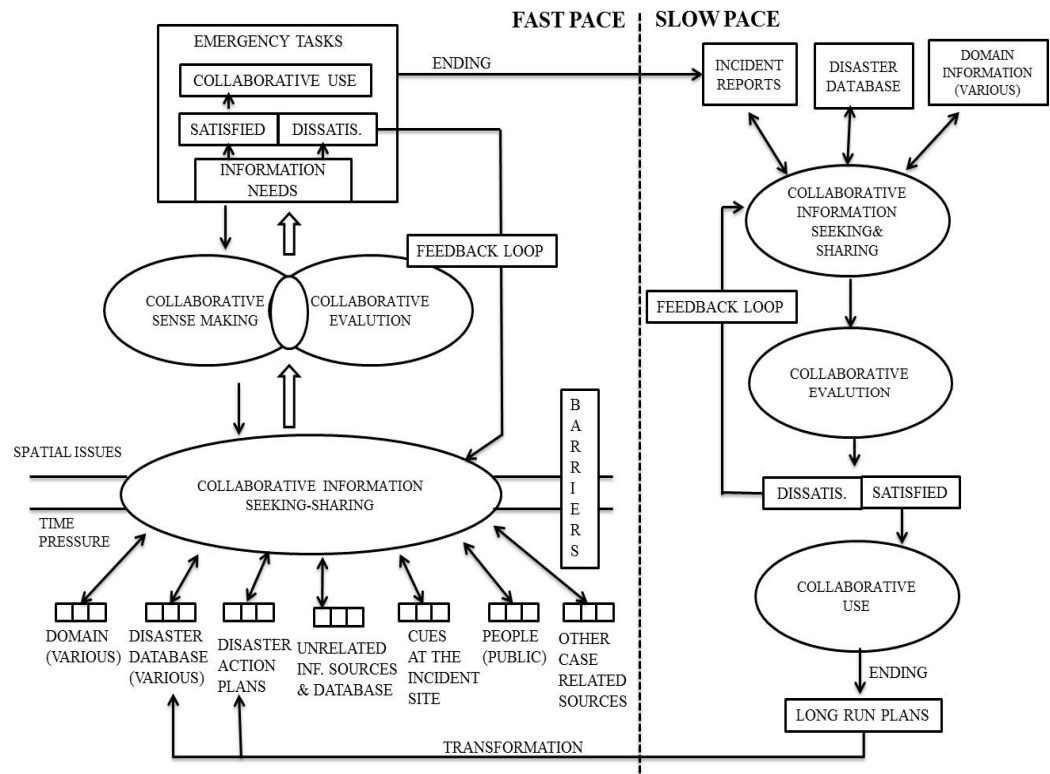
Figure 12 Collaborative information behaviour in the AKOM context

Data analysis in Chapter 4 indicates that collaborative information behaviour in the AKOM context requires and enables *knot-working*. Different emergency teams *knot-work* (Engeström, 2011; Engeström, 1999b) for emergency response during large-scale disasters. *Knot-working* has several advantages for AKOM, such as integration of the fragmented case-based information, distributed domain information, immediate access to the information sources and avoidance of information overload. During large-scale disasters emergency response teams are coordinated through the C&C centre of AKOM; however, each kind of emergency team is commanded by their own C&C centre when the teams are responding to simple incidents.

Contrary to the lack of centralised coordination in Engeström's (1999b) conceptualisation of *knot-working,* large-scale emergency response coordination is held by AKOM's flexible central coordination in Istanbul. The protocols that came into force in 2007 (AKOM, 2007) give responsibility to AKOM for large-scale disaster management. AKOM, however, cannot act

at the top level due to cultural-historical customs. This case has been discussed in the contradictions section in Chapter 4.

The goal of the Command and Control crews is to coordinate the emergency teams. The Ambulance Service's goal is to identify the needs of the patients and keep their health condition stable en route to the relevant health clinic. The Fire Brigade's goal is to save lives and properties. The Rescue teams' goal is to search and rescue trapped people. Sequentially discussed goals are overall activity systems for each of the emergency response teams when they are operating at the incident site, whether it is a simple or a large-scale disaster. Whether they *knot-work* during large-scale disasters or operate as a single agency for single incidents, the above-mentioned goals are always the main goals for the emergency teams.

Similar to the existing literature on the third generation of Activity Theory, the above-mentioned tasks, which generate the overall activity system for each of the emergency response teams, consist of sub-tasks, which are related actions supporting the activity system (Allen et al., 2011; Engeström et al., 1999d). For instance, the overall activity system in emergency response includes: risk assessment, identifying the needs of the patients, fire suppression etc. The operations to support the actions are: information-seeking, sharing and decision making. Use of the hierarchical level of the activity system (Wilson, 2008a) facilitates the emergency response activity system analysis. This hierarchical structure enables the understanding of the conditions and context in a comprehensive manner. For example, in risk assessment tasks Fire Crews, Police and the Ambulance Service share information and collaborate. By doing so, emergency teams gain time and quality information advantage. Through analysis of the tasks and sub-tasks, the researcher understands and interprets how collaborative information behaviour occurs which supports a better emergency response.

When we turn our attention from the hierarchical structure to the varying complexity of the task, as mentioned in Section 4.1.1 and Section 4.2.1, some of the sub-tasks (actions) are simple; however, some are more complex. According to the interview analysis, the complexity level overlaps with the

hierarchical level of the tasks. The researcher points out that when the complexity of the emergency response tasks increases, the number of the sub-tasks (actions or operations), which support the overall activity system, also increase in order to perform the objective. For example, the task of *identifying the needs of the patients* consists of many sub-tasks, such as information seeking, sharing, sense-making, cognitive information processing, recall of past experiences etc. Thus, various factors need to be considered in order to make this task more complex, as Vakkari (2003) discusses in his research.

Table 10 reveals the findings regarding AKOM's settings on tasks, which are perceived as *significant to resolve the problems* and *most often occurring* by the interviewees, along with task categorisation according to the information behaviour of task performers. The selection criteria for the below-mentioned tasks have been discussed in Section 3.7. Here, the varying complexity and information behaviour of the task performers are investigated.

Table 10 AKOM tasks and categorisation of tasks

Situation	Task Name	Task Category
Fast-paced	Gathering information from the incident site	Normal information-processing task
	Relevant data and information support to the emergency response teams operating at the incident site	Normal information-processing task
	Risk assessment at the incident site	Genuine decision task
	Identifying the needs of the patients	Genuine decision task
Slow-paced	Collaborative work among governmental and non-governmental institutions	Normal information-processing task
	Information pooling	Automatic information-processing task
	Operation centre meetings	Known decision task

The gathering information from the incident site task is an action supporting other emergency response activities, such as *relevant data and information support to the team operating at the incident site, risk assessment, identifying the needs of the patient* (in an indirect way).

This task of AKOM can be perceived as a normal information-processing task as the features of the task commonly overlap with Byström and Jarvelin's (1999, 1995) task conceptualisation. The *gathering information from the incident site* task may be approached as a routine task since it is performed for every single incident, whether it is a large-scale or a simple disaster. The process, however, is similar every time and case-based arbitrations exist. For instance, floods, explosions, terrorist attacks, traffic accidents or several weather disasters have different information needs, as information needs are determined by the nature of the disasters.

The incidents or disasters are not pre-determinable in nature; however, after the first signals are received by the C&C centre or when an incident call is received, a priori information needs arise: *"What is* the *type of incident and what is the address?"* The answer to these questions is the initial information gathered from the incident site or about the incident. If the incident is perceived as single (not large-scale), the C&C crews of any of the emergency response institutions (Ambulance, Fire Brigade, Police and AKOM) seek information from the caller. The seeking process goes through questioning and seeking answers from the caller to make sense of the situation and identify the response needs (Dervin and Nilan, 1986). The communication and interaction are direct and limited between the agents when the problem is simple (Reddy and Jansen, 2008).

The gathered information is shared with the relevant emergency response team to prompt the team to the incident site. Thus, for incidents perceived as simple by the C&C crews of emergency response organisations, information needs are not complex and individual information behaviour exists.

Contrary to this case, some times collaborative information behaviour exists even if the incident is perceived as simple. The initial information gathered

from the incident site may need to be *triangulated* from varying sources (IDM 07, IDM 13).

> *IDM 07: "The eyewitness on the phone is terrified most of the time. Sometimes they exaggerate or give misinformation. First of all, I act based on the initial information I receive and I allocate the first Fire team. Then, I turn to the MOBESE department to check the incident through their MOBESE live stream network. While I am acting with the information I receive from the eyewitness, other crews monitor the incident site (if it is available) through live stream network and share what they find with me."*

When the researcher shed light onto disasters, which are perceived as large-scale, such as severe weather (heavy snow in winter) or the 2009 Istanbul flood, it became apparent that the C&C centre of AKOM takes the responsibility of coordination. Large-scale disasters are multi-agency response activities. Multiple agencies, such as the Ambulance, the Police, and the Rescue and Fire Brigade are *knot-worked* for emergency response. Thus, the information needs become complex. Continuous communication is established between the C&C centre of AKOM and the emergency response teams operating at the incident site. First of all, initial information needs about the problem are identified through collaborative sense-making as indicated in Figure 12 (Karunakaran et al., 2013; Weick, 1993).

Various divisions of the AKOM centre and the other related emergency response organisations seek information about the scope of the disaster and the changing conditions. The information retrieved is shared with C&C crews and they allocate sources through referencing the retrieved information. They share this information with the emergency response team leaders operating at the incident site (if the information is relevant to them).

Large-scale disasters prompt the live-stream department of AKOM to use SNG vehicles (trucks or helicopters). The live-stream video recordings are shared with AKOM's C&C centre and AKOM's operation centre. At the same time, some of the C&C crews monitor the incident site through MOBESE cameras to gather live video recordings. C&C crews establish continuous communication with the emergency response team leaders operating at the incident site to make them aware of the changing conditions and allocate new sources or change the response strategy.

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All the above-mentioned actions are held to integrate information gathered from different sources in order to reach collaborative sense-making about the situation. The advantage of collaborative information seeking, sharing and collaborative sense-making is to understand the problem through integrating different perspectives (Paul and Reddy, 2010). IDM 01, a director in AKOM, summarised the actions they take when they encounter a large-scale disaster.

> IDM 01: *"Dark, black smoke invaded the sky. At the same time automated fire-warning systems alert*ed us *about the fire in the Ataturk Airport. Initially,* the *Bakirkoy and Yesilkoy Fire departments g*ot *prepared for response. According to the incoming emerge*ncy *calls received* from *the airport, the colour of the smoke gave us* an *idea* of *the scope of the fire.*
>
> *… Then, we decided to benefit from SNG vehicles and via helicopter we recorded the fire.,* At the same time, C&C crews were communicating with the Bakirkoy and Yesilkoy Fire departments to gather updated information about the fire, such as "the cause of the fire, which department was mainly affected, any injured people, the potential danger of explosive materials" etc. … After the evaluation of the information gathered from different sources, we understood *that the scope of the fire was greater.* After that, I understood that our initial impression was *not enough to comprehend the situation."*

Information gathered from the incident site enables the C&C crews to understand the scope, structure and requirements of the problem encountered (Byström, 2002). It is the first step for emergency response organisations to formulate the problem and take the initial actions. If information needs are not satisfied, an emergency response strategy cannot be built effectively as a response under lack of information involves high risks.

Relevant data and information support to the emergency response teams operating at the incident site is a normal information-processing task, whereby the process is pre-determinable and structured, although case-based arbitrations may need special attention to constitute the content of the process (Byström, 1999).

The C&C centre shares information with the relevant teams. For instance, health-related information is shared with the Ambulance Service and the risky buildings information is shared with Rescue Teams or the Fire Brigade. Motivated information sharing exists, which determines what information to share and with whom (Wittenbaum et al., 2004). The motivated information

sharing strategy (please see Section 2.4.3) of the C&C centre facilitates the effective response of the emergency teams through saving time and avoiding information overload. The relevant information possessed by the C&C crews is shared with the teams, where collaborative information behaviour exist to take advantage of immediate information access and accessing necessary information to sort out the problems.

The Risk assessment task is a genuine decision task, which is not a priori determinable, unstructured, ill-structured or unexpected (Byström, 1999, Byström and Jarvelin, 1995). Risk assessment is necessary and is carried out at the incident site before the response action begins. Also, it is an on-going action since conditions change or new relevant information is gathered. The team leaders of the emergency response teams are responsible for the risk assessment. For single incidents, information is provided to the team leaders before they are despatched to the incident site. C&C crews share relevant information with the team leaders. Risk assessment is mainly carried out as an individual action in single incidents. The team leader processes the information gathered from the C&C cognitively and shares his/her judgement with the other team members. Information processing is individual-based for single incidents; however, the size and the magnitude of the incident forces collaborative judgement about the situation. Collaborative sense-making (Paul and Reddy, 2010) exists to have common understanding about the phenomena by all the team members. This situation facilitates to integrate various perspectives to start effective emergency response. For example, large-scale disasters like the 2009 Istanbul flood, or the 1999 Golcuk earthquake and refinery fire involve many different factors to be considered. For example, the TUPRAS (Turkey Petroleum Refinery Anonim Sirketi) fire in 1999 after the Golcuk Earthquake was massive. The factors considered before the response at the risk assessment stage included the structure of the repositories, the explosion risk of the tankers, invasion risk of the fire to the nearest living spaces and the threat from disseminated chemicals. In this case, multiple agencies collaborated in the response.

