

MANAGING INFORMATION OVERLOAD: ORGANIZATIONAL PERSPECTIVE

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Abstract: The 20th century brought some dramatic changes in terms of volume of information and communication and their diversity. The problem of having too little information has been transformed into a problem of having too much information and increasing information flows. This situation created what is known as “information overload”. The paper investigates this phenomenon both at a conceptual and empirical level. We review the relevant academic literature looking at information overload at the individual and organizational levels. There is a general lack of studies treating information overload from the organizational perspective. Hence, this paper aims to fill this gap by focusing on a case study in which we define information overload in the organizational context, and then elaborate on organization-enabled coping structures.

Key words: information overload, competences, information processing, organizational behavior

Introduction

Information overload has traditionally been understood as the side effect of “sensation overload”, humans’ deficiency in front of new information and, as a result, diminishing abilities to reflect on the changes in environment. Being treated initially as a specific “city disease”, it has expanded eventually into all spheres of human life and posed demands for significant behavioral adjustments (Klapp, 1986). With few exceptions, information overload is formally defined as a state in which the volume and the speed of incoming stimuli an individual needs to cope with is beyond his or her processing capacity (Hiltz, Turoff, 1989).

Research on information overload emerged from the theories of human information processing. Human cognitive resources are strictly limited, so is the human information processing capacity (e.g. Berlyne, 1960). Although varying among individuals, the average limit of information processing capacity is surprisingly low (Miller, 1956 and his magic number 7, plus or minus 2). Even more, it is equally low for numeric, textual, and visual information and, since recently, for communication load. The concept of the “communication limit”, as a maximum number of connections an individual can meaningfully maintain, was introduced expanding the list of human limits (Jones, Ravid, and Rafaeli, 2004; Odlyzko, Tilly, 2005).

Another way to look at information overload is to go beyond the individual towards the organization. In last 10 years companies saw a dramatic escalation of the amount of information they need to collect, process and keep and there is no reason to believe that it will go down in the coming future. According to recent survey done by McKinsey, executives see profitability as a function of knowledge and information trends (McKinsey Quarterly, April, 2006). Having more information in-house should mean better decisions, sound strategies and feeling of comfort and confidence in own abilities to cope with the surrounding uncertainty.

However, one big danger with the information abundance is that in organizations, perceived as an assemblage of interacting human beings (March and Simon, 1958), information can actually be diffused over the wide array of personal repositories with no way to link it into a single, meaningful piece. Indeed, the typical Fortune 1000 companies acknowledge a problem of collecting a lot of relevant, high-quality business data but never using them (Forrester, 2005). Chances are these data are not used since no one has a full grasp of it floating between the islands of information existing in applications and personal cyberspaces.

At the same time, it is widely recognized that “...business are mostly shooting in the dark” (The Economist, 2002), when shooting in the dark does not mean lacking the information, rather it means lacking abilities to process the available information and extract relevant, high-quality fractions. Indeed, many companies are still battling with the information accessibility striving to build the rings of fences and imposing controls over internal information production rather than building a systematic approach aimed at better utilizing of information.

There are several reasons to believe that information overload exists at the level of organizations. First, individual overload when accumulated transfers to group and organizational levels (e.g., Schneider, 1985, Feldman and March, 1981). Second, organizational decision-making could be negatively impacted if individual members are

unable to process information and the spiral of faulty decisions is enacted (e.g., Schneider, 1985). Under such lens, the external factors which affect information processing are highlighted without diminishing the traditional focus on the individual as a source of bounded information processing capacity.

What follows next, is an attempt to signify the phenomenon of organizational information overload and tailor the strategy to cope with it.

1 - Literature Review

1.1 - Information overload at the individual level

By and large, the literature on information overload has focused on explaining the source of such challenges suggesting that either personality or situational factors contribute mostly to human incapacity to process information. In particular, information overload has been studied in connection with decision-making processes and styles. In this regard, two distinct approaches to decision making, namely personologism and situationism have assisted in shedding light on the key aspects relating to information overload at the individual level. Personologism assumes that the individual characteristics of the decision-maker are the main source of behavioral variation. From this perspective, information overload is a product of the interactions between various decision makers' individual characteristics such as cognitive setup, decision-making style, attitude to uncertainty and experience. Information overload is explained by the limited human capacity to process information. Information processing capacity is either augmented or lessened when the positive or negative effect of certain personality factors is present (e.g., Dermer, 1973; Driver and Mock; 1975, McGhee et al., 1978, Kahneman and Tversky, 1974, 1982, 2000; Wickens, 1992; Just & Carpetner, 1992). For example, the decision style is defined by the dominant patterns of information search (how much data is acquired) and information use (how many decision alternatives are considered). Depending on the decision-style, an individual is less or more vulnerable to the information overload.

