CSCW for Strategic Management in Swiss Enterprises: an Empirical Study

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This paper presents the results of an empirical study into the current usage of groupware in strategic management and the potential of Computer Supported Cooperative Work (CSCW) for the top management in large-scale Swiss business enterprises. For this purpose we conducted a survey amongst 168 organisations

1 Introduction

The study presented in this paper is part of the STRATUM project (Sauter et al., 1995, Teufel, 1993). The overall goal of STRATUM is to develop tools to support cooperative work in the strategic management of business enterprises.

As new technology is developed to support cooperative work (so-called groupware) it is important to understand how that technology can best be applied to help users accomplish their work. A clear understanding of group work, as prerequisite for design or redesign of adequate groupware, is included in research frameworks that many research groups have developed (Krcmar, 1991, Mühlherr et al., 1994).

Following the concept of such a research framework, we first have to analyse strategic management groups in order to get an adequate understanding of the nature of their group work. In order to do so, we formulated the following research questions:

- What is the *current usage of groupware* for strategic management in the largest business enterprises in Switzerland?
- What is the *potential of CSCW for top management* in the largest business enterprises in Switzerland?

Since CSCW as an identifiable field emerged in the middle of the 1980s, most work has been done in the development of groupware prototypes. A wide spectrum of systems has been developed (e.g. group decision support systems, electronic meeting systems, electronic bulletin boards) and there has been growing interest in investigating information technology to support the type of group decision making closely associated with management tasks.

Only a few systems are directly related to the field of strategic management or top management although some of the tasks supported are encompassed in strategic management. Some prototypes or commercial products have been evaluated in case studies with top management groups, e.g. (Tyran et al., 1992). Some empirical studies have investigated the application of specific tools (Seward et al., 1993, Sheffield et al., 1993). Further research has been done in developing theoretical groupware methods, and concepts more or less related to the field of strategic management. However, only a few studies have explored top management from the viewpoint of group work (Reder et al., 1990), and none of them has looked at the application of groupware for strategic management in the sense of our perspective. In order to obtain answers to our research questions, we therefore conducted an empirical study (Morger et al., 1995). .

In the next Section we will present the background to our study. First we introduce strategic management as we see it from the viewpoint of our work. Next we give a short overview of CSCW, or groupware respectively, in order to convey a clear understanding of the terms we use for different types of groupware. In Section 3 we present the research methodology used in this study. In Section 4 we report our results. We first present the current usage of groupware in strategic management and then show results which give us information about the potential of CSCW for top management. In Section 5 we present some conclusions and remarks regarding further work.

2 Background to the Empirical Study

Strategic management. Strategic management is generally defined as the development and control of the long-term evolution of an enterprise. Strategic management can be viewed from three perspectives (Rühli, 1991):

(1)   The manner in which strategic management is *instituted.*

(2) Strategic management as a *process*.

(3) Strategic management as an *instrument*.

If we interpret strategic management as *instituted* in an organisation, we have to describe the group of persons performing strategic management - in other words, the strategic actors (Wilson, 1994). Strategic actors are the people in a business enterprise who are directly involved in the strategic management process. The people with direct responsibility for this process are the board of directors and upper management. In the following we will use the term *top management* as a synonym for strategic actors. Note that top management needs assistance from staff.

Strategic management as a *process* involves four basic elements (Wheelen et al., 1992): (1) environmental scanning, (2) strategy formulation, (3) strategy implementation, and (4) evaluation and control (see Figure 1).
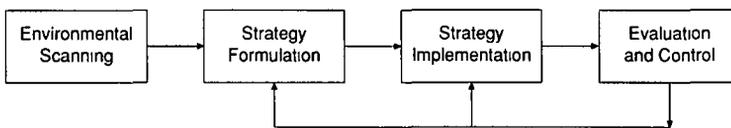

Figure 1 Strategic management process (source (Wheelen et al , 1992))

Such simple descriptive models are developed in order to illustrate a phenomenon that is very complex in reality. We can assume that many business processes exist in reality, primarily for operational and tactical purposes. At the same time these processes are the necessary basis of specific phases of the strategic management process. For this reason we cannot clearly demarcate strategic processes from operational processes (Mintzberg, 1994, Rühli, 1991).