The need to integrate the domain expertise of emergency response teams, the fragmented information held by different agencies and immediate access to these fragmented information sources to assess changing conditions, force multi-agency interaction and continuous communication (Reddy and Spence, 2008) in order to establish a shared understanding (Paul and Reddy, 2010) of the situation and a collaborative risk assessment.

For instance, the AKOM C&C centre investigated the potential health hazards from the electric transformers invaded by the flood. The AKOM C&C centre communicated with TEDAS and TEDAS assessed the risks and shared the potential risks with AKOM. Conversely, infection risks from the floodwater were assessed by the Istanbul Directorate of Health and shared with AKOM. The traffic situation was sought from the MOBESE cameras and the Istanbul Directorate of Highways was needed to identify potential routes that were not affected by the flood that could be used for emergency response. This kind of information is organisational domain information and cannot be held by all the emergency response institutions. The C&C centre of AKOM integrates the information gathered, and through continuous communication, shares this information with the emergency teams. Thus, the team leaders (Fire, Rescue, Ambulance and Police) gain a shared understanding of the situation.

Identifying the needs of the patient is a genuine decision task which involves unexpected process and structure, and whose information requirements cannot be pre-determinable (Byström, 1999; Byström and Jarvelin, 1995). Every incident has its unique characteristics and unique information needs, and every patient has a unique condition and information needs stimulated from his/her past health condition and the type of incident he/she was rescued from.

Intervention involving errors caused by lack of information or expertise, cannot be tolerated. The value of quality decisions through information processing gains importance when we shed light on the potential results. These kinds of errors may result in the death of the patient. Therefore, emergency paramedics (Ambulance Services) are trained to gain a clear

understanding of the condition of the patient and how to collaborate with the other emergency staff at the incident site. Lead paramedics are responsible for establishing communication with C&C, emergency teams at the incident site, and among their own team members (paramedics). By doing so, similar to the results by Reddy and Spence (2008), collaboration significantly facilitates the satisfaction of information needs and access to relevant health information at the right time.

During a single incident response, such as an Ambulance Service response, the first introduction of the patient to the health service is held through the paramedics' response. The first intervention of the paramedics is crucial to keep the health condition of the patient stable until their arrival at the nearest (or relevant) hospital.

Similar to Klein's NDM (2008), paramedics recall from their past experiences or integrate clues at the site; however, if anything unexpected happens, they seek additional information from team mates or from the C&C centre (see Section 2.5.3 for NDM and mental simulations and deliberative information seeking under time pressure). By doing so, paramedics make sense of the condition of the patient through assessing the information gathered from the C&C centre. En route to the incident site, they have a mental evaluation of what they will probably encounter (IDM 18).

> *IDM 18: "Before we depart from our station, we almost know what we will do. The station gives us the details of the incident. The type of the incident, such as a traffic accident, cracked bones, heart attack, delivering birth, trauma etc. alters our preparation. En route to the incident, we discuss the probabilities among each other in the ambulance as well."*

Large-scale disasters bring vague problems. Thus, the identification of the problems is not easy as in single incidents. Fire and Rescue crews are responsible for saving lives from collapsed buildings, fires and flood. By doing so, first aid is administered by Fire or Rescue crews. Paramedics are the second agents who interact with the patients in this case. Fire or Rescue crews may have an insight of the health condition of the patient and share it with the paramedics at the incident site. Paramedics use this information to determine the subsequent course of actions. If there are more information

needs, lead paramedics seek information from the Directorate of Health where the historical health database of people is deposited.

The paramedics seek information from C&C and C&C seek information from the Directorate of Health. The Directorate of Health crews retrieve information from repositories. The information retrieved is shared among agents, to be used for evaluation by the paramedics in order to judge the situation of the patients.

Another point is the lack of expertise. Paramedics are trained to stabilise the health condition of the patient en route to the hospital. If any complications occur en route to the hospital, however, lead paramedics communicate with doctors and they try to find short-term solutions for the problem (IDM 18).

> IDM 18: *"We are all trained on birth delivery. But we are not very well trained on hedging the complications. For instance, we need to put the baby into the incubator, but we do not have it on the ambulance. We call the hospital, and* the *doctor instructed us after he underst*ood *the situation."*

Lack of expertise and the need to access the historical health records of the patient force paramedics to collaboratively seek and share information (Reddy and Spence, 2008). If the paramedics do not know the symptoms, the problem becomes more complex and paramedics share the problem information with seniors or doctors in order to reach a working solution (Stasser et al., 1995).

Another point is the complexity of information needs. The information needs of the Ambulance Service have different components (Reddy and Spence, 2008). For instance, Istanbul has a major traffic problem, and paramedics seek low traffic density roads. In some cases, however, the roads are blocked. Therefore, paramedics turn to C&C requesting another nearest hospital or to be transferred to a special unit if the health problem of the patient is specific (IDM 17).

> IDM 17: *"I pray not to go to a very* urgent *incident in peak hours*, b*ecause* the roads are *blocked and we try to find low density routes or change our direction to another available hospital."*

Another issue is the transfer of the patient to a specialised unit if required after the assessment of the paramedics and the doctor. For instance, deep burn patients are transferred to specialised hospitals, which have burn intervention units. Therefore, paramedics, C&C and related hospitals collaborate to assess the situation and reach a satisfying result in limited time. This kind of complex information needs, which involves many different components rather than just health-related issues, trigger collaborative information (Karunakaran et al., 2013).

Information pooling is an automatic information-processing task. It is a simple task. It requires no, or very little, case-based consideration (Byström, 2002). Reports produced after the response, historical reports of nationwide or worldwide disasters, satellite photos, and videos and photos from past incidents are pooled at AKOM to be used for further training and for strategic level long-term planning purposes (please see Figure 12). By doing so, as discussed in Section 2.5, during the decision-making period, the various information sources gathered facilitate quality and unbiased decisions (Scholten et al., 2007; Stasser and Titus, 2003; Franz and Larson, 2002; Stasser et al., 1995; Gigone and Hastie, 1993; Stasser and Titus, 1985).

Another point concerning the information-pooling task is the collaborative information behaviour, which exists in large timescales. Whilst collaborative information behaviour in the literature (see Section 2.3.2) is discussed as the use of found information by others, information pooling teams use found information a long time after it is retrieved. Information is sought and found for further use, so collaboration is established in two stages in the long run.

An *Operation Centre meeting* is a known decision task. The type and structure of the result is known, but permanent procedures to perform the task have not emerged yet (Byström, 1999). The directors of disaster management institutions gather at the AKOM Centre. The topic is known in advance. Long-term disaster planning is discussed among directors. Each of the directors brings different insights according to his/her institution's perspectives on the topic (Franz and Larson, 2002), and information is collectively pooled to be evaluated and used for decision making

(Wittenbaum et al., 2004; Michailova and Husted, 2004; Winquist and Larson, 1998).

As discussed in Section 2.6.1, according to the responsibility and organisational structure, every disaster management institution possesses different domain information. For instance, the Fire Brigade produce reports about fire risks in historical buildings in Istanbul. The Directorate of Health produce reports about epidemic diseases during potential floods. The Rescue and First Aid Institution produce reports on search strategies during potential earthquakes etc. Information is collectively shared and evaluated. The reports and databases produced regarding disasters are discussed. The aim is to achieve a shared understanding in order to make decisions on long-term disaster management.

5.2.3   CIB in a news-production context

This section aims to show how news staff process information for news-production tasks and how situational factors shape how they behave. The objective of the overall news-production activity system is news production and the motive is informing the public. This research focuses on investigating the information behaviour of organisational members in breaking news production in a fast-paced situation, whereas, the focus on daily or documentary news production is on slow-paced situations. The collaborative information behaviour model below (Figure 13) aroused through the data analysis of the activity systems of CIHAN and the interpretation of the research findings.

The nature of both types of news (breaking news and documentary news) differs according to the environment in which the news tasks are carried out. Time pressure and uncertainty are high during breaking news production, in contrast to daily or documentary news production. There are deadlines for the daily news and documentary news; however, time pressure and uncertainty

are acceptable when they are compared to disaster management tasks (please see Section 4.2).
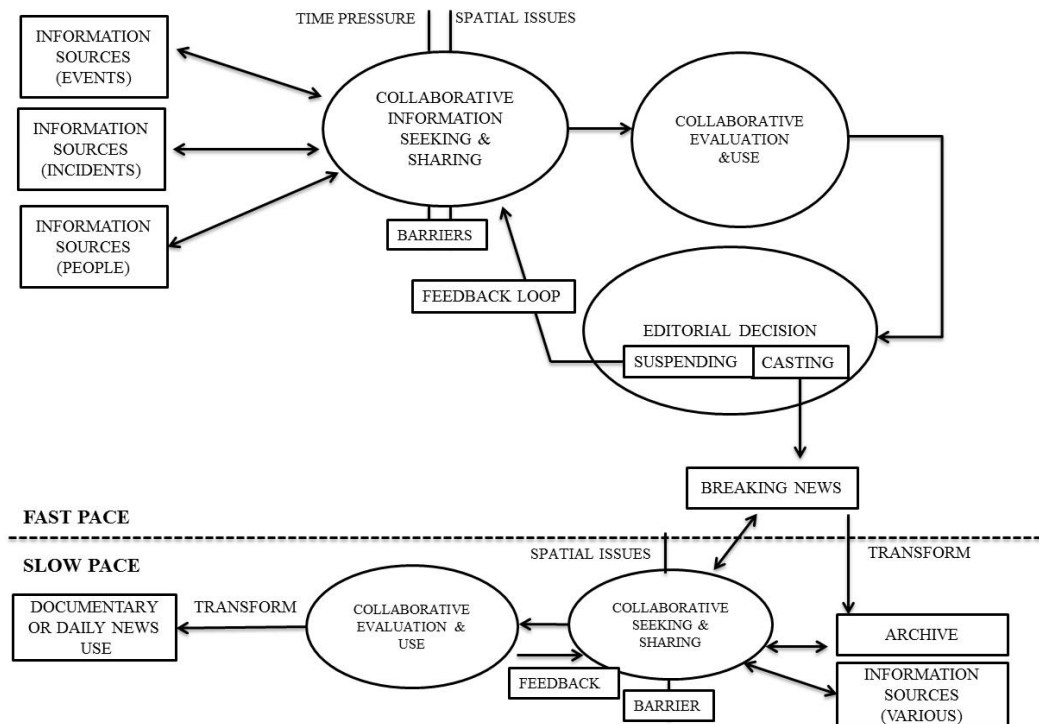
Figure 13 Collaborative information behaviour in the CIHAN context

In the CIHAN News Centre, different divisions deal with the news tasks and collaborate for news production. Contrary to the disaster management context, *knot-working* (Engeström, 2011) does not exist. The divisions do not gather to carry out specific tasks; they habitually work together.

Commonly, the news staff works as a team or a group to carry out news tasks. Contrary to the individual information behaviour research (Wilson, 1999a), interactions are conversational, and collaborative seeking, evaluation and sharing (Talja and Hansen, 2006b) exists in the CIHAN News Centre (please see Figure 13).

CIHAN's staff information-processing types and the triggers of information behaviour are investigated considering the varying complexity of the news production tasks (Table 11).

Table 11 CIHAN tasks and categorisation of tasks

Situation	Tasks	Task Category
Fast-paced	Collecting information for breaking news	Normal information-processing task
	Accuracy check	Normal decision task
	Checking the consistency of news	Normal information-processing task
Slow-paced	Collecting information for documentary news	Normal information-processing task
	Coordinating text editors, photo archive and graphics division crews to design the news stories	Automatic information-processing task
	Editorial meetings	Known decision tasks

Collecting information for breaking news is a normal information-processing task. The process is determinable with the case-based arbitrations in content (Byström, 1999). Correspondents are key persons in carrying out the task. Time pressure is very high. Correspondents collect information about an event and send it to the CIHAN News Centre to be checked and broadcast by the editors.

The nature of the task alters the information behaviour of both correspondents and editors. If the event occurs in a single place, one correspondent can attend to it. If the event has different aspects to be considered or the event is happening in different places, several correspondents work to carry out the task. For example, information collected about an explosion needs a single team, a correspondent and a cameraman. If the event, however, is happening in different places, one single correspondent team cannot sort out the spatial proximity, and the need for several different correspondents arises. For instance, the general and local elections' news is collected by various correspondents. These correspondents work at each elections venue. The information is fragmented in each elections venue so that each correspondent (freelance correspondents especially) collects

information about his/her venue and shares it with the temporary elections news centre. The temporary elections news centre pools shared information and shares it with the CIHAN News Centre continuously. By doing so, as Figure 13 summarises, collaborative information seeking and sharing exist and enable CIHAN to integrate fragmented information (Karunakaran et al., 2013; Reddy and Jansen, 2008)

This collaboration enables access to spatially fragmented information under time pressure. As a result of CIHAN's SEKOM system, which facilitates collaborative information seeking and sharing, CIHAN is the market leader in publishing the elections news. That gives an advantage to its subscribers.