On the other hand, situationism implies that situational factors cause and define behavioural variations and information overload is a situation-contingent phenomenon. The situation, or the combination of circumstances at a given moment, is associated either with the task or broad organizational setting. In this stream of research, most studies have focused on investigating the link between the task and information overload (e.g., Peters et al., 1984; Hahn et al., 1992; Joslyn and Hunt, 1998; Stocks and Tuttle, 1998; Tuttle and Burton, 1999; Speier et al., 1999; Seshradi and Shapira, 2001). Task has been defined as the process of transforming a certain input into a predefined output. In the context of decision making, input is information to be processed; the act of transformation is the underlying information processing activities; and the output is a decision of a certain quality. First, the *input*, the actual amount and quality of information, may affect individual's ability to process information. Perceived as the number of independent information cues and their degree of disclosure, an addition of information cues or, alternatively, an increase in the dimensionality of each cue, may lead to information overload. Similarly, an increased diversity and repetitiveness of information cues, which are the factors of the quality of information, may affect the ability to process information and the value of the decision outcome (e.g. Iselin, 1988; Hwang and Lin, 1999). Second, the *act* is defined in terms of information processing activities that should be performed, their sequence, the complexity of the underlying mental processes, and the time frame. Thus, time constraint, the number of tasks that must be

performed, and the intensity and the frequency of interruptions, all define task complexity. As task complexity goes up, so does the degree of information overload.

Table 1 - summarizes the main characteristics of information overload from an individual perspective demonstrating past research's emphasis on aspect relating to human traits and task related issues.

Approach	Description	Exemplar Articles	Key factors studied
Personologism	Information overload is a result of interplay between various people's inherent qualities.	Mock et al (1972), Dermer (1973), Chervany and Dickson (1974), Driver and Mock (1975), McGhee et al. (1978)	Decision-making style, Attitude to uncertainty, Experience
Situationism : Task-specific factors	Information overload is a task-contingent phenomenon, which happens, and must be explained, only within a task context.	Snowball (1980), Shields (1980), Casey (1980), Peters et al. (1984), Iselin (1988), Chewning and Harrell (1990), Schick et al (1990), Hahn et al (1992), Tuttle and Burton (1999), Speier et al (1999), Hwang and Lin (1999)	Information load: number of independent information cues, degree of disclosure Information quality: information format, degree of repetitiveness; Time pressure, Task environment: interrupted, non-interrupted

Table 1 - Main Characteristics of Information Overload from an Individual Perspective

Source: authors

On one plane, at the heart of traditional research on information overload lies the assumption that information overload is purely an individual-level phenomenon linked to the limited information processing capacity, often confined to a particular task frame. In a relatively stable business environment, such assumptions might still work. On the broader plane, however, information overload should be treated as a truly organizational phenomenon. This will require different conceptual and methodological apparatus but, at the same time, will offer a more complete and thorough understanding of why organizations are still failing to find the right way to manage information resources. As mentioned above, research on information overload rarely went beyond the particular task case and studied it within the broad organizational context. Though large number of explanations can be drawn upon to explain why this gap exists (e.g., generally acknowledged complexity of the contextualist studies, large number of variable and relationships at play etc.), its presence hinders the overall understanding of the issue of information overload and impairs the practical relevance of the research results.

2. Information overload at the organizational level

The inability of traditional information overload paradigm to capture and model the real world and, as a result, the limited practical relevance is not new (Jacoby, 1984). Though a number of explanations have been proposed by researchers (e.g. flaws in research methods, measurement inconsistency, lack of common basis in defining key constructs etc.), the need to place the research on information overload into the organizational context is recognized.

Indeed, organizations can be approached as complex information processing systems with certain processing capacity and codified behavioural norms. Through their institutions and coordination and control mechanisms, organizations define, enable and at the same time constrain information processing. In many, if not all organizations, processing information became a core activity.

Information overload at the level of organization is defined as the imbalance between the organizational information processing requirements and the information processing capacity (e.g. Schneider, 1987). Despite being rather abstract, information overload reveals itself through various symptoms, e.g. loss of boundaries between roles, tasks, and functions (Schneider, 1987) and faulty decisions (Feldman and March, 1981).

The concept of organizational information processing was developed into the organizational information processing theory. The core assumption states that organizational information processing is not a simple aggregation of the processes that typically occur at the individual level, but a complex construct with a great variety of forces and contingencies involved (e.g. Tushman and Nadler, 1978; Daft and Lengel, 1985). Similar ideas were stretched further in the media richness theory (MRT), once popular among the social science researchers, now heavily criticized. In MRT, organizations are complex information processing systems that collect and process information to reduce uncertainty (i.e. difference between required and available information (Daft and Lengel, 1986, p.556)) and equivocality (i.e. uncertainty of meaning that is expressed by the existence of a large number of conflicting and multiple interpretations (Daft & Lengel, 1986, p.556)).