To perform tasks related to the basic elements of the strategic management process one can use a large variety of *instruments*. We distinguish instruments that support *generic tasks* of top management from instruments used for *specialised tasks* related to the basic elements of the strategic management process. Instruments used for generic tasks are those which support different processes of interaction between people (typical tools are e-mail or electronic meeting systems); instruments used for specific tasks might be, for example, tools for financial budgeting or project planning.

CSCW. The research field CSCW has the overall goal of improving efficiency and effectiveness of group work through the usage of groupware. Groupware applications are based on different technologies (e.g. video, telecommunication, data base management systems). Such applications support a set of functions (e.g. mailing, shared writing) using textual, visual and audio media types. For classifying applications, one can take a schema like the time-space-matrix (Grudin, 1994). For *our purposes*, the *functions* of groupware are the most important characteristics. A classification schema which we derived in (Sauter et al., 1994) represents this.

Groupware tries to support groups by providing functions for communication, coordination and cooperation. Within this triangular framework we have placed typical group applications, corresponding to their functions. In addition to this, we have classified each application type into a *system class* corresponding to its application concept (see Figure 2). This classification schema allows groupware to be placed, corresponding to its focus of supported functions.
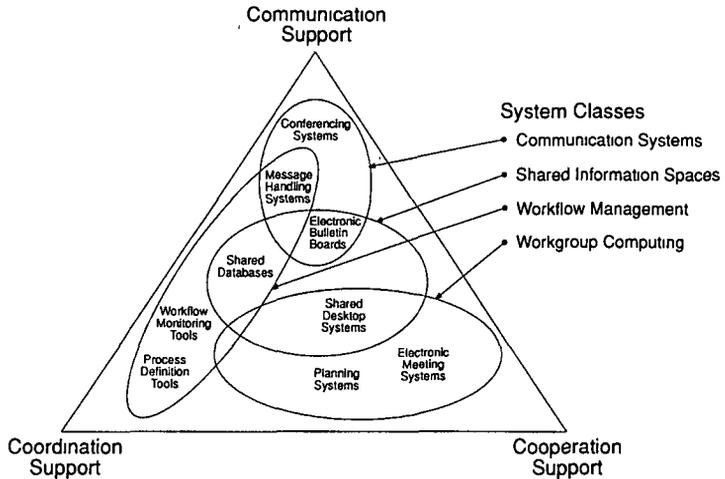

Figure 2. Functional classification schema for groupware (adopted from (Sauter et al., 1994))

We used this schema as the basis for designing our empirical study. For clarification we provide a short description of each system class and a few examples (for a detailed description see e.g. (Teufel et al., 1995)).

Communication Systems. Typical groupware applications which focus on supporting communication are message handling systems (e-mail, voice mail, video mail) and conferencing systems (computer conferences, audio conferences, video conferences). We assign such systems to the class of communication systems. The application concept for communication systems is the separation of communication partners according to time and/or place.

Shared Information Spaces. Groupware such as electronic bulletin boards allows implicit communication between several persons. Such forms of communication can be realised through any form of shared information spaces. Systems of this kind can take on both functions for communication (e.g. electronic bulletin boards) and functions for coordination and cooperation (e.g. in the case of a shared project data management system or a group calendar application).

Workflow Management. Groupware that we place in the system class workflow management has as its priority the support of coordination functions. Coordination functions are specified on the basis of permanent organisational rules with the help of process definition tools. Monitoring tools should enable workflow participants

to obtain information concerning different aspects of the business process. Application concepts for this systems class are group tasks that are well structured and have a high frequency of repetition (e.g. customer order processing).

Workgroup Computing. Into the field of workgroup computing fall complex tasks with middle to low frequency of repetition that have to be fulfilled in cooperative groups. With respect to the supported functions, the focus of workgroup computing systems lies in the field of cooperative processes, which means goal-oriented working together. Important representatives of this system class are electronic meeting systems, or group decision support systems respectively, planning systems and shared desktop systems (e.g. shared drawing).