Accuracy check is a normal decision task. This is quite structured but is needed for case-based arbitrations, which have a major role in carrying out the task (Byström, 1999). The trust level of the sources stands out in the decisions of the editors. The editor individually makes the decision because of the time constraints in breaking news. Editors suspend the news casting if they are suspicious of the source. This is a cognitive process, bound by the editors' expertise but affective intuition in particular plays a role in this decision task as discussed in decision making research literature (Hodgkinson et al., 2009; Hodgkinson et al., 2008).

Checking the consistency of the news is a normal information task. The editors make sense of the consistency of graphics, text, photos and videos. This is an individual, cognitive action.

Collecting information for documentary news is a normal information-processing task which is almost completely determinable, but case-based arbitrations are required (Byström, 2002). CIHAN's journalists' information behaviour resembles Kulthau's (Hyldegård and Ingwersen, 2007; Hyldegård, 2006, Kulthau, 2004) information search process.

A documentary is produced by one journalist or can be produced by several journalists. For documentaries, which are produced by more than one journalist, the sub-topics are divided according to the interest or domain expertise of the journalists. For instance, a documentary about coups in

Turkey involves societal, economic and political issues. Different journalists search information about each of these issues. The information found through collaborative information-seeking is shared among each other to gain a shared understanding of the case. After collaborative evaluation, the collected information is used to produce documentary needs. Collaborative information behaviour exists to avoid biases and to hedge the mistakes caused by the lack of domain expertise.

Editorial meeting is a known decision task. The structure and type of the result is known, but permanent procedures have not emerged yet (Byström and Jarvelin, 1995). Editors and journalists of different divisions in the CIHAN Centre gather. The topic is known in advance; however, during the conversations news themes emerge. Each editor discusses issues regarding his/her division. Information is collectively sampled (Stasser et al., 1989). Biases on the potential news are discussed. The editors evaluate the mistakes and biases, and decide on broadcast plans.

Consequently, collaborative information behaviour gives an advantage to both AKOM and CIHAN to access information quickly while working in a dynamic environment. AKOM, however, benefits from collaborative information behaviour to access the domain information and assess the situation comprehensively. AKOM staff gains a deeper understanding of the situation through the use of collaborative information behaviour, while CIHAN staff just try to collect information from the event site and disseminate the news quickly in order to gain the pioneering advantage in the news market.

Collaborative information seeking and sharing facilitates access to rich information sources, such as diversified domains and different perspectives in slow-paced situations in both the AKOM and CIHAN contexts (Figure 12 and Figure 13). Overall, collaborative information behaviour facilitates the overcoming of time pressure and spatial proximity barriers in fast-paced and slow-paced situations in both contexts (Figure 12 and Figure 13).

5.3 The influence of temporal issues on information processing and decision making (intuitive vs. analytical) in dynamic environments

The intuitive and analytical decision-making modes (Sinclair, 2010; Hodgkinson, 2009; Klein, 2008) and their linkage to information behaviour have been discussed in the literature (Allen, 2011; Mishra et al., 2011c). The analytical mode involves deliberative information processing to pool a rich amount of information in order to reach optimum decisions. Thus, this action requires more time to process information. In real-life settings, however, decisions are mostly made in dynamic environments where uncertainty is high and time pressure exists. Both the disaster management and news-production contexts are investigated in real-life settings through fieldwork. Considering the research findings interpretations in Chapter 4 and the investigation of the decision-making modes of organisational members it is shown that uncertainty and time pressure drive them to find the first working course of action. By doing so, both intuitive and analytical modes are widely used according to the nature of the work tasks.

Investigation of the decision-making modes of organisational staff sheds light on practical and real-work settings as alternatives to the laboratory cases (Stasser and Titus, 2003; Stasser et al., 2000; Stasser and Titus, 1985) discussed in Sections 2.4.1 and 2.4.4. The information behaviour of decision makers, which is linked to their decision-making type, is a relatively unexplored area in information behaviour research (Allen, 2011; Mishra et al., 2011c).

The researcher has scrutinised the information use and decision-making behaviour (linking to information behaviour) of organisational staff in both contexts. Every action taken in both contexts consists of individual, cognitive or group-based decisions. Initially, the researcher discusses the decision-making processes in disaster management. The decision-making behaviour of organisational staff in fast-paced and slow-paced situations has been investigated.

Individual-based decision-making is done through cognitive functioning and individual processing, such as recalling past experiences and mental simulations. Conversely, group-based decisions require collaborative action. Tactical level commanders: fire fighters, rescue crews and paramedics are responsible for tactical decisions prior to or during response (modifying the actions).

Table 12 Context-based decision-making modes

Context	Disaster Management		News-production	
Situation	**Fast-paced**	**Slow-paced**	**Fast-paced**	**Slow-paced**
Subjects involved	Tactical level commanders	Strategic level commanders	Tactical level staff	Tactical level and strategic level staff
Decision-making mode	Recognition-Primed Decision Model	Analytical	Intuitive	Analytical
Community	Individual-based and group-based	Group-based	Individual-based	Group-based

The findings of the case studies (see Table 12 above) indicate that the decisions of tactical level commanders are based on domain expertise and past experiences influenced by time pressure, task complexity, availability of relevant information and the characteristics of the operating environment. Overlapping with these findings, emergency tasks are carried out in a dynamic environment where conditions change rapidly, and where latent response could have fatal consequences, such as the loss of lives. Therefore, the decision-making type of the responders should support rapid decisions on actions to decrease losses to an acceptable level. Hence, it can be interpreted that information behaviour has a supporting role in the decision making of tactical commanders when responding to emergencies.

The nature of analytical information processing and choosing the optimum from the alternatives has contrasting features among the fire fighters, paramedics, rescue and C&C crews when a rapid course of action has to be taken. This behaviour of the tactical level commanders overlaps with the studies of Klein's RDM (2008, 1993), as discussed in Section 2.5.3.2. The findings from the disaster management context (fast-paced situation) point out that time pressure impacts on the way responders decide on their next action. Therefore, the expertise of the responders positively impacts the speed of the responses because the expert responders are familiar with the situation, recognise the past response actions and tie together the relevant cues (Klein, 2008). When new and useful information is received, however, the responders should take this into consideration to match new cues with those existing during the response. The same applies to when the situation is unfamiliar or when complications occur during the response. In those cases, the responders should turn to the responsible team leader (or C&C) requesting more relevant information (IDM 11; IDM 18; IDM 15). The lack of relevant information about the situation, the uniqueness of the case or the lack of domain expertise (IDM 18) hinders the recognition of the situation and result in seeking information.

> IDM 11: *"How experienced you are... how well informed by the command centre, rarely you cannot make sense of the situation very well. You need more even if you have done this before many times. Every incident has its unique characteristics."*

> IDM 18: *"Every one of our actions has an impact on future life and even the life of the patient. Before I do anything, I should think several times, check again and again..."*

> IDM 17: *"After the heart attack, we had the first intervention and then transferred him to the ambulance helicopter. Everything was going smoothly. Then I realised that the patient was sweating though the cabin was cool. I could not give meaning to this. ... I started to think about what to do. After a 15-20 seconds conversation with my colleague, I realised that the sound of the helicopter scared him. ... and I grabbed his hand to give him confidence."*

According to the findings, the use of recognition of a situation through recalling past experiences and integrating the cues for mental simulations are expertise-based intuitive actions used by fire fighters, C&C crews,

paramedics and rescue crews for the case study. Table 13 illustrates the evaluation of findings from the disaster management fast-paced context.

Table 13 Evaluation of the findings of the fast-paced disaster management context from an RDM point of view

Simple match	Developing a course of action	Complex strategy
Non-conscious operations	Conscious actions	
Cognitive-based information processing	Cognitive/individual-based information behaviour	Individual/collaborative-based information behaviour
Intuitive decision-making	Analytic decision-making	
Repetitive tasks	Complex tasks	
Rapid response ⟵⟶		Slower response

The emergency team leader (IDM 15) managing the responders at the incident site stated that: *"every situation has its unique characteristics."* Thus, the relevant information about the situation is sought from accurate sources. Accurate sources include the tactical level staff at the C&C centre and the respondents' own observations at the incident site (when assessing the situation). Through their observations, responders add new cues to their mental simulations and reassess the situation. IDM 11, IDM 07 and IDM 18 drew attention to the value of past experiences during rapid decisions.

> *IDM 11: "After the announcement and seeing the colour of the flashing light at the station, I started thinking about the response. … En route to the incident site I shared my decisions with my teammates. The response structure in my mind was shaped by the information I gathered from the C&C and especially my past experiences. What I can say here is that I use my theoretical background, gained experiences from past responses and the information gathered from the fire station (C&C). I draw a map in my mind and share it with my team members."*

IDM 07: "While we are preparing for the response to a fire, first of all I try to remember my past responses in that area. In my mind I draw a map: where to enter, which device to use, what is the possible reason for this fire. ... For example, when we are going to a fire in X area, we all know that people use electricity illegally and that the electricity networks are not healthy. Therefore, fires caused by electricity are very usual in this area.

Whether the caller on the phone notifies us about the cause of the fire or not, firstly we base our response plan on an electricity type fire."

The experiences of the responders are not only related to the nature of the disasters, they also gain experience about the phenomenon, which has no direct link with the disaster (IDM 18). By doing so, the other complex needs of the disaster can be hedged or the responders can be aware of the phenomenon (Reddy and Spence, 2008).

IDM 18: "We have electronic databases, maps and city plans that show the features of the streets, roads. Our database is full of data (laughs); however, we should know more than the systems we use. Istanbul is a city where most buildings are built against the legal plans or have had alterations after the municipality plans were confirmed. That is why we cannot work just by referring to the databases. We should keep real information in our brains, to use during response."

Actual physical training and training simulations are commonly used by the disaster management institutions to enable the responders in order to gain experience for potential responses in a dynamic environment (IDM 19). Training and simulation-based training are rich sources for the emergency responders to gain insights and experience; however, there is no risk factor in simulations and the risk factor is minimised in emergency response training (Lipshitz et al., 2001). If the simulations and training related to real work settings, this approach would support effective decision-making under time pressure and uncertainty. The responders integrate the real-life situation, which is mapped out in the simulations and training to enable rapid decisions. The live stream department of AKOM works to archive the live recordings of the incidents to be used for further training and long-term planning needs.

Breaking news production is an event-driven activity and carried out in a dynamic environment. The editors are restricted by the limited time they have

available to check the accuracy of the news and communicate it to the subscribers. The editors decide to newscast and communicate the news with the subscribers by using the trust or the strength of the relations between the source and themselves (INP 04).

> INP 04: "Telling the truth to the public and avoiding manipulations are valuable for our agency. Initially, we teach how to avoid exaggeration while producing news. For instance, you cannot say the number of the victims without checking it with formal or very trusted sources. ... As an editor, I produce the graphics of the breaking news and share it with my subscribers. I rely on my correspondent team working in the field."

Correspondents, as trusted sources, and there past experiences are used as factors influencing the rapid decision-making of the editors for the breaking newscast. CIHAN editors rely on their correspondent team as highly trusted information sources. The accuracy of the newsworthy information is checked at the incident/event site where the correspondents collect that information (INP 04, INP 11). Breaking news decisions have affective (Sinclair, 2010) and expertise (Dane and Pratt, 2007) aspects. When environmental conditions are changing in a rapid manner and the quality of the information sources is susceptible to them, the breaking news editors use their expertise-based intuition to judge the accuracy of the news (Table 14). They decide on *casting* or *suspending.* At the initial stage of the breaking news flow, the editors have no chance to seek information from diversified sources to check accuracy because of time pressure (INP 05). Therefore, the editors rely on the sources, whether the news information comes from CIHAN's correspondents or external sources. Interpersonal relations between the editors and information sources have a significant impact while working in breaking news (Abrams et al., 2003), and the type of the source (external vs. internal) plays a significant role on the decisions of the editors.

> INP 05: "Last week, our correspondent sent breaking news about the explosion. 'The teenage boy was killed in a car' was the first heading on TV. Then it became clear that 'the teenager was the live bomb!"

There is a shortage of analytical tools that can be used to check the accuracy of information gathered from the correspondents at the initial phase of the

breaking news. Thus, the editors' decision is based on intuition (Table 14). This intuitive decision involves heuristics and biases (Dane and Pratt, 2007). The breaking news decision is an especially unconscious action, and past experiences and *gut feeling* support this action (Hammond, 2010; Sinclair, 2010, Hodgkinson et al., 2009).

Table 14 Editorial decision-making for breaking news

Environment	Information sources	Action/Operation	Decision
Rapidly changing conditions	External (manipulative)	Conscious	Suspend
	External (trusted)	Unconscious	Share
	Internal (trusted)	Unconscious	Share
Plausible Dynamic	External (trusted)	Unconscious	Share
	Internal (trusted)	Unconscious	Share

In the slow-paced situation of the news-production context, the editorial meetings are held in the news centre for daily broadcasts or documentary-based news. Group discussions are needed to reach a decision about the broadcasts. The content of produced news is verified from archives and databases, and the source of the news supports the editors in making decisions about the news broadcast. The domain information of the editors plays a supporting role in reaching a feasible decision. This is a deliberative phase. Similar to the discussion of Stasser and Titus (2003), and Simon (1987), editorial meetings are the environments where information is pooled that enriches the business decisions. By doing so, as a consequence,

newsagent subscribers access more reliable news information, and newsagents become more trusted resources.