In this regard, uncertainty and equivocality can be either internally or externally driven. Uncertainty and equivocality can be created by an unclear or inadequate organizational structure. The function of organizational structure is to facilitate and optimize information collecting, processing, and dissemination and in so doing to protect the members from external information overload (Tushman and Nadler, 1978). The latter is performed through the boundary roles within an organizational structure which are individuals that maintain boundaries and filter information. These boundary roles are perceived as “a main line of defense against information overload” (Aldrich and Herker, 1977, p.218). There are four distinct boundary-spanning roles that defense against information overload at different entry points and contexts; the ambassador, who represents the team externally; the task-coordinator, who coordinates technical and design issues; the scout, who gathers information; and the guard, who protects against the release of information (Ancona, 1990; Ancona and Caldwell, 1992).

In addition, some organizational structures, due to the intrinsic properties, can be more efficient in accommodating large information load. The organizational information processing capacity can be treated as a function of the organic-mechanistic (Burns & Stalker, 1961) nature of the structure of subunits, and coordination and control mechanisms applied

(Daft and Langel, 1985). Organic, in other words, highly connected, suggest that structures have a greater capacity for information processing, however are less controllable. Indeed, at a later stage, the social network theory confirms a similar idea claiming that highly connected structures are efficient in terms of information processing since they eliminate the single break-down points. In this regard, the nature of and roles within an organizational structure may indeed affect the organizational information overload.

Similarly, information communication technologies, in most general meaning, may lead to information overload (e.g., Farhoomand and Drury, 2002). For example, electronic mail and the Internet are two sources of information that could result in floods of information, if not managed properly (e.g. Mackay, 1988, Hall, 1998, Wilson, 2002, Farhoomand and Drury, 2002). Clearly, ICTs increase access to information and could simplify information production and yet may result in producing information overload. At the same time, ICTs could offer avenues to mitigate information overload through a wide range of information processing and decision-making functionalities. For example, Mackay (1988) suggested that the patterns of email use determine the vulnerability of information overload. Shultze and Vandenbosch (1988) showed that in a groupware environment, information overload peaks during the initial phases and goes down as users develop their skills and deepen their knowledge of application.

While the majority of the studies have focused on the organizational structure and information technologies as factors that may assist in overcoming information overload at the organizational level, other factors may have an impact on the ability of organizations to process information.

With this in mind, we seek to explore a case of managing information overload to reveal the key concerns managers were considering with regard to information overload at the organizational level and the coping strategies developed thereafter.

Therefore, the following section describes the methodology applied in this study, outlining the key concerns managers at SoftCom were considering. The case study section will follow describing how such information management was managed around these key issues and the coping strategies that emerged at the organization level.

3. Research Method and Approach

An in-depth case study of Industry, Distribution & Transport Division of SoftCom, based in the Netherlands, was carried out in the period from 2004-2005. The case company is a global IT solutions provider, which supplies a wide range of information technology and business process solutions across various markets and industries. The company was created through the merger of two equally sized players, Soft (The Netherlands) and COM (UK), and was trying to manage the multiple impacts of it at the moment of the study. The success of merger was contingent on the success of consolidation of the resources and competences of two previously independent companies. As part of this, the wide scale information management initiatives were launched with information overload being part of an agenda.

Research approach was designed in line with the general recommendations of Yin (2003). The MIS-field specific advices of Lee (1989) and Lee and Baskerville (2003) were applied as well. In the process empirical data analysis the instruments approaches by Eisenhardt (1989) and Miles and Huberman (1994) were used.

Applying a case study method as a research strategy involves the use of an all-inclusive method and offers several approaches to data collection and analysis (Yin, 1994). In this study, evidence was gathered from a variety of sources such as documentation, archival records, and interviews (Eisenhardt, 1989; Yin, 1994). Semi-structured, in-depth interviews were the primary means of data collection. In total, 15 managers were interviewed. All levels of management were questioned and the discussion was structured around the issue of information overload, possible triggers, causes and countermeasures. Several follow-up telephone and email conversations were scheduled to verify the researcher's interpretation of the information obtained. The interviewees were selected based on their position in the formal hierarchy and involvement in the different product and competence areas. In total, detailed information about five sun-groups of the division was collected.

The interviews lasted for 1-1.5 hours and were recorded; detailed sight and interview notes were taken. The interview data was complimented with data from secondary sources, i.e. information from the external website, corporate presentations to analyst, reports in newspapers and magazines. These provided financial, strategy, competitive position data and merger-related analytics and were used for constructing organizational context.

In this section we analyze the challenges associated with organizational information overload and consider the countermeasures applied towards these challenges.

4. Research Findings and Discussion

4.1. Information overload as an organizational phenomenon

SoftCom was established in 2002 as a result of a merger between the UK Company Soft and the Dutch-UK Company COM. The merger was market and customer driven, and aimed at two major goals. First, significant cost cuttings and economies of scale were expected. In the market of wireless products, the consolidation of equally sized players, Soft and COM, allowed them to increase market share and compete with market leaders. Second, customers persistently indicated a preference towards collaborating with a few business partners who can provide full-scale IT support. After the merger, the competencies of the two companies were combined and the product offer was diversified, so the opportunities for cross selling emerged. At the moment of the study, the organizational structure was undergoing various changes, driven by both the merger and the market.