3 Research Methodology

3.1 Contextual Issues

For our purposes we found analytical methods to be inappropriate. With the help of analytical methods one wants to be able to formulate statements about a domain by testing hypotheses. Prerequisites for this are the ability for demarcation and well-known determinants of the domain. As we pointed out in Section 2.1, strategic management is a very complex phenomenon with interdependent relationships to operative processes. In order to explore the domain in a broad manner we therefore applied a *descriptive* method.

Letters inviting participation and questionnaires were mailed in September 1994 with the reply deadline set as the middle of November 1994. Processing and analysis have been in progress since November 1994.

3.2 Subject and Method of Investigation

The subject of the investigation, as described, is strategic management in large-scale Swiss business enterprises. As we suggested in Section 2.1, one can assume that strategic management is performed by top management. For this reason we decided to target the top management.

As the method for data collection, we decided to use a standardised questionnaire. The questionnaire consisted of four parts with 17 questions and several sub-questions, so that the evaluation of about 300 answers was possible. Most questions were qualitative questions. We utilised the resulting data through frequency counts. In some cases we extended those results with mean values (mode and median). In cases of quantitative questions we got back interval scaled data (e.g. percentage distribution). We utilised this data through calculating arithmetic means and standard deviations.

3.3 Selection of the sample

The domain of the survey was business enterprises in Switzerland. For the selection of business enterprises we considered two criteria: *sector of industry* and *scale of the enterprise*. We assumed that the topic of CSCW in strategic management was not limited to specific sectors of industry and thus included all sectors (manufacturing, trading, services, banking and insurance).

Typical problems of strategic management are characterised by high complexity and low frequency of repetition (Schoemaker, 1993). For such problems in particular, group work is appropriate. We assumed the following: the bigger the enterprise the more complex the problems of strategic management; the more the need for group work; and the more the need for groupware. We therefore decided to restrict our survey to large-scale enterprises.
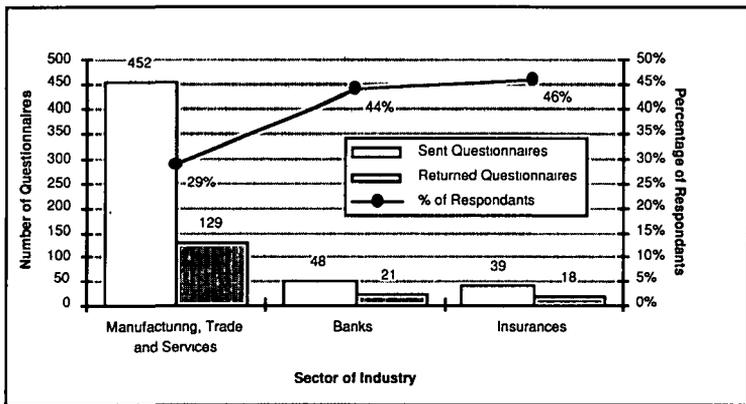

Figure 3 Distribution of the sample and percentage of respondants for each sector

For the selection of enterprises we took the following criteria:
- *turnover* for manufacturing, trade and services: ≥ US $ 125 million
- *total assets* for banks: ≥ US $ 1,5 billion
- *gross premium income* for insurance companies: ≥ US $ 75 million

As a result of the selection process we got 539 business enterprises. In order to achieve representative statements about the domain of the survey, we decided to include all 539 enterprises in our inquiry. We addressed the questionnaire to the CEO or a member of the Senior Management Group, or where possible to the person, responsible for the IS department or IS function. The response rate to our survey was 31% (168 returned questionnaires). In addition to the response we got 46 letters or phone-calls from enterprises which could not participate in the survey for various reasons. Figure 3 shows the distribution of the sample, with percentage of respondants for each sector of industry.

4 Results of the Survey

In the following we present some of the results of the empirical study. First, we give an overview of the usage of groupware in strategic management according to our classification schema. Second, the potential of CSCW for top management is explored.

4.1 Current Usage of Groupware in Strategic Management

Our first objective was to establish whether computer support for top management is provided. The results were that 57% of the respondents said that they personally use computers to support strategic tasks, 40% said they use no computer and 3% gave no statement.