Disaster managers gather at the operation centre of AKOM. Disaster management institutions hold reports and databases, which are shared for long-term planning, recovery, prevention and preparedness. Relevant information is retrieved from technological sources and text-based historical sources. Databases and text-format reports are based on past observations or the results of past disasters. Past strengths and weaknesses are reported in databases and reports. Technological tools, such as AKOMAS and HAZTURK, are used to support the decision makers. The strategic level managers discuss and share their domain information. All the relevant information gathered from various sources is pooled during the meetings to reach the best working alternative for future emergency response actions (Winquist and Larson, 1998).

An analytical decision-making model is used in strategic level meetings, which are held in the slow-paced situations of both contexts. The disaster planning meetings in the disaster management context and the editorial meetings in the news-production context are the realms of analytical decision-making.

In contrast to laboratory cases (see Section 2.4.4), RPD, intuitive and analytical decision-making in real-life settings, observed in both fast-paced and slow-paced environments, contribute to the existing literature. As the researcher conducted research in dynamic environments, it was observed that Naturalistic Decision Making (NDM), and especially the Recognition-Primed Decision Model (RPM), is used by emergency responders during disaster responses. NDM concerns decision behaviour in real-life settings and consists of intuitive and analytical parts (Klein, 2008). As NDM explains the decision-making habits of individuals in real-life settings, temporal issues trigger the emergency responders to use RPD (Klein 1998; Klein, 1989) which stems from NDM (Klein, 1993).

Pattern matching is the intuitive part of RPD and simulation generation is the conscious, deliberative part. On account of this, RPD is widely used by

AKOM emergency responders. Rarely do the teams need specific information about the incident or the cause of the incident. The information-seeking feedback loop enables the responders to gather the required information from the C&C crews (Figure 12). Communication between the team leaders and the responders operating at the incident site fulfils their information needs. In this situation, the speed of the response decreases, but this conscious collaborative information-processing action fulfils their immediate information needs through access to the fragmented information sources, distributed domain information and other unrelated information needs for the disaster. Therefore, as an outcome of RPD, decision speed and quality balance is established and fatal errors are minimised in AKOM's emergency responses.

On the other side, breaking news decisions are not as complex as emergency response decisions. The intuitive mode of decision-making stands out, relying on trust between sources and CIHAN's editors while dealing with breaking news tasks (Table 14).

5.4 Conclusion

Initially, the gap in the information behaviour literature has been mentioned and the findings have been interpreted to trace answers to the research questions.

In the first part of this chapter, the collaborative information behaviour of both AKOM and CIHAN has been investigated considering temporal issues. Individual information behaviour, while carrying out work-related tasks, has been discussed within the literature. There is relatively little research scrutinising the societal side of information behaviour in organisational settings where time pressure, task complexity and the nature of the organisational tasks drive organisational members to process information in a collaborative manner in order to carry out organisational tasks and reach shared organisational goals (Karunakaran et al., 2013). The case studies, which have been conducted in two different environments, provide specific

examples of the influence of situation and time pressure on the information behaviour of organisational members. Particularly, collaborative information behaviour facilitates the overcoming of the time pressure barrier and provides immediate access to the information required (domain information and other information sources) with the aim of lowering uncertainty in fast-paced situations, and generating an information-rich environment in order to reach quality decisions in slow-paced situations.

In the second part of the chapter (Section 5.3), decision-making behaviour modes and their linkage to information behaviour under time pressure while carrying out complex tasks have been examined. The intuitive and analytical decision-making modes and their linkage to information behaviour have been discussed in the literature. The analytical mode involves deliberative information processing to pool a rich amount of information in order to reach the optimum decision. Thus, this action requires more time to process information. Nevertheless, in real-life settings decisions are mostly made in dynamic environments where uncertainty is high and time pressure exists. Both the disaster management and news-production contexts are investigated in real-life settings through fieldwork. Investigation of the decision-making modes of organisational members indicates that uncertainty and time pressure drive them to find the first working course of action, if uncertainty and time pressure is high. By doing so, both intuitive and analytical modes are widely used according to the nature of the work tasks.

Consequently, the research shed light onto the way CIHAN and AKOM staff process information under time pressure and make decisions while carrying out complex work tasks. The information behaviour types and decision-making modes of organisational members in these two different contexts and situations have been compared to contribute to the literature. As a whole, this research contributes to the existing literature via the collaborative information behaviour model of both the CIHAN and AKOM contexts and the elucidation of two modes of decision-making in dynamic environments.

CHAPTER 6 CONCLUSION

The departure point of this research is information behaviour and the thesis concentrates on the information behaviour of organisational members carrying out tasks in disaster management and news production contexts. The behaviour of organisational members has been investigated in two situations in which complexity and time pressure vary.

The information-processing actions in information behaviour literature (Karanukaran, 2011; Widén-Wulff, 2008; Case, 2006, 2002; Reddy and Hansen, 2008; Wilson, 1999b, 1997) and communication literature (Stasser and Titus, 2003; Stasser et al. 2000; Stasser and Titus, 1987) have been reviewed to shed light onto the gap in the literature. The existing literature and information behaviour models and theories deal with individual information behaviour, as mentioned in Section 2.2 and Section 2.5.1. A small number of articles discuss collaborative information behaviour, as mentioned in Section 2.3.2. The individual information behaviour models do not emphasise situational factors, such as time pressure and complexity, in a comprehensive way and collaborative information behaviour research has mainly been investigated in time-pressured environments. Organisational tasks, however, are carried out in group settings, and temporal factors and complexity influence the way organisational members process information to be used for task completion.

The first contribution of this research is an analysis and discussion of the influence of task complexity and time pressure on collaborative information behaviour. The findings indicate that both CIHAN and AKOM process information under time pressure in emergency response and breaking news production situations, and that the nature of the work tasks alters the way organisational members behave while seeking and sharing information. Errors in information processing during emergency response may result in death for some of the participants. For the news production context, the late dissemination of breaking news may only result in losing the pioneering position in the news market. Thus, the risk factors differ, and also

organisational members differ in the way they process information and decide on courses of actions.

Time pressure and spatial proximity are barriers for organisational members to access relevant information. Collaborative information behaviour is a tool to overcome these barriers. Complex tasks need immediate access to domain information and relevant databases in emergency situations for an effective and timely response. People or organisations, however, which have domain information for the resolution of the incidents, are geographically distributed. In order to integrate the distributed information, collaborative seeking and sharing take place. In the long-term planning phase, the directors of different disaster management institutions gather to share their institutional reports about potential disasters and the precautions that can be produced as disaster action plans. In this case, time pressure is not as pronounced as in the response phase. The directors of the disaster management institutions use the information found by other disaster management institutions to make quality decisions through accessing rich information.

The driver behind collaborative information behaviour is the complex information needs of the emergency tasks. These are genuine decision tasks, and organisational or personal domain information is required to solve complex task problems. Therefore, collaborative information behaviour facilitates access to relevant domain information, its integration and faster use. In terms of slow-paced situations, collaborative information behaviour is used to pool a rich amount of information in order to understand the potential disasters and take actions in a comprehensive manner. Overall, an increase in task complexity results in the requirement for collaborative information behaviour in the AKOM context.

Collaborative information behaviour is required in the CIHAN context as well, if the event is geographically distributed. The aim is to disseminate the news rapidly. There is no need to access personal or organisational domain information while carrying out breaking news tasks. The tasks are not as complex as in the emergency response phase, but collaborative information

behaviour is used to secure the advantage of being a pioneer in disseminating breaking news.

For documentary news production, collaborative information behaviour is used to access domain information and integrate geographically distributed information. Editorial meetings are areas to exchange insights and decide the broadcast policy.

As a rule, the tasks are less complex in the CIHAN context. Collaborative information behaviour is used to grab different perspectives in a slow-paced situation, while it is also used to broadcast news rapidly in a fast-paced situation.

The second contribution of this research is the elucidation of information processing and decision-making types of organisational staff in dynamic environments that involve complex work tasks and which are carried out under time pressure. Dynamic environments drive organisational members to make rapid decisions. The decision-making literature and information behaviour literature linked to decision-making discuss analytical modes of decision-making (Section 2.4.4 and Section 2.5.3). Decision-making and information processing in dynamic environments is still an unexplored area (Allen, 2011; Mishra et al., 2011c).

The findings confirm that emergency responders use their expertise-based intuition to facilitate rapid response; however, the complex information needs of the incident may drive them to seek new information from relevant sources or collaborate with other responders to seek and share information. On the other hand, editors use mainly affective-based intuition while deciding on broadcasting breaking news. This decision is affected by the trust between the information source and the editors. Internal sources, i.e. CIHAN's correspondents, are highly trusted sources. Other news agencies or international networks can be perceived as manipulative sources. Therefore, news originating from external sources is verified before broadcasting.

Overall, intuition is used to gain a time advantage while working in dynamic environments; however, the nature of the tasks or the potential losses which

can be caused by dissatisfied information needs activate the information-seeking and sharing process during the completion of time-pressured tasks.

Subsequently, work tasks have a societal side and they are commonly carried out in groups via division of labour. In contrast to the existing information behaviour literature (Case, 2006; Wilson 2008), this research highlights that most work tasks are carried out in social environments and organisational members collaborate to carry them out. By doing so, the information behaviour of organisational staff should be investigated as a collaborative activity, as well as an individual activity.

The interpretation of the field observations and the findings, the information needs, the fragmented information sources and the distributed domain expertise trigger the collaboration of different agencies and organisational members. In carrying out information-related activities, individual, agency and inter-agency-based information sharing exists. Different agencies use the information found by other agencies and share information with each other.

As an outcome of the fieldwork and observations, two collaborative information behaviour models have been defined to describe the phenomenon in the AKOM and CIHAN contexts. Generally, the AKOM model is more complex than that of CIHAN. The nature of the emergency tasks and the potential outcomes drive emergency responders to provide a shared understanding of the situation and focus more on domain expertise while seeking information to solve the problems. Domain expertise, however, is not used while carrying out breaking news. Breaking news only involves the basic information about the incidents or events. Errors in breaking news do not result in catastrophic losses. Therefore, in breaking news situation the collaborative information behaviour model looks simpler than the emergency response situation model.

Time is perceived as a situational factor, which is a barrier between the information sources and the users. In contrast to the dominant information behaviour models, time has contingent attributes rather than determined deadlines as used in Kuhlthau's ISP model.

Discussed from an AT perspective, information behaviour is an action in the overall activity system. When collaborative information behaviour is considered from a temporal aspect, organisational members use concrete artefacts in both slow-paced and fast-paced situations. In fast-paced situations, use of the ICT tools facilitates the healthy communication between C&C crews and the teams operating at the incident site. Additionally, ICT tools support the decision-making of strategic level commanders. Technological tools are used to seek and share information in both situations. In a time-constrained situation, the motivation for information seeking is to reduce uncertainty into a manageable quantity while carrying out the work tasks (Savolainen, 2012). In order to satisfy information needs, organisational members communicate with each other and it is notable that eyewitnesses are a source for satisfying the information needs and fulfil the information gap at the initial phase of the emergency response, or at the initial phase of the breaking news production. In a fast-paced situation, the eyewitness or the caller can be involved in collaborative information behaviour, on a par with the tactical commanders or correspondents.

Turning to interacting activity systems and shared objectives, it can be considered that different groups and teams work together to achieve a common goal (Engeström, 2001). The third generation of Activity Theory elucidates the interaction between groups while they are in collaborative action. In disaster management, independent institutions such as AKOM, the Fire Brigade, the Ambulance Service and the Police knot-work (see Engeström 2011; Engeström et al. 1999;). These teams come together to achieve the shared objective (disaster management). Adhocracies exist during large-scale emergency response depending on the nature of the disaster. Post-response, for the recovery phase, the team unknot themselves and the formal hierarchy is restored while carrying out routine disaster management tasks. *Knot-working*, however, cannot be observed in the news-production context. Networking replaces *knot-working*. Due to the rivalries in the market, the nature of the news-production tasks and the information process structure of the CIHAN, the strength of internal and external networks gains importance for timely and quality news production. The shared objective (news-

production) is achieved through internal collaboration, which means that teamwork among different departments exists within the CIHAN.

The use of Activity Theory allows the researcher to find the tensions and contradictions in the system; however, it is not a direct focus of this research. Tensions and contradictions are the unstable condition of activity systems; however, they are useful in that they encourage innovative change and development (Nowe et al., 2008b; Engeström, 1987). Although achieving the shared objective is crucial for teamwork, different teams prioritise their own team's goals. For instance, the Ambulance Service's goal is to access the patient, while the Fire Brigade's is to assess the risks. By the term 'disaster management', the Ambulance Service understands that it needs to access the patient as soon as possible; however, the Fire Brigade understands that it needs to assess the risks and ensure the security of the incident site prior to response. Unshared information about the incident can be contradictory in some cases. If the teams do not share all relevant information at the incident site, the next action cannot be determined effectively. Healthy communication via radio and face-to-face conversation among team leaders play a crucial role in effective emergency response. To the contrary, fragmented information at the incident site hinders effective response. Collective information pooling (Section 2.4.2) should be achieved. Another contradiction is the binding rules and regulations of AKOM (IBB, 2011). In the hierarchical structure of the government, AKOM comes after the Ambulance Services and Fire Brigade, so in some cases the commands of AKOM are ignored.