At the moment of the study, the organizational structure was undergoing various changes, driven by both the merger and the market. In general, it inherited elements of the structures of Soft and COM, though with a greater emphasis on the centralization of power and knowledge and the unification of all internal processes and flows.

The organizational structure of two companies differed significantly due to the differences in the underlying business processes. Although the unification and standardization of structures, roles, and processes across markets and product lines has been promoted by the company's management, a mismatch in the organizational structure and managerial roles has produced uncertainties in communication and information and knowledge sharing. The quotation below is illustrative:

Divisions have different organizational structures. I find it hard to believe that it is of any good to have such freedom. When you are talking to the managers from the Utility Division, they have different roles. For instance, they have field managers; in

our division, we do not have them. It produces numerous uncertainties in setting up the function house. {RR}

Before the merger, all business units in the Soft Company held significant decision-making power and were treated as separate, “small companies” that had profits and losses and were reasonably free in terms of operational moves. The reorganization and centralization also implied the redirection of information flows. A greater emphasis was placed on the efficiency of top-down information transmission and communication. At the same time, the changes in the organizational structure were not always accompanied by changes in the structure of information flows. As a result, an ambiguity of information flows and also information and knowledge losses happened often. One of the interviewees described the situation in the following way:

Before we used to have all information within the smaller companies, and there was always someone who knew how to handle it. Now you see that a lot of information and knowledge had moved and it is not clear where all these information went. {RC}

Previously, the decisions about the organizational structure and the internal process were also accomplished at the level of the business units. As a result, the units were often using different operation procedures and management structures. The merger intended to change this also. The quotation below illustrates the idea as follows:

[...] we had a lot of local rules, totally different from unit to unit. All these rules aimed to do the same, but in the special way. During the last two years [after the merger], more and more authority goes up, more and more decisions about marketing, customers are shifted to the higher level. Companies at the lower level are working as a part of the bigger organization {RC}

Despite the fact that Soft and COM were equal-sized companies, operating in similar markets, and providing similar types of services, the merger-driven changes in the organizational structure, business processes, and management are defined as significant. In the quotation below one of the competence directors suggests that besides the changes in the organizational structure a wide-scale reconsideration of the structure of information flows is necessary. He illustrates the current challenges with respect to these matters as follows:

The merger has changed our behavior. We are changing our way of working, we are changing our structure, we are changing the responsibilities – we need information to support these changes. We used to have business units who were responsible for everything. Now the business units need different and more information because profit and losses are at the Divisional level. The idea of a merger was to move more towards the specialized departments, which are not fulfilling every task. So we are not profit / loss units any more, rather we are units with specialized tasks. Therefore, we need new information systems. For us it is struggle to determine what kind of information needs we have, for the financial department is very hard to provide us with this information. {DS}

The horizontal structure was not defined formally but rather is grounded and driven by personal networks. From one perspective, the diversity of competences does not imply intensive cooperation among the business units within the Division. The cooperation between similar competence units across the divisions, when the solutions, knowledge, and experience are shared and reused, is also rare.

From another perspective, consultants often combine their competence roles with account management, sales, and delivery roles. The interviewees continuously emphasized that the extended social network is necessary for fulfilling daily responsibilities.

Besides providing undisputable advantages, combining of roles often leads to stretching managers in opposite directions, imposing conflicting demands on their time and attention. In the quotation below the interviewee compares having two responsibilities with having two heads, and depicts the downside of it:

Our organization model sometimes makes it quite difficult because my competence boss says that I should spend more time on competence and my account boss says that I should spend more time on Unilever. I am just stating at the beginning of the year that my intention is to spend 20% on Unilever and 80% on competence. Many people have two heads within this company.{RVR}

In all, the horizontal structure resembles a highly connected network. The number of connections, their direction, and strength vary. It is not codified or described in the organizational regulations or procedures.

Summarizing, the formal structure of the new organization became a four-level hierarchy with a strong emphasis on centralization of power, responsibility, and information flows. Initiatives to overcome the structural and management differences between the units have been undertaken. A uniform, standard structure within all organizational entities has been targeted at.

Since the objectives and major processes are different for the different units, formal links between business units are absent. At the same time, the informal interactions are frequent due to the fact that many managers have combined roles. Personal networks determine the actual patterns of interaction, such as their direction, frequency, and intensity.