As pointed out in Section 2.1, one can distinguish instruments supporting *generic tasks* from instruments supporting *specialised tasks*. Generic tasks are communication, coordination and cooperation. Specialised tasks are all tasks which have to be fulfilled within the basic elements of the strategic management process (e.g. market analysis in the process element of environmental scanning). In the following Sections we will first present the survey results related to generic support, then those pertaining to specialised support.

4.1.1 Usage of Systems Providing Support for Generic Tasks

As a basis for exploring the usage of systems providing support for generic tasks, we took our classification schema for groupware as shown in Section 2.2. First we asked about each application type: its availability or whether or not it is planned. Second we asked these top managers how they estimate the importance of each type of system if available.
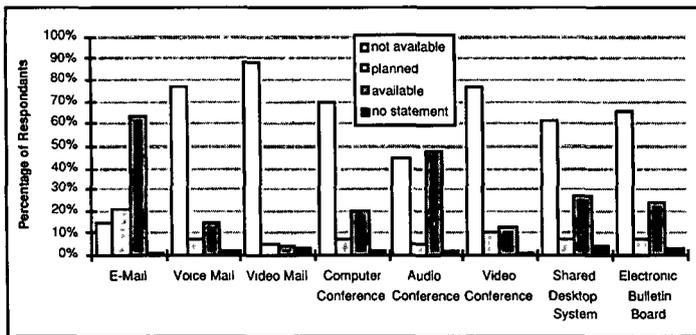

Figure 4 Availability of communication systems and shared information spaces

Figures 4 and 5 show the results for system classes *communication systems* and *shared information spaces*. The most commonly available communication systems can be seen to be electronic mail and audio conferencing. More than a quarter of the

respondants indicated that shared desktop systems are currently available. It is interesting to note that while nearly 50% of the respondants have access to audio conferencing, more than 60% of this group consider it to be an unimportant communication medium. Otherwise over 70% considered e-mail as an important or very important communication medium. The high importance and availability that has been attributed to e-mail, together with other results not reported here for economy of space, indicate an impending shift in guiding employees more and more by e-mail then by oral or other written directives. Furthermore it is interesting to see that shared desktop systems have · high rating of importance with respect to the other systems while video mail seems to have no importance at all.
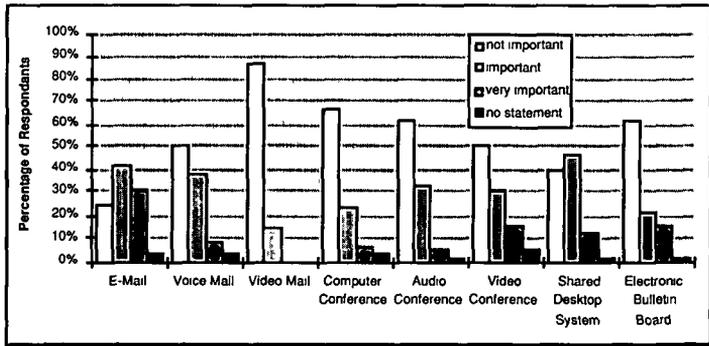

Figure 5. Importance of communication systems and shared information spaces (where available)
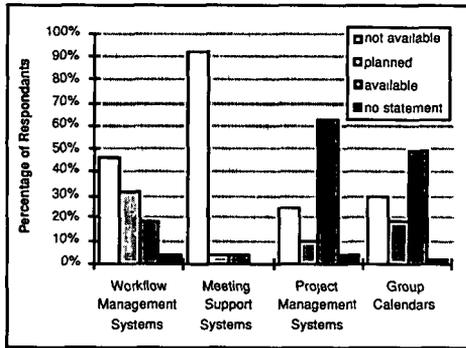