The training quality of the C&C crews is another complaint point. C&C crews (not all, some) are not good at seeking information from the caller in order to reduce uncertainty for the emergency teams. Thus, response time is negatively affected. Some of the staff is not familiar with new technologies. This contradiction has been identified in both contexts (disaster management and news-production); however, the news staff seems to adopt new technologies faster than the disaster management staff.

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Different emergency numbers (110 Fire, 112 Ambulance, 155 Police, 444 2 566 AKOM) confuse people as to which number to call at a time of emergency. These numbers have been generated for the sake of division of labour; however, this situation hinders the speed of the response.

The contradiction in the news-production context is the breaking of confidentiality. The correspondent seeks information from the people who are involved in the event. The rivalry in the market triggers the correspondent to gather information via informal ways. The networks of the correspondent play a role in this situation; however, press rules and regulations (Basin, 2012) bypass press staff. It is the Police's prerogative to share information with the press before operations; however, it is very usual for correspondents to be aware of Police operations. Similarly, the Police radio is cut off and the place and time of operations can be known by referring to the oral codes used by the Police. Interaction between teams or individuals hinders information sharing. This case identified in news-production contexts is very usual. Beliefs, ideologies and political affiliations affect the communication between correspondents and the information source. The above-discussed tensions and contradictions arising in the systems can be studied in further research.

Consequently, the research resulted in elucidating the way organisational members process information for making decisions while carrying out work tasks under time pressure in dynamic environments. It also resulted in the presentation of two collaborative information behaviour models explaining the ways organisational members seek, share and use information, as well as the information sources used while carrying out tasks in different situations in which complexity and time pressure differ.

6.1 Research limitations

The researcher designed the hand response cards that explain the factors influencing task complexity. However, the factors have been rated by the interviewees according to their complexity perception. Thus, there could be some biases in task categorisation as complexity perception is subjective. For instance, a task can be very complex for a novice or a new team member, but less complex for expert staff.

6.2 Further research

The role of ICT technologies cannot be underestimated in collaborative work settings in a disaster management context. The use of Activity Theory has enabled the researcher to identify the role of ICT tools in collaborative information behaviour. In particular, the AKOM context can be explored to comprehend the historical record and future projections for improvement in ICT technology to provide effective inter-agency and inter-personal communication during large-scale disasters.

As mentioned in the conclusion above, Activity Theory has enabled the researcher to determine the tensions and contradictions in the systems, which are not directly linked to this research. These findings can be presented, discussed and interpreted in an article.

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CHAPTER 8 APPENDICES

8.1   The communication system of information science

GENERATORS ⟶ TEXTS ⟵⟶ RECIPIENT

(a) The Linguistic Level of the System

STATE OF KNOWLEDGE ⟶ INFORMATION ⟷ ANOMALOUS STATE OF KNOWLEDGE

(b) The Cognitive Level of the System

Figure 14 The communication system of information science (Belkin, 1978)

8.2 The cognitive communication system for information retrival
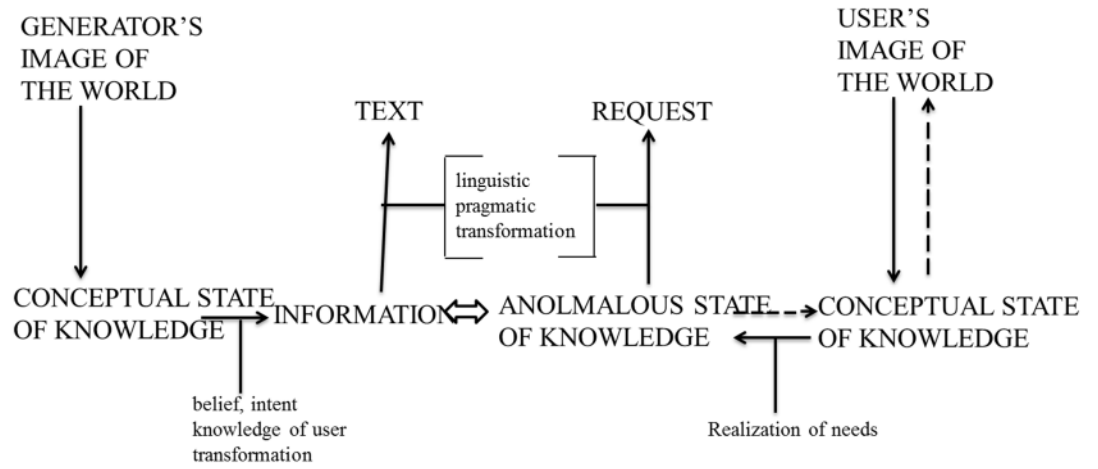
Figure 15 Anomalous State of Knowledge (ASK) (Belkin et al., 1982)

8.3   A model of information behaviour
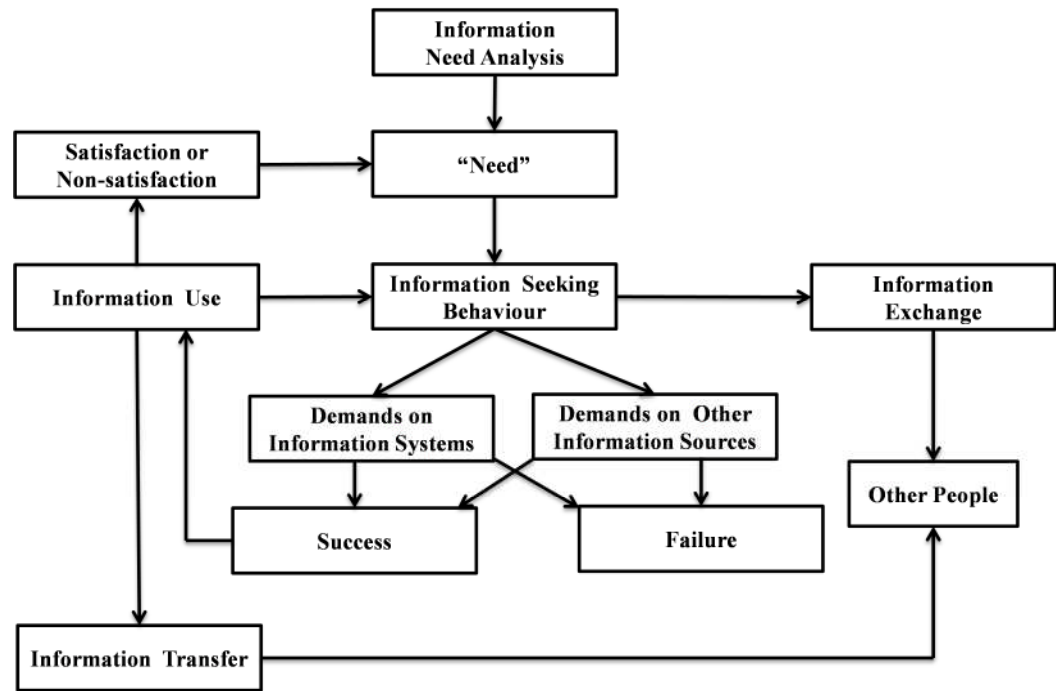
A Model of Information Behaviour

Figure 16 A model of information behaviour (Wilson, 1981)

8.4 Information needs and seeking
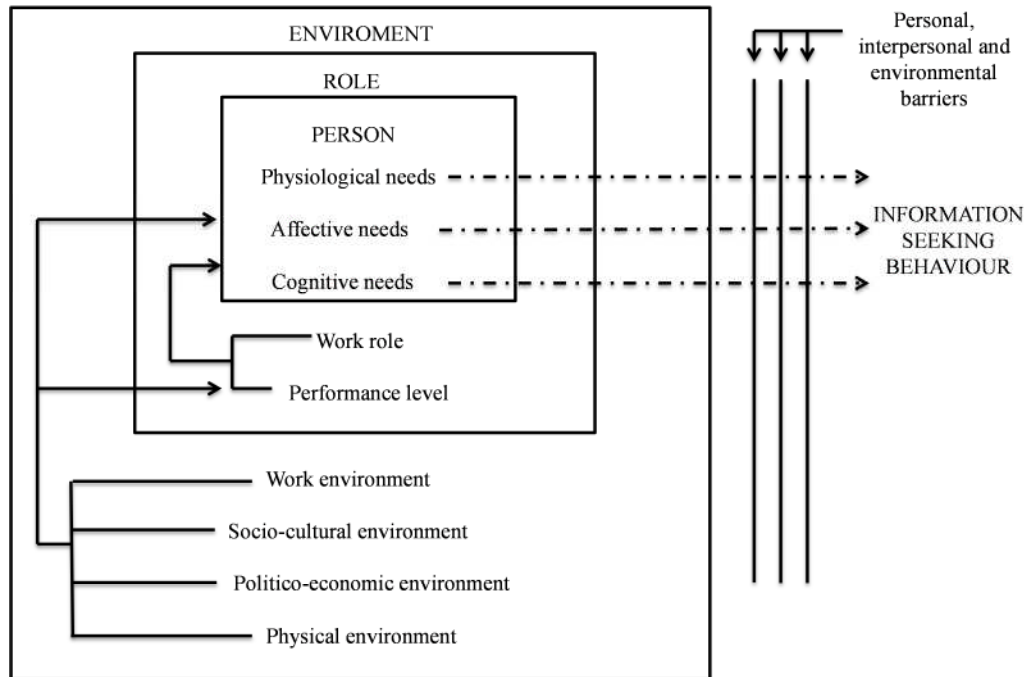
Figure 17 Information needs and seeking (Wilson, 1981)

8.5   The information seeking model
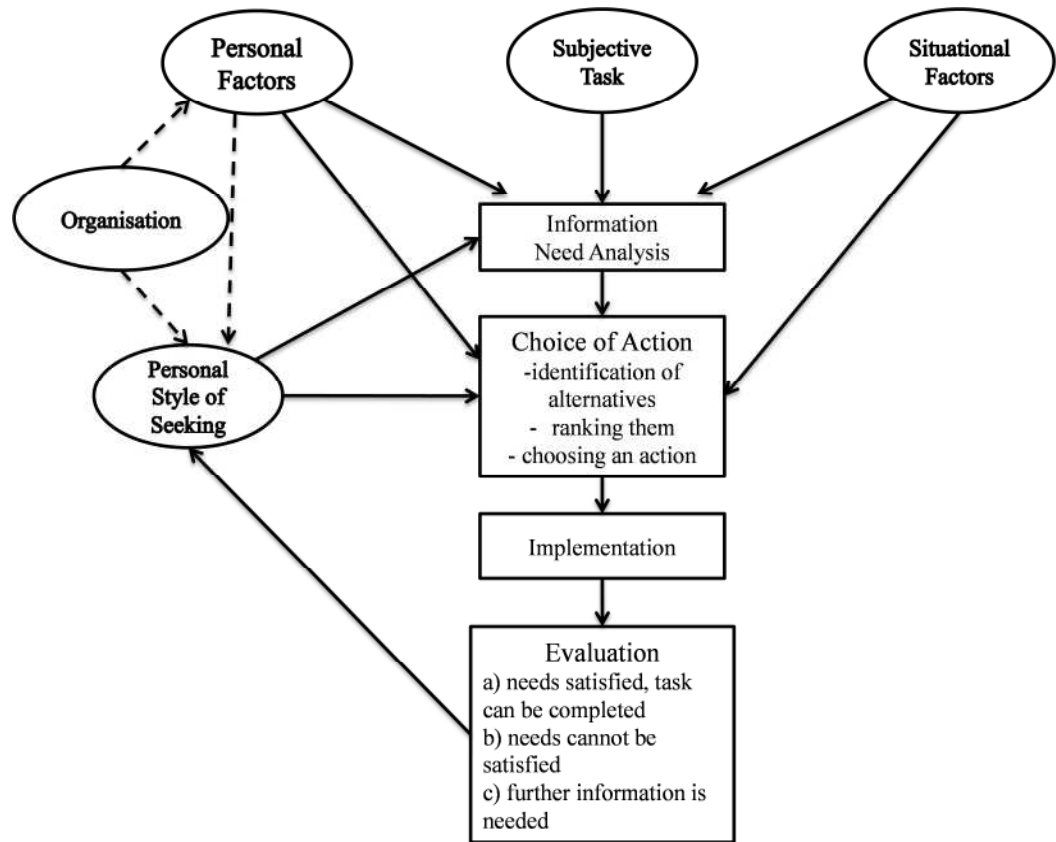
Figure 18 The information seeking model (Byström and Jarvelin, 1995)