Similar to all internal processes, the corporate culture has not stayed the same after the merger. Although both COM and Soft were IT services companies that operated in similar markets and provided similar services, there were major differences in terms of structure, the ways of working, and the internal culture. While the structural and process differences have been resolved to a large extent, the cultural differences between the former COM and former Soft are still significant

In general, the culture of SoftCom inherited the spirit of formalism from Soft. This formality revealed itself through the introduction of new hierarchy, built on the principles of layers and subordination, the shift from a human-centered to a result-centered approach, the centralization of power and responsibility, the imposition of a new, meticulous reporting structure, and the emphasis on compliance with standards and standard operating procedures.

<i>COM Culture</i>	<i>SoftCom Culture</i>
The main emphasis is on people	The main emphasis is on financial results Tough attitude to employees
Although formal, easy to communicate and “talk” to boss	Formal; the hierarchical barriers have been introduced
Open culture where all decisions can be discussed and negotiated	Closed culture where decisions are more prescriptive with no room for discussion
Reporting on “general” picture and leaving the control over details at the lower level	Detailed reporting, increased number of obligatory reports
Being aware of rules and standard operating procedures but at the same time being reasonably free to act otherwise if this complies with the company’s objectives	More emphasis on standard operating procedures and promoting discipline in using them
Decision power is located at the low levels	Decision power is centralized and is UK-based
Dutch-dominated working environment	English and Dutch have equal stakes in the company in terms of number of people employed. The major decisions come from the UK, and are often perceived by the Dutch employees as enforcement.

Table 2 - Cultural differences: Soft versus COM
Source: authors

As a result, as many respondent suggested, though the nature of the work has not changed, the way of working has been altered significantly. Moreover, since most initiatives come from the UK, the Dutch employees perceive this as a forceful imposition of new, “British” orders and neglecting the “Dutch” part of it. For instance, the increased number of reports is qualified as somewhat unnecessary by Dutch employees. Similarly, making the procedures obligatory and actively enforcing them contradicts the Dutch spirit of working. In the quotation below, DV explains the typical attitude to rules, and speculates on its Dutch nature:

I do not believe in rules, rules are broken; they are not followed in this company. We are just Dutch. We do not accept the rules, we do not accept the authority, and we think we are smart enough. We only accept the rules in the format of practical solutions that have direct benefits and demonstrate that things can be better. If you want to change something in this company, it needs to be practical. It won't work only because the boss says you have to do it like this. Everybody says yes, and no one is following it. We have a lot of rules and regulations and I think we are acting according to them but we are not following the rules. Lot of guidelines: we are trying to use the rules a bit more visibly. I think that 99.9 % of the population will not know exactly the rules but will act 90% according the rules. It is a much higher score than if you make it obligatory. {DV}

The attitude to information and knowledge sharing is particularly important for the information overload study. Although the ultimate success of the company depends on the efficient re-use of existing knowledge and expertise, the tradition of knowledge and information sharing within SoftCom is underdeveloped.

The efficiency of knowledge sharing is defined by the quality of the enabling technological platform, the procedures and regulations that define the terms of exchange, and a wide range of social factors, such as corporate culture, attitude, and the presence of a stimulus to engage in knowledge sharing. SoftCom, being a leading IT solutions company, possesses an extensive expertise in the area of enterprise content management (ECM) and has an impressive history of successful ECM implementations. At the same time, within SoftCom the area of knowledge management is one of the most critical and underinvested in. The Director of the ECM competence suggests the following metaphor to describe “the state of the art”:

As we say, the children of the shoe seller always have bad shoes, and the children of the doctor do not have the best treatment. We are IT people, we help our customers with IT, but our internal knowledge management is not very good. I can earn more money with my people helping customers than helping the internal organization. {AB}

Regarding the quality of technology, as SoftCom becomes more and more international with affiliates in a large number of countries and supporting clients all over the globe, the need to shift from the local to global IT platforms becomes genuine. Storing knowledge and information in compatible standards promotes and stimulates the sharing of information. At the moment of the study, SoftCom was changing the enterprise content management platform. There were several pilot projects; however, the final decision towards a particular IT solution had not yet been accomplished. Again, the comments of AB, the ECM competence director, are helpful:

We, within COM, had a system for that [information sharing], in Soft, they had nothing. There is now a lot of discussion going on about what are we going to use. The old COM units still have their old Lifelink system, but the integrated divisions have virtually nothing. There are some pilot projects, there are some units who start to use something, but it is not a general chosen system at the moment. Some people are trying this and that. I think Sharepoint as it is, is not a good solution for SoftCom. It will not fulfill our demands. {AB}

However, above all, not the technology but the lack of discipline or incentives to share information contributes to the loose culture of knowledge sharing within SoftCom. The Commercial Director, FK, who is responsible for an initiative which aims at increased quality system awareness and consists of measures that stimulate knowledge and information exchange comments on the current situation as follows:

The biggest challenge this company is facing is sharing information. I know that we have a lot of clever people at this company but there is no attitude to share information. It's only culture. Our business management system clearly defines project close, where in the project close all lessons learned have to be evaluated, written down uploaded. Standard templates are available etc. Somehow, it is not done, or if it is done, the information is not shared. This is not because people do not want to share this information but most of the time people think that their knowledge is not special enough to be shared. It is attitude. {FK}