Figure 6. Availability of workflow management and workgroup computing

Figures 6 and 7 show the availability and importance of workflow management and workgroup computing systems. Project management systems are the most commonly available type of system. This was followed by the availability of group calendars. The absence of meeting support systems clearly demonstrates that this type of system has not yet penetrated any of the business sectors. It is evident from the ratings of importance of these systems, that group calendars are considered

more important then project management systems, even though group calendars are less available. It is also surprising that even amongst the few who do have meeting support systems, these were seen by a majority to be unimportant. Furthermore it is remarkable that over 30% of the respondants plan to appy workflow management systems in top management, although management systems particularly support group tasks of high frequency of repetition.
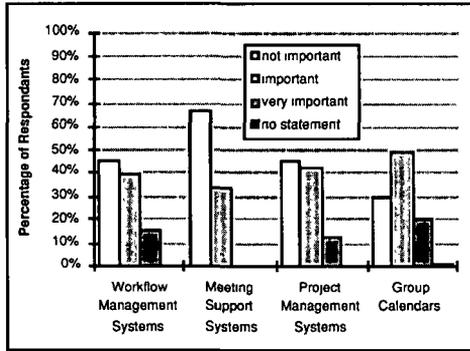

Figure 7 Importance of workflow management and workgroup computing (where available)

4.1.2 Usage of Systems Providing Support for Specialised Tasks

For exploring the availability and usage of systems providing support for specialised tasks, we presented some typical tasks in the questionnaire, according to basic elements of the strategic management process (see Figure 1). Respondants had the opportunity to add tasks or systems respectively. We assumed that most available applications would not support groups. We therefore asked explicitly whether group support is given or not.
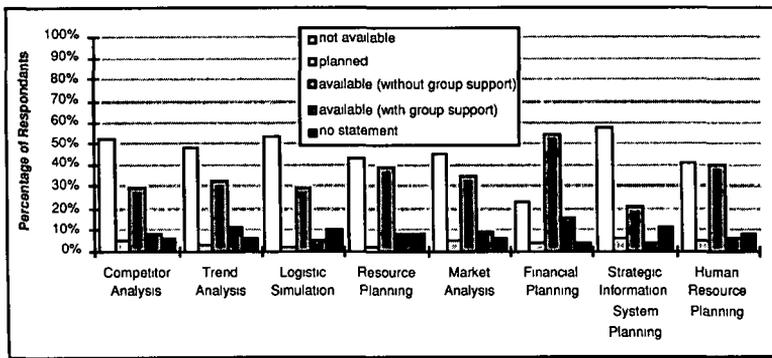

Figure 8. Availability of systems providing support for specialised tasks

Figures 8 and 9 show the availability and usage of systems providing support for specialised tasks. The most commonly available systems for specialised tasks

are those for financial planning which are also often or very often applied in 97% of respondants. Unsurprisingly, most of these (and the other specialised systems reported) are available without group support.
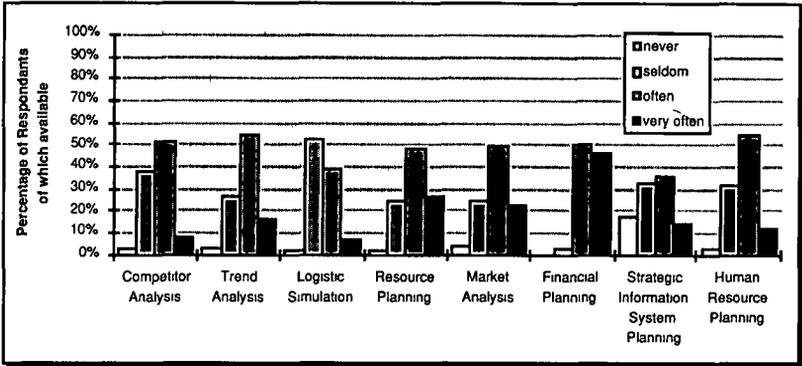

Figure 9. Usage of systems providing support for specialised tasks (where available)

4.2 Potential of CSCW for Top Management

As our second research question we explored the potential of CSCW for top management. We therefore asked top managers, according to the three perspectives of strategic management (Section 2.1), about the general organisational, procedural and instrumental aspects of their environment. Empirical studies show that top managers spend most of their time in meetings (Kurke et al., 1983) and we attempted to verify this by collecting detailed data about the meetings of top management. In the following sections we will present related results.