8.6   Kulthau's model of information search process

| Stages	Initiation	Selection	Exploration	Formulation	Collection	Presentation
Feelings (Affective)	Uncertainty	Optimism	Confusion/ frustration/ doubt	Clarity	Sense of direction/ confidence	Relief/ satisfaction or disappointment
Thoughts (Cognitive)	General/ Vague --->			Narrowed/clearer	Increased interest	Clearer/focused
Actions (physical)	Seeking background information		Seeking relevant information		Seeking relevant or focused information	

Figure 19 Information Search Process (Kulthau, 1993)

8.7 Wilson's information behavior model
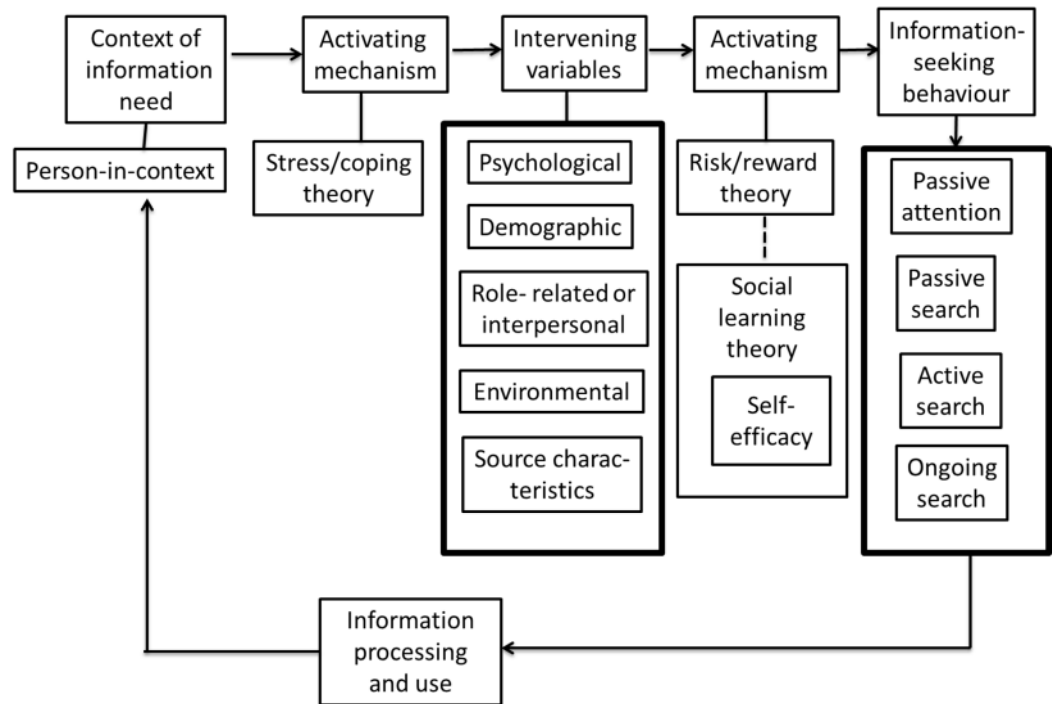
Figure 20 Wilson's model of 1996 (Wilson, 1999)

8.8   Information gathering habits of scientists
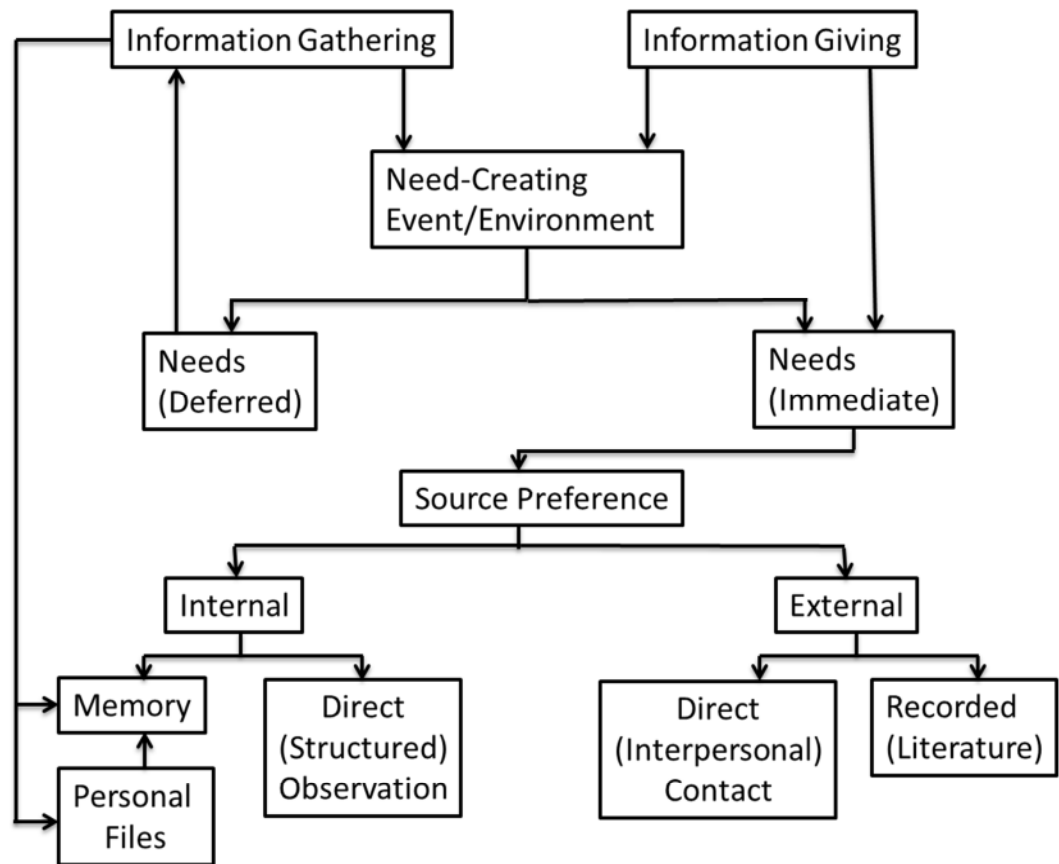
Figure 21 Information gathering habits of the scientists (Krikelas, 1983)

8.9 Information seeking behaviour of professionals
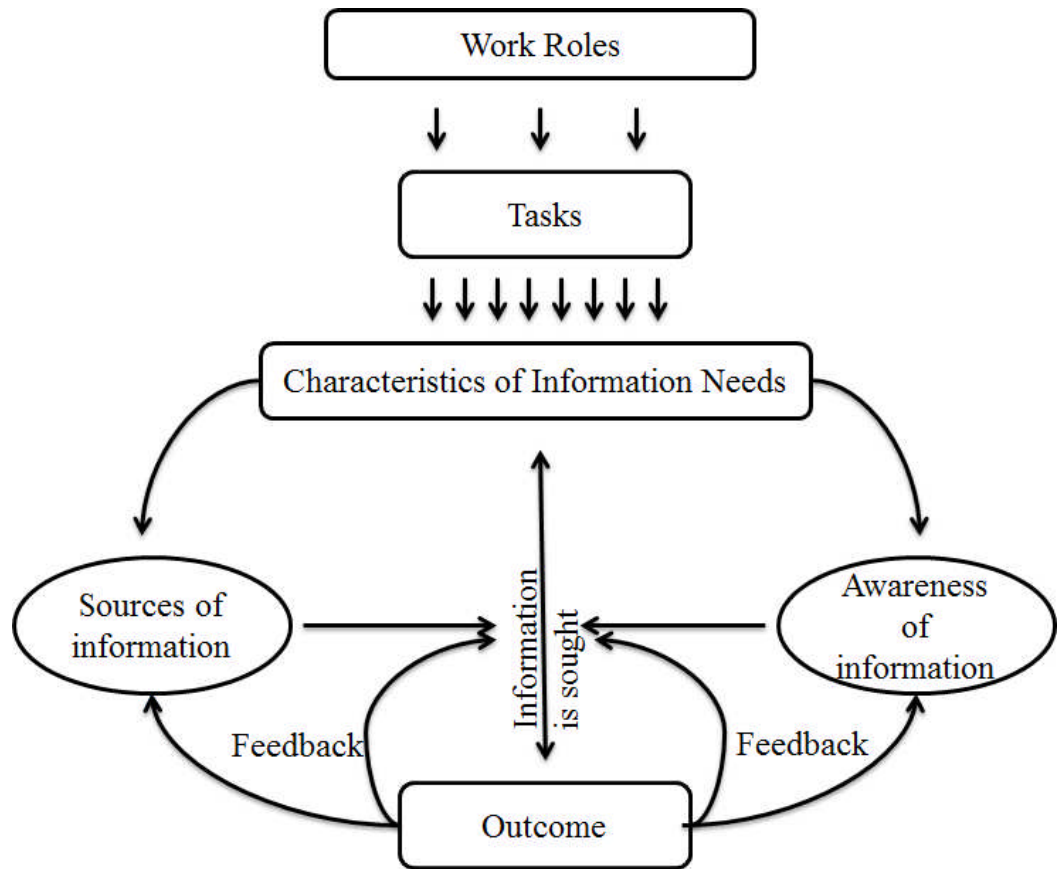
Figure 22 Information seeeking behaviour of professionals (Leckie et al., 1996)

8.10 Recognition-Primed Decision Model
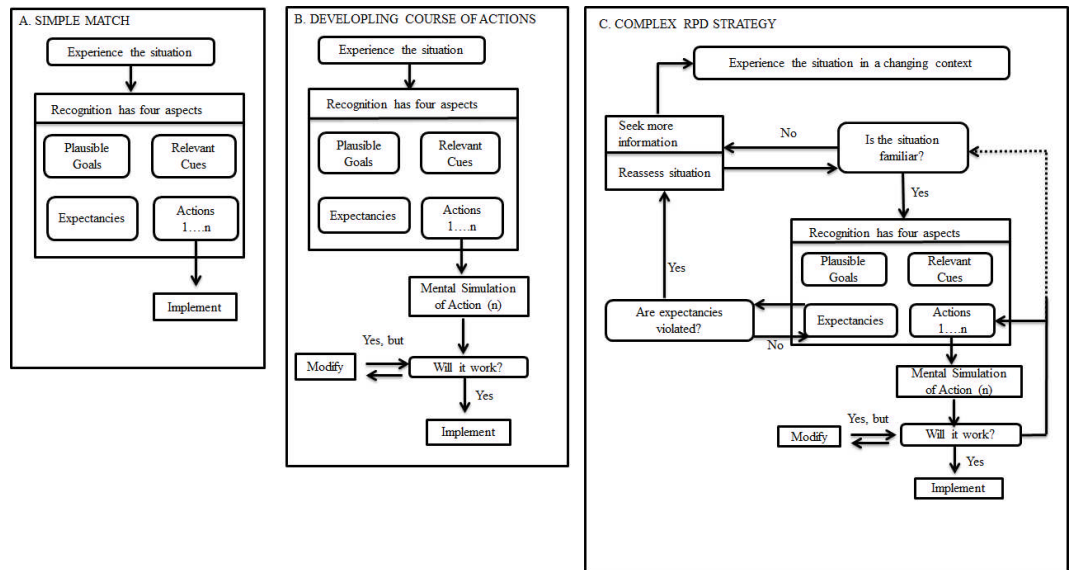
Figure 23 RPD model (Klein, 1989)

8.11 Disaster Coordination Centre response sheet sample

University of Leeds Business School

Interview Schedule

Name of the project: The influence of task and time on information behaviour in organizations in different contexts.

Name of the researcher: Alperen Mehmet Aydin

Date and Location:_____

Start and End Time:_____

Participant:_____

Organization:_____

Introduction:

I'm doing research on the influence of task complexity and time pressure on information (seeking and sharing) behaviour of the emergency responders while acting at the incidents. I'm particularly interested in the behaviour of the emergency responders during the initial phases of the major incidents.

Section A

In the first section of the interview, I would like to explore with you the degree to which you feel that the tasks carried out in the initial stages of the major events are objectively complex or time pressured. I have prepared a list of tasks on this sheet (hand Response Card One)

I would like you to view the complexity of these tasks are determined by four different criteria: how much information needs to be absorbed, how many decisions need to be taken, how many people you need to involve, and how difficult to communicate information.

A1. Please could you review each of these tasks and rank them on a 1-5 scale how complex are these tasks according to different criteria by filling the relevant box on the Response Card 1? Scale is on the response card

(Respondent returns response card)

A2. I see that you have identified "Task X" as one involving high complexity in a couple of the measures. To what extent are you under time pressure during this task? (Interviewer notes the responses on the Response Card 1)

A3. Focusing on these tasks could you rank them in terms of their significance to the resolution of the incident / occur most often? (Please Rank 1 as insignificant and 5 as significant)

(Fill in the Response Card 2 please)

Section B

In the following section, I would like to understand more about how these tasks are undertaken in the field and would like you to share your experience about carrying out these in a recent incident.

B1.What was the incident?

_____

B2. Where and when did it happen?

_____

B3. Could you describe what happened?

_____

_____

B4. Thinking about this incident, I would like to talk about "task X" and "task Y". What information did you need?

_____

_____

B5. How did you gather required information?

_____

_____

B6. And how long did it take approximately?

_____

_____

B7. Which information sources did you use before you carried out this task and while you are carrying out this task?