The loose attitude to knowledge sharing originates and is reinforced by the insufficient emphasis and lack of incentives to codify information and experience gained and to place it into the system. Since making information available to others neither affects a manager's performance indicators nor directly contributes to the project, the stimuli to do it are very low. Moreover, the high workload of managers, assigned to a new project two weeks before the

previous project is closed, does not leave much space for the closure. In the quotation below, the interviewee describes the situations and reflects on the immediate outcomes:

We have the procedures, we have the tools, but we do not use them. Why we are not using them? I think the reason is that the guys who have done the project do not have incentives to write the information and store it so someone else can use it. They do not have the benefits of doing evaluation. They have knowledge, they have done the project, if they need to do it again, they know it. For them there is no incentive for storing it. Of course we have the procedures that say that when the project is finished it must be evaluated and stored. We have the tools. There is no one, REALLY no one, who stores information in the database when the project is finished. It is often that at the later stages we are looking for this information, and only because of your personal network you phone your friends, and following your own network you will, if you are lucky, find out, if you are not lucky you will need to reinvent the wheel. That happens quite often. If it is not in the tools, not in the procedures, that it must be culture.

To summarize, all the research participants emphasized the urgent need for improvement in the area of enterprise knowledge management. Both the shortcomings in the existing technological platform and the attitude and lack of motivation were cited among the reasons. As a result, no, or very few, information and knowledge resources have been codified and stored for wide access. This inhibits the reuse of information and existing expertise and causes significant redundancies and “re-inventing the wheel”. Naturally, solving the problem at the level of technology only could not change the situation. As FK suggests in the quotation below, changing the attitude of people and the culture of knowledge sharing must precede and dominate the process:

I was involved in a pilot project for a knowledge-based system that performed the matching of an engineer with a problem. The system was very rudimentary and was not performing well. However, when the information about the skills of engineers was in the system, the system could make a good decision. The problem being, get the right information into the system. It was the hell of a job to get the proper information into the system. So, the logic of the knowledge-based system was not a problem, getting the right information was an issue. As SoftCom is not that very good in putting information into a system, the implementation of KBS is beyond our interest. We are not there yet. Let's put the information into systems first, let people start using this information, and only if you are there and people start trusting this information, you are ready to go the next step {FK}.

4.2. Organization-enabled coping

The organization-enabled coping has been defined as affecting the information streams by using such mechanisms as organization re-design, information and knowledge management initiatives, introduction of certain cultural and behavioral norms, and training. In the table below, we outline the collection of coping structures that have been elicited in the course of data analysis.

Organization-enabled coping	Empirical evidence
Implementation of reorganization initiatives	<p><i>We have done last reorganization on 1st of March. We saw internally some blocks and we have removed them.</i></p> <p><i>Responsibilities were not clear to everybody. Not in the last place, to people who were supposed to perform these responsibilities. Now it is more clear where the responsibilities lie and where you can reach people who are responsible for certain areas or businesses. {AB}</i></p>
Design and implementation of standard operating procedures	<p><i>What is annoying me is that there is too much freedom within this company about procedures and processes. It is not standardized. Divisions have different organizational structures. And I find it hard to believe that is of any good to have such freedom. We have introduced a new performance management system, but when you give so much freedom it becomes difficult to get someone in that project management system and than to review and say are you doing well or not. {RR}</i></p> <p><i>We are now implementing he procedures on informing. We used to have a formal procedure in our Business Management system, it has not been neglected but it has not been implemented well. Lot of people are not reporting {RC}</i></p>
Design and implementation of gate-keeping roles	<p><i>I see a lot of managers who have nicely organized mailboxes because their secretaries are doing that. I have not done that. I've tried that 5 years ago, but it seemed to be very difficult for the secretary to grasp the essence of things. It is very difficult for her to catch up with the speed of issues, so I do it myself. She often reminds me of emails she thinks are important. Her perception of importance is different from my perception of importance; she is very much focused on her task. {DV}</i></p> <p><i>Secretary cannot handle it because she just cannot. {RB}</i></p>
Training aimed at enhancing the skills, domain-specific knowledge, and efficiency of personal-level procedures	<p><i>Time management course</i></p> <p><i>Professional training</i></p> <p><i>Skills training</i></p>

Table 3 - Organization-enabled coping

Source: authors

Restructuring and organizational re-design was largely merger-driven and aimed at reducing the differences and incompatibilities between organizational entities and converging to a uniform organizational structure and management. In the process of restructuring, the organizational power has been shifted upward, moving the responsibilities from the unit to the divisional level. Accordingly, centralization of information flows and knowledge depositories has been targeted.

Placing more emphasis on formality was accompanied by reinforced control. The controlling function, in turn, implied the design and utilization of standard operating procedures, similar across the units and the divisions.