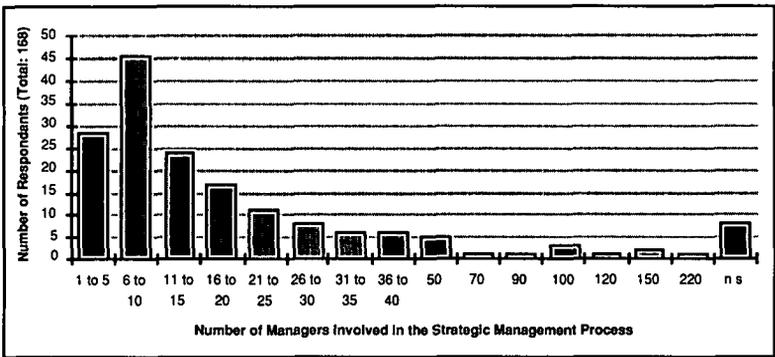### 4.2.1 Organisational Aspects

Figure 10 Number of managers regularly involved in the strategic management process

One of the questions asked of survey respondents was the number of managers who are involved in the strategic management *process* on a regular basis. Clearly the level of involvement can vary, but on average these were the number of participants collaborating in the performance of strategic management. The results of this question are very valuable when considering computer support for the cooperative process of strategic management, since they reveal the average number of participants which such a system should provide for. It can be seen that involvement of 6 to 10 persons was true for the majority of respondants (see Figure 10).

Figure 11 shows that although participation in the strategic management process is in the range described above, *strategic decision making* is most often carried out by three managers together. We also see that strategic decisions are generally performed by up to 10 persons while more than 10 persons are the exception. Considering these results we assume, that functions such as those for voting (often integrated in electronic meeting systems), which directly support the decision process of a group, are not appropriate for strategic decision makers such as those surveyed.
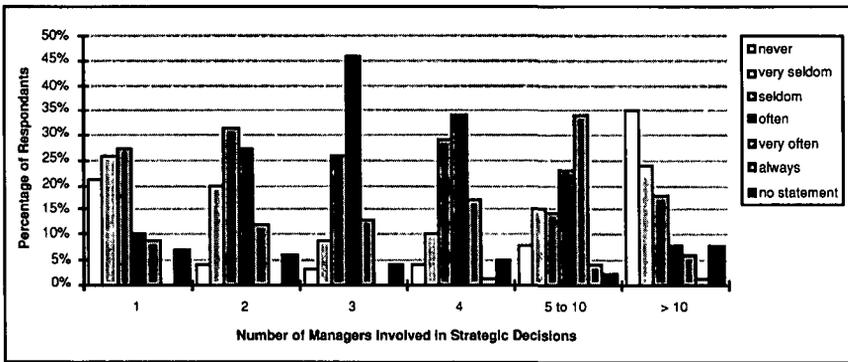

Figure 11 Number of managers regularly involved in strategic decisions

4.2.2 Communication of Top Managers

As we pointed out in Section 2.2 support of communication is an important domain of groupware. Therefore, we collected detailed data about communication patterns of top management.

Figure 12 shows the average mean, the median and the modus of time spent on communication with different partners of top management. The results show that the average mean of time spent on communication, ranges from 22% (within top management) up to 28% (top management with staff). In most cases top management communicates not mainly within top management (as we assumed) but also with representatives from all management levels in nearly the same frequency.
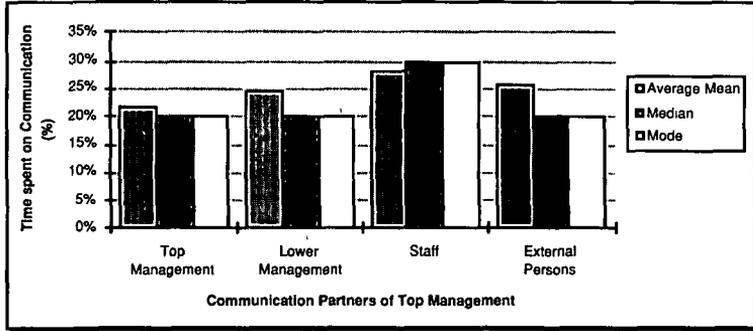
Figure 12. Distribution of communication with different communication partners