(Please, could you fill in the Response Card 3?)

B8. And which information source was prior for you to act?

(Please, could you fill in the Response Card 3?)

B9. I see that you say that you didn't use information sources of any kind in the case of X. B9a. What took the place of information in this case?

_____

_____

B9b. How did you decide how to deal with the task?

_____

_____

B10. In relation to Task X, how did you use the information you acquired? Please respond by using this Response Card 4.

Were there other ways you used the information that are not identified on the card? – then you can write on the card (perhaps on the back of it) whatever the reply is.

_____

_____

_____

Section C

C1a. Do you feel there are constraints or problems when gathering information during an incident?

_____

_____

C1b. And why they occur?

_____

_____

C2a. Do you feel there are constraints or problems in sharing information during   an   incident?

_____

C2b. And why it happened?

_____

C3. What do you think to avoid this situation?

_____

_____

Section D

D1. Personal information

What is your department?

_____

What role do you perform at an incident?

_____

How many year have you been in this organization?

_____

Thank you for your help

Response Card 1 – Tasks (related to A1)

In the initial phase of an incident the following tasks need to be undertaken: Please assign a score from 0 to 5 as shown.

	Tasks	Information to absorb 0: none at all 1: almost none 2: a small amount 3: a manageable amount 4: difficult to cope with 5: too much	Decisions to take 0: none 1: very few 2: a few 3: quite a lot 4: a great deal 5: too many	People to involve 0: only myself 1: one or two others 2: only my team 3: my team and 1 or 2 others 4: everyone in the incident 5: all on site and some off the site	Difficulty to communicate information 0: too easy 1:easy 2: moderate 3: not very difficult 4:easy 5: too difficult
1.	Risk assessment, ensuring the safety of the crew members and the other people around the incident milieu				
2.	Collaborative work with governmental and non-governmental disaster management institutions				
3.	Assessing the situation of the victims (trapped people), searching				
4.	Ensuring the healthy communication with the remote commanders				
5.	Rescue the victims				

	Tasks	Information to absorb 0: none at all 1: almost none 2: a small amount 3: a manageable amount 4: difficult to cope with 5: too much	Decisions to take 0: none 1: very few 2: a few 3: quite a lot 4: a great deal 5: too many	People to involve 0: only myself 1: one or two others 2: only my team 3: my team and 1 or 2 others 4: everyone in the incident 5: all on site and some off the site	Difficulty to communicate information 0: too easy 1:easy 2: moderate 3: not very difficult 4:easy 5: too difficult
6.	Fire suppression				
7.	Salvage operations				
8.	Ventilation				
9.	Opening the drainage channels, or removing the debris				
10.	Identifying the needs of the patient				
11.	Administering basic and advanced life support techniques: CPR and defibrillation (electric shocks)				
12.	Performing surgical procedures if required				
13.	Keeping the patient's airways open				

	Tasks	Information to absorb 0: none at all 1: almost none 2: a small amount 3: a manageable amount 4: difficult to cope with 5: too much	Decisions to take 0: none 1: very few 2: a few 3: quite a lot 4: a great deal 5: too many	People to involve 0: only myself 1: one or two others 2: only my team 3: my team and 1 or 2 others 4: everyone in the incident 5: all on site and some off the site	Difficulty to communicate information 0: too easy 1:easy 2: moderate 3: not very difficult 4:easy 5: too difficult
14.	Medicating the patient and administering injections if required				
15.	Administering intravenous fluid and drug therapy				
16.	Dressing wounds				
17.	Completing accurate patient records				
18.	Administering oxygen				
19.	Transporting the patients to the hospitals				
20.	Ensuring communication and interoperability with the other government or non-government organizations during the incident				

	Tasks	Information to absorb 0: none at all 1: almost none 2: a small amount 3: a manageable amount 4: difficult to cope with 5: too much	Decisions to take 0: none 1: very few 2: a few 3: quite a lot 4: a great deal 5: too many	People to involve 0: only myself 1: one or two others 2: only my team 3: my team and 1 or 2 others 4: everyone in the incident 5: all on site and some off the site	Difficulty to communicate information 0: too easy 1:easy 2: moderate 3: not very difficult 4:easy 5: too difficult
21.	Relevant data and information support to emergency response teams operating at the incident milieu				
22.	AKOM Operation centre meetings				
23.	Gathering information from the incident milieu (call centre, public and news channels)				
24.	Gathering information from the incident milieu (remote cameras, security cameras of the sites, live recording devices of the emergency teams, sensors (early warning systems, etc.)				

Response Card 2 (related to A3) Please rank them 1 as insignificant and 5 as significant.

Tasks	Significance to the resolution of the incident	Occur most often

Response Card 3- Information Sources (related to B7, B8, B9)(Use separate for each task)

Name of the task:_____

Information sources	Before carrying out the tasks	While carrying out the task	Prior for me to act	No Information sources used
Face-to-face communication with other team members				
Face-to-face communications with the victims (verbal or non verbal communication)				
Telecommunications with the victims				
Situation of the victims or patients (health condition)				
Face-to-face communication with the public				
Paper work (static data), action plans and rules				
Information from the local bodies (cite managers, local governors, etc.)				
Electronic databases, maps showing the specifications and characteristics of the milieu, weather or the buildings				

Information sources	Before carrying out the tasks	While carrying out the task	Prior for me to act	No Information sources used
Data gathered from remote cameras and dynamic live recording devices (video and stream data)				
Data gathered from early warning systems, sensors				
Information gathered from call centres				
Information gathered from news channels				
Information from frontline responders				
Commands from remote commanders through radio or any other electronic devices				
Personal knowledge, experience				
Personal knowledge, theoretical information				

Response Card 4 – Use of the information (related to B10) (Use seperate for each task)

Name of the task:_____

To judge the risks and assess the situation	
To make decisions for the next action	
To command the other team members/crews	
To share with other team members operating at the incident milieu (seniors or peers)	
To share it with the remote commanders	
To share with the patients or trapped victims	
To share with the other teams operating at the incident milieu	
To share it with the public to give them awareness about the situation	
To integrate the information comes from different sources	
To make decisions about or changing the strategy/tactic of emergency response	
To produce the incident report	

8.12 CIHAN Media Response Sheet Sample

University of Leeds Business School

Interview Schedule

Name of the project: The influence of task and time on information behaviour in organizations in different contexts.

Name of the researcher: Alperen Mehmet Aydin

Date and Location:_____

Start and End Time:_____

Participant:_____

Organization:_____

Introduction:

I am undertaking research on the influence of task complexity and time pressure on information (seeking and sharing) behaviour of members in decision making in the news room during news making period.

I am particularly interested in decision making and information use behaviour of the editors before broadcasting the news.

Section A

In the first section of the interview, I would like to explore with you the degree to which you feel that the tasks carried out in the news making period in newsroom are objectively complex or time pressured. I have prepared a list of tasks on this sheet (hand Response Card One)

I would like you to view the complexity of these tasks are determined by four different criteria: how much information needs to be absorbed, how many decisions need to be taken, how many people you need to involve, and how difficult to communicate information.

A1. Please could review each of these tasks and rank them on a 1-5 scale how complex are these tasks according to different criteria by filling the relevant box on the Response Card 1? Scale is on the response card.

(Respondent returns response card)

A2. I see that you have identified "Task X" as one involving high complexity in a couple of measures. To what extent are you under time pressure during this task? (Interviewer notes the responses on the Response card 1)

A3. Focusing on these tasks could you rank them in terms of their significance to the decision you make to broadcast the news or not? (Please Rank 1 as insignificant and 5 as significant)

(Fill in the Response Card 2 please)

Section B

In the following section, I would like to understand more about how these tasks are undertaken in the field and I would like you to share your experience about carrying out these in news making period.

B1. What was the news story/program about?
_____

B2. When did you prepare it?
_____

B3. Could you describe the process?

_____

B4. Thinking about this process, I would like to talk about "Task X" and "Task Y". What information did you need?

B5. How did you gather required information?

_____

B6. And how long did it take approximately?

B7. Which information sources did you use before you carried out this task and while you are carrying out this task?

(Please, could you fill in the Hand Response Card 3)

B8. And which information source was prior for you to act?

(Please, could you fill in the Hand Response Card 3)

B9. I see that you say that you did not use information sources of any kind in the case of X.

B9a. What took the place of information in this case?

B9b. How did you decide how to deal with the task?

_____

B10. In relation to task X, how did you use information you acquired? Please respond by using the Respond Card 4.

Were there other ways you used the information that are not identified on the card? -then you can write on the card (perhaps on the back of it) whatever the reply is.

_____

Section C

C1a. Do you feel there are constraints or problems gathering information during news making period?

_____

C1b. And could you explain why? And how affect you?

_____

C2a. Do you feel there are constraints or problems sharing information during news making period?

_____

C2b. And could you explain why? And how affect you?

_____

C3. What do you think to avoid this situation?

_____

Section D

D1. Personal information

What is your department?

What role do you perform in newsmaking process?

How many year have you been in this organization?

Thank you for your help!

Hand Response Card 1 – Tasks (related to A1)

In the news making period at news room the following tasks need to be undertaken

	Tasks	Information to absorb 0: none at all 1: almost none 2: a small amount 3: a manageable amount 4: difficult to cope with 5: too much	Decisions to take 0: none 1: very few 2: a few 3: quite a lot 4: a great deal 5: too many	People to involve 0: only myself 1: one or two others 2: only my team 3: my team and 1 or 2 others 4: everyone in the incident 5: all on site and some off the site	Difficulty to communicate information 0: too easy 1: easy 2: moderate 3: not very difficult 4: difficult 5: too difficult
1.	Collecting information about regional events (crime, local people) and writing stories				
2.	Collecting information about national events and writing stories				
3.	Collecting information about international events and writing stories.				
4.	Checking the accuracy of the information collected from different news agencies				
5.	Checking the accuracy of the information collected from different local bodies.				
6.	Editing the text of the stories				

	Tasks	Information to absorb 0: none at all 1: almost none 2: a small amount 3: a manageable amount 4: difficult to cope with 5: too much	Decisions to take 0: none 1: very few 2: a few 3: quite a lot 4: a great deal 5: too many	People to involve 0: only myself 1: one or two others 2: only my team 3: my team and 1 or 2 others 4: everyone in the incident 5: all on site and some off the site	Difficulty to communicate information 0: too easy 1: easy 2: moderate 3: not very difficult 4: difficult 5: too difficult
7.	Writing the headlines for the stories				
8.	Creating the graphics for the pages				
9.	Allocating the photos in the pages to the relevant news				
10.	Final design of the pages regarding the text, graphics and photos				
11.	Preparing the news stories for online broadcast				
12.	Preparing the news stories for TV broadcasting				
13.	Preparing the news for newspaper print				
14.	Working with the other editors to develop the materials prepared by my own department				

	Tasks	Information to absorb 0: none at all 1: almost none 2: a small amount 3: a manageable amount 4: difficult to cope with 5: too much	Decisions to take 0: none 1: very few 2: a few 3: quite a lot 4: a great deal 5: too many	People to involve 0: only myself 1: one or two others 2: only my team 3: my team and 1 or 2 others 4: everyone in the incident 5: all on site and some off the site	Difficulty to communicate information 0: too easy 1: easy 2: moderate 3: not very difficult 4: difficult 5: too difficult
15.	Editorial meetings				
16.	Final decision on the news to be broadcasted				

Response Card 2 (related to A3) Please rank them 1 as insignificant and 5 as significant.

Tasks	Significance to making the news accurate	Occur most often

Hand Response Card 3- Information Sources (related to B7, B8, B9)

Information sources	Before carrying out the tasks	While carrying out the task	Prior for me to act	No information sources used
Face-to-face communication with other team members				
Face-to-face communications with the other departments				
Telecommunication with the reporters at the event area				
Telecommunications with the other departments				
Telecommunication with my team members				
Telecommunication with other news agencies				
Telecommunication with other local bodies				
Archive of our own				
Paper work (static data), historical data (archive)				
Search from electronic database (archive) about the events that will be presented as the news				
Web pages about the event				
Personal knowledge, experience				
Personal knowledge, theoretical information				

Hand Response Card 4 – Use of the information (related to B10)

To use it to detail my news story	
To make decisions to broadcast the news or not	
To send it to my senior editor	
To share it with my other team members	
To share it with other news agencies	
To check the accuracy of the news prepared to be broadcasted	
To use it in the design of the news (photos, graphics)	
To integrate the information comes from different sources (other agencies, local bodies, Journalists, archive)	

8.13 Informant Sheet Sample for CIHAN

27/03/2011

Konu: "Organizasyonlarda gorev ve zamanin bilgi davranislari uzerine etkisi"

(The influence of task and time on information behaviour in organizations) konulu

alan calismasi hakkinda

Cihan Medya Ajansi

Istanbul

Isbu doktora arastirmasi organizasyonlardaki bilgi ile ilintili islerin yapilis tarzini ele almaktadir. Organizasyon icerisinde gerceklestirilen islerin complex olusunun ve zaman baskisinin bilgi yogun isler ile istigal eden organizasyon uyelerinin bilgi davranislarini ne yonde etkiledigi uzerinde bir arastirma yapilacaktir. Arastirmada organizasyonun gecmis performansi hakkinda da bilgiler yer alacak ve organizasyonun bilgi sistemlerini (electronic-digital ve kullanici odakli olarak) nasil gelistirdigi ve ileriye donuk olarak da nasil iyilestirmeler yapabilecegi seklinde bir analiz yapilacaktir.