To address the clients' needs at best but, at the same time, to reduce the costs of each project, the reuse of knowledge and expertise was proclaimed to be the central factor of business success. Finally, to comply with the demands imposed by globalization, serving clients across the globe and exploiting distributed working were targeted. Therefore, in all, the institutional context can be characterized as being focused on centralization and standardization of structures, processes and procedures, aiming at increased efficiency and enhanced reuse of existing knowledge and expertise.

The expertise and knowledge, presumably, should be shifted in the same direction as power. In practice, no central depository was created and the information flows became even more de-centralized and widespread. Since much emphasis has been placed at the formalization of organizational culture and the reinforcement of control over all operations, the central depository of the templates, standard forms and reports were created. Moreover, to overcome the difference that existed between the units and divisions in terms of structure, management, and major processes the standard operating procedures were introduced at the level of the entire organization. To support this initiative, the alignment of organizational structure and creation of standardized and unified information were defined as necessary.

In practice, the changes in information flows have been delayed or have not been subject to thorough implementation.

Conclusions

This paper deals with the phenomenon of information overload. We conducted a literature review and highlighted a general lack of studied treating information overload from the organizational perspective. The paper intended to contribute to filling this gap. The paper presented a case study, in a setting of a corporation created in a merger of two companies. We defined information overload in the organizational context and elaborated on organization-enabled coping structures.

While this research has contributed to our understanding of the phenomenon of information overload and has outlined the ways of coping with it, a number of topics are suggested for further investigations. First, a similar analytical strategy can be applied within different organizational settings so as to refine and sharpen it further. In particular, the investigation of the relative importance of the factors that contribute to information overload is needed.

We have demonstrated that the problem of information overload is likely to emerge as a result of the interaction among a wide range of organizational, task-related, and human-related factors. Under the pressure of a turbulent external environment, organizations and individuals strive for greater flexibility and responsiveness, and thus alter the traditional ways of working. We have argued that the research problem lies at the crossroads of several disciplines, e.g. management information systems, organizational behavior, human cognition and offers an unconstrained freedom for the researcher in terms of choosing the focus and perspective, making the research process exciting, demanding and challenging at the same time.

References

- ALDRICH, H.; HERLER, D. *Boundary spanning roles and organizational structure*. In: **Academy of Management Review**, 4. P. 217-230. 1977.
- ANCONA, D.G.; *Outward bound: Strategies for team survival in an organization*. In: **Academy of Management Journal**, 33(2). P. 334-365. 1990.
- _____; CALDWELL, D.F. *Bridging the boundary: external activity and performance in organizational teams*. In: **Administrative Science Quarterly**, 37. P. 634-665. 1992.
- BERLYNE, D.E. *Conflict, Arousal and Curiosity*. New York: McGraw Hill. New York. 1960.
- BKURNS, T.; STALKER, G.M. *The Management of Innovation*. London: Tavistock. 1961.
- CASEY, Jr.; C. J. *Variation in accounting information load: The effects on loan officers' predictions of bankruptcy*. In: *The Accounting Review*. 55(1). P. 36-49. 1980.
- CHERVANY, N.L.; DICKSON, G.W. *An experimental evaluation of information overload in a production environment*. In: **Management Science**, 20(10). P. 1335-1344. 1974.
- CHEWNING, E.G.; HARRELL, A.M. *The effect of information load on decision-makers' utilization levels and decisions quality in the financial distress decision tasks*. In: **Accounting, Organizations and Society**, 15(6). P. 527-542. 1990.
- DERMER, J.D. *Cognitive characteristics and the perceived importance of information*. In: **The Accounting Review**, 48(3). P. 511-519. 1973.
- DRIVER, M.J.; MOCK, T.J. *Human information processing, decision style theory, and accounting information systems*. In: **The Accounting Review**, 50(3). P. 490-508. 1975.
- EISENHARDT, K. M. *Building theories from case study research*. In: **Academy of Management Review**, 14(4). P. 532-550. 1989.
- FELDMAN, M.S.; MARCH, J.G. *Information in organizations as signal and symbol*. In: **Administrative Science Quarterly**, 26(2). P. 171-186. 1981.
- FRAHOOMAND, A.F.; DRURY, D.H. *Managerial information overload*. In: **Communications of the ACM**, 45(10). P. 127-131. 2002.
- HAHN, M.; LAWSON, R. *The effects of time pressure and information load on decision quality*. In: **Psychology and Marketing**, 9(5). P. 365-378. 1992.
- HALL, R.J. *How to avoid unwanted email*. In: **Communications of the ACM**, 41(3). P. 88-95. 1998.
- HILTZ, S.R.; TURROF, M. *Structuring computer-mediated communication systems to avoid information overload*. In: **Communications of the ACM**, 28(7). P. 680-689. 1985.