Figure 13 shows the average mean of usage of different communication mediums according to the different communication partners of top management. Unsurprisingly face-to-face communication dominates as the medium of communication between top management and the other groups within the enterprise. 10% of top management's communication is done via electronic mediums (both within top management, with lower management and with staff; about 4% with external persons). Remarkable is the dominance of textual communication with external persons.
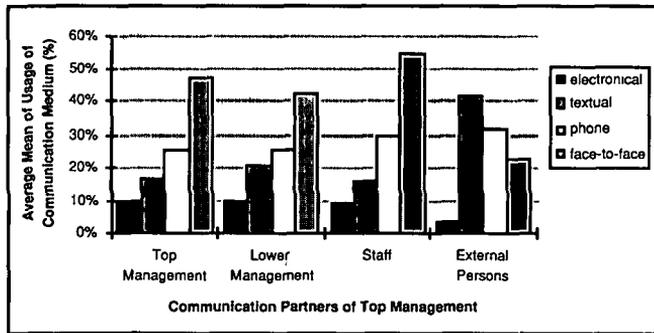

Figure 13. Communication of top management

Analysing the results shown in Figures 12 and 13, we discover that communication of top management is synchronous in most cases. We assume that there is a large potential for substituting or supporting traditional synchronous mediums for communication with groupware (e.g. e-mail or electronic bulletin boards). We also assume that groupware which is appropriate for support of the textual communications of top management with external persons has great potential.

4.2.3 Meetings in Top Management

Results of empirical studies (Kurke et al., 1983) looking at the activities of top or middle management, show that managers spent most of their time in meetings. Our

survey confirmed those results (see Figure 14). Considering all respondants, the average percentage of working time spent in meetings was 41%. The median was 40% and the mode was 50%. We also distinguished between planned and unplanned meetings. The average mean for planned meetings was 75% (unplanned 25%). Both the median and the mode of planned meetings were 80% (20% unplanned).

In order to assess the potential of electronic meeting systems in strategic management, we were also interested in the number of participants in meetings and the duration of meetings. Figure 15 shows the results for planned meetings. We found that in most cases a maximum number of 10 persons took part in meetings. In addition we discovered that the duration of meetings ranged mostly between one and four hours.

To determine how satisfied top managers are with their meeting patterns, we asked the question: "Are you satisfied with meetings as they are now?" From our point of view it was remarkable to see that about 70% of top management are satisfied or very satisfied with meetings. Therefore, we were not surprised about the answers to the following question: "Would you appreciate the application of an Electronic Meeting System?" (Results: 25% *yes*, 31% *no*, 38% *don't know*, 6% *no answer*).
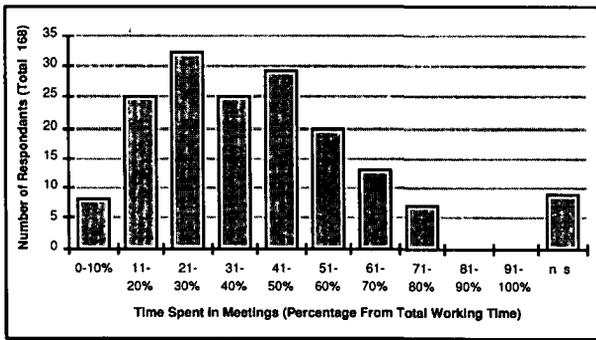

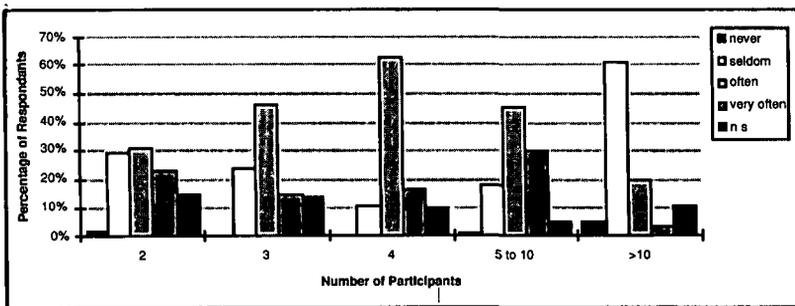Figure 14. Time spent in meetings (% from total working time)