Bu arastirma icin Cihan Medya'nin dusunulmus olmasinin sebebi son zamanlardaki genel ve yerel secimlerdeki basarisidir. Sozu edilen secimlerde en hizli ve dogru secim sonuclarini aciklamis ve bu durum da ona bir sonraki secimlerde daha fazla kanalin sonuclari Cihan Medya'dan almasini saglamistir.

Sonuc olarak Cihan Medya'da oncelikle organizasyonu tanimak ve bilgi akisini anlamak adina bir kac gunluk gozlem, yaklasik 20 kisi ile roportaj (sayi degisebilir), yaklasik 20 kisi ile anket metodu kullanarak alan calismasi yapmak istiyorum.

Iyi calismalar.

Alperen Mehmet Aydin

PhD in Information Behaviour

Management Division- Leeds University Business School

Leeds-United Kingdom

bnama@leeds.ac.uk

8.14 Informant Sheet Sample for AKOM

27/03/2011

Konu: "Organizasyonlarda gorev ve zamanin bilgi davranislari uzerine etkisi"

(The influence of task and time on information behaviour in organizations) konulu

alan calismasi hakkinda

Istanbul Buyuksehir Belediyesi Afet Koordinasyon Merkezi

Istanbul

Isbu doktora arastirmasi organizasyonlardaki bilgi ile ilintili islerin yapilis tarzini ele almaktadir. Organizasyon icerisinde gerceklestirilen islerin kompleks olusunun ve zaman baskisinin bilgi yogun isler ile istigal eden organizasyon uyelerinin bilgi davranislarini ne yonde etkiledigi uzerinde bir arastirma yapilacaktir. Arastirmada organizasyonun gecmis performansi hakkinda da bilgiler yer alacak ve organizasyonun bilgi sistemlerini (elektronik-digital ve kullanici odakli olarak) nasil gelistirdigi ve ileriye donuk olarak da nasil iyilestirmeler yapabilecegi seklinde bir analiz yapilacaktir.

Bu arastirma icin AKOM'un dusunulmus olmasinin sebebleri: faaliyetlerinin bilgi yogun olmasi (bilginin birimler arasi ve takim icinde paylasilmasi, entegrasyonu, ve analizi); son zamanlardaki olasi afetler icin erken onlem almasi; ve afet durumunda kaynaklarinin etkin bir sekilde koordine etmesidir.

Zaman baskisinin yukarida bahsedilen afet durumlarinda ve afete mudahalede organizasyon bilgi sistemlerinin ve bu bilgi sistemlerini kullanan organizasyon uyelerinin uzerinde ne gibi etkileri oldugu hakkinda bir doktora calismasinin AKOM'da yapilmasi dusunulmektedir. Arastirmanin sonucunda

da mevcut bilgi sistemlerinin etkinligi, ve varsa ileri donuk ne gibi gelistirmeler yapilabilir hakkinda rapor sunulacaktir.

Sonuc olarak AKOM'da oncelikle organizasyonu tanimak, bilgi sistemleri hakkinda bilgi almak ve bilgi isleyisini anlamak adina bir kac gunluk gozlem, yaklasik 15-20 kisi ile roportaj (sayi degisebilir), yaklasik 20 kisi ile anket metodu kullanarak alan calismasi yapmak istiyorum.

Ilk etap olarak da 26-27-28 Nisan 2011 tarihleri arasinda merkezenizde organizasyon isleyisini daha kapsamli olarak kavrayabilmek icin kurum ici gozlem yapmak istiyorum.

Iyi calismalar.

Alperen Mehmet Aydin

PhD in Information Behaviour

Management Division-Leeds University Business School

Leeds-United Kingdom

bnama@leeds.ac.uk

8.15 Informant Sheet Sample for Potential Participants

27/03/2011

Topic: The influence of task and time on information behaviour in organizations

Disaster Coordination Centre, Istanbul

Istanbul

Dear participant,

You are being invited to take part in a research project. Before participating in the research, this informant sheet will explain you the purpose of the research and why you are chosen. Please take time to read the following information carefully and discuss it with others if you wish. Ask me if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for reading this.

The research is about the information behaviour of the organizational members in different contexts while dealing with the work tasks. Objectives of the research are to provide an understanding about the information seeking, using, sharing; how organizations' information behaviour is shaped regarding to time pressure and task complexity; how organizations' information system design alters with respect to stable vs. unstable environments.

Disaster Coordination Centre's tasks are bounded to time pressure and uncertainty. Disaster Coordination Centre's objectives are preparedness, mitigation, response to emergency cases and recovery. In the response to emergency case phase, the team members share information in collaborative settings, and seek new information if uncertainty exists. Disaster

Coordination Centre operates in unstable environment and most of the cases they come across are unique cases, so the existence of 'anomalous states of knowledge' triggers the uncertainty. To hedge this uncertainty they seek new information.

In this regard, the interview will be conducted with you to comprehend the information behaviour of the organizational members because you are dealing with the information tasks in your institution. During the interviews audio recorder will be used.

It is up to you to decide whether or not to take part. If you decide to take part you will be given this information sheet to keep and be asked to sign a consent form. You can still withdraw at any time without giving any reason.

This research is conducted by Leeds University Business School and the data collected from you via interview and questionnaire will be kept confidential. The data will be kept in the University's databases during the analysis till the end of my PhD program. You will not be able to be identified in any reports or publications.

At the end of the research, a report will be presented in your institutions about the analysis of the data, and some recommendation for your institutions about system design.

Thank you!

Alperen Mehmet Aydin

PhD Candidate, Information Behaviour

Leeds University Business School-Management Division

Leeds-United Kingdom

bnama@leeds.ac.uk

27/03/2011

Konu: Organizasyonlarda gorev ve zamanin bilgi davranislari uzerine etkisi

Afet Koordinasyon Merkezi, Istanbul

Istanbul

Degerli katilimci,

Bu form size yapmis oldugumuz arastirma programinin, amacini, neden sizing secildiginizi belirtmek amaciyla olusturulmus bir bilgilendirmedir. Arstirmaya katiliminiza karar vermeden once lutfen bu formu okuyunuz, eger daha fazla bilgi almak istiyorsaniz ve sorulariniz var ise lutfen cekinmeden sorunuz.

Isbu doktora arastirmasi organizasyonlardaki bilgi ile ilintili islerin yapilis tarzini ele almaktadir. Organizasyon icerisinde gerceklestirilen islerin kompleks olusunun ve zaman baskisinin bilgi yogun isler ile istigal eden organizasyon uyelerinin bilgi davranislarini ne yonde etkiledigi uzerinde bir arastirma yapilacaktir. Arastirmada organizasyonun gecmis performansi hakkinda da bilgiler yer alacak ve organizasyonun bilgi sistemlerini (elektronik-digital ve kullanici odakli olarak) nasil gelistirdigi ve ileriye donuk olarak da nasil iyilestirmeler yapabilecegi seklinde bir analiz yapilacaktir.

Bu arastirma icin Afet Koordinasyon Merkezi'nin dusunulmus olmasinin sebebleri: faaliyetlerinin bilgi yogun olmasi (bilginin birimler arasi ve takim icinde paylasilmasi, entegrasyonu, ve analizi); son zamanlardaki olasi afetler

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icin erken onlem almasi; ve afet durumunda kaynaklarinin etkin bir sekilde koordine etmesidir.

Zaman baskisinin yukarida bahsedilen afet durumlarinda ve afete mudahalede organizasyon bilgi sistemlerinin ve bu bilgi sistemlerini kullanan organizasyon uyelerinin uzerinde ne gibi etkileri oldugu hakkinda bir doktora calismasi icin sizinle roportaj yapilacaktir. Roportajlar ses kayit cihazi ile kayit altina alinacaktir. Sizin de bilgi yogun bir isle istigal etmeniz yuzunden bu calismada yer almak icin size teklif sunulmustur.

Bu arastirma Leeds Universitesi Business School tarafindan yapilmaktadir ve toplanan veriler doktora calismasinin sonuna kadar universitenin databaseinde depolanacaktir. Herhangi bir suretle ucuncu partiler ile paylasilmayacak, veya herhangi bir yayinda adiniz belirtilmeyecektir.

Calismanin analizleri sonucunda kurumunuza bilgi sistemleri dizayni ve kurumunuzn su anki bilgi davranislari hakkinda onerileri icinde barindiran bir rapor sunulacaktir.

Arastirmada yer almayi kabul ediyorsaniz bu formu kendinizde tutup, Kabul formunu imzalayiniz. Arastirmanin herhangi bir yerinde neden belirtmeden birakabilirsiniz.

Iyi calismalar!

Alperen Mehmet Aydin

PhD Adayi, Bilgi Davranislari

Leeds University Business School

Leeds-United Kingdom

bnama@leeds.ac.uk

Topic: The influence of task and time on information behaviour in organizations

Cihan News Agency

Istanbul

Dear Participant,

You are being invited to take part in a research project. Before participating in the research, this informant sheet will explain you the purpose of the research and why you are chosen. Please take time to read the following information carefully and discuss it with others if you wish. Ask me if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for reading this.

The research is about the information behaviour of the organizational members in different contexts while dealing with the work tasks. Objectives of the research are to provide an understanding about the information seeking, using, sharing; how organizations' information behaviour is shaped regarding to time pressure and task complexity; how organizations' information system design alters with respect to stable vs. unstable environments.

News desk in Cihan Media Corporation is information intensive unit that is dealing with time pressure while broadcasting the news. They aim to release the news as soon as possible and to check its validity. They design information network systems to seek, transfer and validate information.

In this regard, the interview will be conducted with you to comprehend the information behaviour of the organizational members because you are dealing with the information tasks in your institution. During the interviews, audio recorder will be used.

This research is conducted by Leeds University Business School and the data collected from you via interview and questionnaire will be kept confidential.

The data will be kept in the University's databases during the analysis till the end of my PhD program. You will not be able to be identified in any reports or publications.

At the end of the research, a report will be presented in your institutions about the analysis of the data, and some recommendation for your institutions about system design.

It is up to you to decide whether or not to take part. If you decide to take part you will be given this information sheet to keep and be asked to sign a consent form. You can still withdraw at any time without giving any reason.

Thank you!

Alperen Mehmet Aydin

PhD Candidate, Information Behaviour

Leeds University Business School-Management Division

Leeds-United Kingdom

bnama@leeds.ac.uk

27/03/2011

Konu: Organizasyonlarda gorev ve zamanin bilgi davranislari uzerine etkisi

Cihan Medya Ajansi

Istanbul

Degerli katilimci,

Bu form size yapmis oldugumuz arastirma programinin, amacini, neden sizing secildiginizi belirtmek amaciyla olusturulmus bir bilgilendirmedir. Arstirmaya katiliminiza karar vermeden once lutfen bu formu okuyunuz, eger daha fazla bilgi almak istiyorsaniz ve sorulariniz var ise lutfen cekinmeden sorunuz.

Isbu doktora arastirmasi organizasyonlardaki bilgi ile ilintili islerin yapilis tarzini ele almaktadir. Organizasyon icerisinde gerceklestirilen islerin complex olusunun ve zaman baskisinin bilgi yogun isler ile istigal eden organizasyon uyelerinin bilgi davranislarini ne yonde etkiledigi uzerinde bir arastirma yapilacaktir. Arastirmada organizasyonun gecmis performansi hakkinda da bilgiler yer alacak ve organizasyonun bilgi sistemlerini (electronic-digital ve kullanici odakli olarak) nasil gelistirdigi ve ileriye donuk olarak da nasil iyilestirmeler yapabilecegi seklinde bir analiz yapilacaktir.

Bu yonde kurum personelinin bilgi davranislarini kavrayabilmek ve system dizayninin nasil nasil yapilabildigini anlamak adina sizinle roportaj yapilacaktir. Roportajlar ses kayit cihazi ile kayit altina alinacaktir. Sizin de bilgi yogun bir isle istigal etmeniz yuzunden bu calismada yer almak icin size teklif sunulmustur.

Bu arastirma Leeds Universitesi Business School tarafindan yapilmaktadir ve toplanan veriler doktora calismasinin sonuna kadar universitenin databaseinde depolanacaktir. Herhangi bir suretle ucuncu partiler ile paylasilmayacak, veya herhangi bir yayinda adiniz belirtilmeyecektir.

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Calismanin analizleri sonucunda kurumunuza bilgi sistemleri dizayni ve kurumunuzn su anki bilgi davranislari hakkinda onerileri icinde barindiran bir rapor sunulacaktir.

Arastirmada yer almayi kabul ediyorsaniz bu formu kendinizde tutup, Kabul formunu imzalayiniz. Arastirmanin herhangi bir yerinde neden belirtmeden birakabilirsiniz.

Iyi calismalar!

Alperen Mehmet Aydin

PhD Adayi, Bilgi Davranislari

Leeds University Business School

Leeds-United Kingdom

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