- ISELIN, E.R. *The effects of information load and information diversity on decision quality in a structured decision task*. In: **Accounting, Organizations and Society**, 13(2). P. 147-164. 1988.
- JACOBY, J. *Perspectives on information overload*. In: **The Journal of Consumer Research**, 10(4). P. 432-435. 1984.
- JONES, Q.; RAVID, G.; RAFAELI. *Information overload and the message dynamics of online interaction spaces: a theoretical model and empirical exploration*. In: **Information Systems Research**, 15(2). P. 194-210. 2004.
- JOSLYN, S.; HUNT, E. *Evaluating individual difference in response to time – pressure situations*. In: **Journal of Experimental Psychology**, 4(1). P. 16-43. 1998
- JUST, M. A.; CARPENTER, P. A. *A capacity theory of comprehension: Individual differences in working memory*. In: **Psychological Review**, 98. P. 122-149. 1992.
- KAHNEMAN, D.; TVERSKY, A. *Judgment under Uncertainty: Heuristics & Biases*. Eds. Cambridge University Press. 1982.
- _____. *A. Choices, Values and Frames*. Cambridge: Cambridge University Press. Cambridge. 2000.
- _____. *A. Judgment under uncertainty*. In: **Heuristics and biases, Science**, 185(4157). P.124-1131. 1974.
- KLAPP, O.E. *Overload and boredom: essays on the equality of life in the society*. Greenwood Press. 1986.
- LEE, A.S. *A scientific methodology for MIS case studies*. In: **MIS Quarterly**, 13(1). P. 33-50. 1989.
- _____; BASKERVILLE, R.L. *Generalizing generalizability in information systems research*. In: **Information Systems Research**, 14(3). P. 221-243. 2003.
- MACKAY, W.E. *Diversity in the use of electronic mail: A preliminary inquiry*. In: **ACM Transactions on Office Information Systems**, 6(4). P. 380-397. 1988.
- MARCH, J.G.; SIMON, H.A. *Organizations*. New York: Wiley. New York. 1958.
- McGHEE, W.; SHIELDS, M.D.; et al. *The effects of personality on subject's information processing*. In: **The Accounting Review**, 53(3). P. 681-697. 1978.
- MILE, M.B.; HUBERMAN, A.M. *Qualitative Data Analysis*. In: **SAGE Publications**. 1994.
- MILLER, G. A. *The magical number seven, plus or minus two: some limits on your capacity for processing information*. In: **The Psychological Review**, 63. P. 81-97. 1956.
- MOCK, T.J.; ESTRIN, T.L.; et al. *Learning patterns, decision approach, and value of information*. In: *Journal of Accounting Research*, 10(1). P. 129-153. 1972.

ODLYZKO, A.; Tilly, B. *A refutation of Metcalfe's Law and a better estimate for the value of networks and network interconnections*. Work in Progress. University of Minnesota. 2005.

PETERS, L.H.; O'CONNOR, E.J.; et al. *The relationship between time pressure and performance: a field test of Parkinson's Law*. In: **Journal of Occupational Behavior**, 5(4). P. 239-299. 1984.

SCHICK, A.G.; GORDON, L.A.; et al. *Information overload: a temporal approach*. In: **Accounting, Organizations, and Society**, 15(3). P. 199-220. 1990.

SCHNEIDER, S.C. *Information overload: causes and consequences*. In: **Human Systems Management**, 7. P. 143-153. 1987.

SCHULTZE, U.; VANDENBOSCH, B. *Information overload in a groupware environment: now you see it, now you don't*. In: **Journal of Organizational Computing and Electronic Commerce**, 8(2). P. 127-148. 1998.

SNOWBALL, D. *Some effects of accounting expertise and information load: an empirical study*. In: **Accounting, Organizations and Society**, 5(3). P. 323-338. 1980.

SPEIER, C.; VALACICH, J.S.; et al. *The influence of task interruptions on individual decision making: An information overload perspective*. In: **Decision Science**, 30(2). P. 337-360. 1999.

STOCKS, M.H.; TUTTLE, B. **An examination of information presentation effects on financial distress predictions**. In: SUTTON, S. **Advances in Accounting Information Systems**. Ed. Lavoisier. 1998.

TUSHMAN, M.L.; NADLER, D.A. *Information processing as an integrating concept in organizational design*. In: **The Academy of Management Review**, 3(3). P. 613-624. 1978.

TUTTLE, B.; BURTON, G. *The effects of modest incentives on information overload in investment analysis task*. In: **Accounting, Organizations and Society**, 24. P. 673-687. 1999.

WICKEN, C.D.; HOLLANDS, J.G. *Engineering Psychology and human performance*. Prentice Hall. 1992.

WILSON, E.V. *Email winners and losers*. In: **Communications of the ACM**, 45(10). P. 121-126. 2002.

YIN R.K. *Case Study Research: Design and Method*. SAGE Publications. 2003.

_____. *Case Study Research: Design and Methods*. 2nd ed. Thousand Oaks: Sage Publications. 1994.