Figure 15. Number of participants in planned meetings

Considering the results shown in Section 4.1.1 (only a few enterprises do have electronic meeting systems (EMS); most of those who have an EMS found them unimportant; only 7 enterprises plan to install an EMS) and the results shown in this section (most of top managers are satisfied with current meetings; only 25% would appreciate the application of EMS) we assume little potential for EMS in the strategic management of large-scale Swiss business enterprises.

4.2.4 Trends in CSCW from the viewpoint of top management

To explore trends in CSCW for top management we asked respondents about the usefulness of CSCW in general; their assessment about trends in general; and for specific domains where they believe CSCW could be applied.

First we asked: "How do you assess general trends for CSCW in strategic management?" 76% of respondents said that they expect increasing application of CSCW; 0% expect a downward tendency in the application of CSCW; 20% expect no changes; and 7% gave no answer.

Second we asked: "Do you think CSCW is useful in strategic management?" The majority of respondents (76%) said that CSCW is useful (14% *it is not useful*, 10% *no statement*).
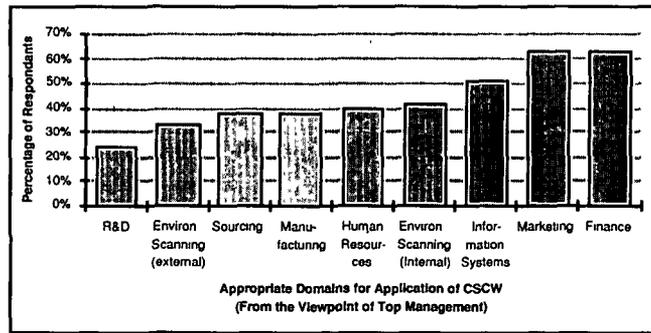

Figure 16. Appropriate domains for the application of CSCW

Those respondents who considered CSCW in strategic management as useful, were asked to give appropriate domains for the application of CSCW. Information systems, marketing and finance are the most appropriate domains from the viewpoint of top management (see Figure 16).

4.4 Limitations

The participation in our study was voluntary. For this reason we have to keep in mind that respondents and nonrespondents could differ in some investigated characteristics. In view of this situation, and considering that our response rate was 31 % (168 out of 539 returned questionnaires), there is a possibility of skewed results. We assume however, that our data represents a random sample of the

investigated domain and therefore believe that our study can be seen as representative.

5 Conclusions and Further Work

In this paper we presented results and preliminary interpretations of an empirical study. The study was conducted in order to gain a clear understanding of group work for the purpose of supporting strategic management in the most effective manner. The study was part of the project STRATUM, the overall goal of which is to develop tools to support cooperative work especially in the strategic management of business enterprises. Two research questions were formulated in order to investigate the current usage of groupware in strategic management as well as to reveal the potential for CSCW usage by top management in Switzerland. The most interesting preliminary results are:

- Looking at groupware supporting generic tasks, we found that the most available and important system class providing functions for communication is e-mail. It was interesting to see that over 30% of respondants plan to apply workflow management systems which mainly provide functions for coordination.
- Looking at the class of workgroup computing systems, we found that group calendars and project management systems in particular, are commonly available and also assessed as important from the viewpoint of top management.
- The results of questions asked about groupware supporting specialised tasks show that a large number of different systems are available. Most of these systems do not support group functions.

In summary we can say, that we now have a good overview about the current usage and potential of CSCW in strategic management and of how top management assesses groupware in general. Further results gave us detailed knowledge about different organisational aspects of top management (e.g. the number of managers regularly involved in the strategic management process or in strategic decisions respectively). We also collected detailed data about the communication patterns of top management and in particular about meetings.

Further work must thus be done in completing the analysis, the interpretations and in drawing conclusions through cross relations. In addition we plan to investigate qualitative statements further, through the use of case studies.

Acknowledgments

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