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A study on groupware choice in companies

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Definitions

There are a lot of terms figurating in the field where we are doing our research, and there can be a great number of definitions of the same term. In order to avoid misunderstandings we will give the definitions of the terms we will use in this study.

Program:	One or many functions that is included in one application. E.g. an e- mail program where one can send, receive, store, and order e- mail e t c.
Groupware:	Any computerised system that facilitates collaboration between people.
Single function Groupware application:	One program (for collaboration), for instance an e- mail program or a discussion database (Chaffey, 1998).
Multifunction groupware Application:	A system containing several programs (Lotus Notes, MS Exchange, Novell's Groupwise etc)(Chaffey, 1998)
System:	A set of programs, thus a multifunction groupware application is a system.
Industrial company:	A company which main function is production, e.g. Tarkett or Ifö.
IT- company:	A company which main function is system development, System management and/or system maintenance.
Collaboration:	Cooperation that is directly related to a work task, and is performed via a computerised system.

Abstract

This study addresses the issue of groupware choice in two different kinds of companies, IT-companies and industrial companies. Our main goal is to find out whether the companies' type effects the choice of groupware. We have conducted qualitative interviews as well as sent out quantitative questionnaire in order to fulfil our goals.

The result indicates that there is a connection between groupware choice and company type among the companies participating in our study. IT- companies tend to use single function groupware applications while industrial companies choose multifunction groupware applications. This can have a number of reasons, for instance that IT- companies want detached programs since they would not make use of all programs within a multifunction groupware application. It can also be that industrial companies want easier systems, that contain programs with a friendlier user interface.

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1. Introduction

1.1 Problem area

We suspect that industrial companies more often choose groupware systems that are "ready packets", referred to as multifunction groupware applications[1] (MGAs), while IT- companies are satisfied with single function groupware applications[1] (SGAs). The reason why we suspect this is that IT- companies, often working with computer systems, might have a greater knowledge of collaboration tools, and companies' need of these tools. They might also be more critical than industrial companies on this issue, since we presume that they more often come across these systems when performing their work. The result of this could, according to us, be that the companies spend money on programs they do not use.

1.2 Problem limitation

An extensive body of literature and journals has been written about groupware and its effect on organisations. What we want to look closer at in our study is which type of company that uses which kind groupware, and see if we can find a pattern in their choices. The companies that we have chosen to compare are IT- companies and industrial companies[1]. The reason why we have chosen IT- companies is because we find them very interesting since they are possibly our future workplace. Industrial companies are in our interest since they are a large category of companies and we believe that their work routines differ from the way IT-companies' work.

We will also limit ourselves to companies located in Blekinge, Sweden. The size of the companies (or offices) have been limited to approximately 200 employees, since we think that the number of employees may effect the choice of groupware within the company or office.

1.3 Target group

Our study mainly targets companies, especially the kinds present in this study – industrial companies and IT- companies. Most interesting would this study be for companies that are

[1] See definition in the beginning of this paper.

about to introduce a groupware in the organisation. The study also targets students in the computer science area, as well as people in general who are interested in the field of computer science.

1.4 Hypothesis

The hypothesis we have worked out follows below:
"IT- companies tend to use single function groupware applications while industrial companies choose multifunction groupware applications "

1.5 Purpose

To make the companies that use MGAs aware of that they might not make use of the majority of the programs, and thus pays for superfluous programs. The study aims to examine the groupware choice in two different types of companies, and find out the reasons for their choice.

1.6 Goals

We have determined a set of goals that we wish to accomplish through this study.

- Determine whether there is a connection between the company type and the groupware choice.
- And if so, why?
- Decide on suitable actions to take for the interviewed companies i.e. keep their current groupware or consider changing the entire groupware or parts of it.

2. Methods

Our hypothesis is based on, as far as we know, an unresearched area. We have therefore not found a great amount of journals and books that substantiates our hypothesis. To try our hypothesis we need to do an empirical[2] research investigation to find out what kind of groupware the different types of company use.

In the investigation we have used both qualitative and quantitative methods. In the qualitative method we have made a comprehensive investigation and looked on the total situation in form of semi-structured interviews. We have conducted the interviews at four companies, two interviews with IT- companies and two with industrial companies to determine if there is a connection between the company type and their groupware choice. The interviews have helped us understanding why the companies have made their groupware choices through telling us the companies' view of their choice.

The questionnaire has been conducted to investigate the possibilities to find patterns in companies' groupware choice and to see if we can support or falsify our hypothesis. We did this by sending out a questionnaire to 30 companies in the county Blekinge by electronic mail (e-mail). Unfortunately, we did not receive as good response as we had hoped for and therefore we had to change communication media to telephone. Due to this, we got better response to our questions that could be used for statistics.

In the literature study we had a lot of literature that were in some way connected to our research area, both in books, journals, and bachelor thesis from previous years. Some databases, as a collection tool, have been very important to us, where we have found a lot of interesting journals.

[2] We have decided to use an empirical method that is a theory that either is build on knowing you collected through the mind experience, or that contains statements that have to be supported with help from mind experience (”Filosofilexikonet”, 1988). We have done this with several semi-structured interviews and by sending out a questionnaire to support our interviews.

2.1 Interviews

2.1.1 Companies and interviewees

We have done four interviews, two at industrial companies and two at IT-companies. One industrial company wants to be anonymous in this study, why we will use the name *Industrial Company 1* (IC1), and the interviewee at this company will be referred to as "Mr A". Mr A is responsible for the IT-questions at IC1. The other industrial company was SwedeMatic AB (SwedeMatic), and there we interviewed Mr Jarltén (computer engineer). The other two were conducted at IT- companies, one with Mr Christansson (project leader), who is an employee at Ericsson Software Technology AB (Ericsson), Ronneby, and one interview with Mr Hägg (salesman), Dimension AB (Dimension), Karlskrona.

We found these companies in the yellow pages in a telephone book over Blekinge. The companies were randomly chosen. The companies we interviewed were contacted first by e-mail and thereafter we had telephone contact. Over the telephone contact we made sure that the companies fulfilled our requirements of our limitations.

2.1.2 Structuring and standardisation

All interviews have been semi-structured with some grade of standardisation. With semi-structured we mean that we made directions for the questions before the interview took place, and then asked more specific questions depending on the answers we got during the conversation/interview (Lantz, 1993). Thus, we did not have specified questions before the interviews, only guidelines for what we wanted to have answers at. This gave us the opportunity to make the interviews flexible and suited, due to the situation and context at the different companies.

According to Trost (1997), structuring an interview can have two different meanings. His first way of using the term is regarding interviews or a questionnaire that have fixed alternatives to choose. In other cases the term has a total different meaning and usefulness for example when an interview or questionnaire is well structured then it is designed with a structure. We will use the term structure in Trost's first example. When we use the term standardisation we refer to the same definition as Trost (1997) where he means to what grade the questions and the situation are the same for all the interviewed. Standard imply a loss of variation that means that the prerequisites are the same for all participants.

We have chosen to use this approach with semi-structured and standardised interviews, to have a ground to rely on. It would have been impossible to remember all the things we wanted answers to in each company without some structure. This structure with questions could also serve as an introduction to a dialogue between us, and them, which would serve us with more information.

2.1.3 Questions

All interviews we have done consist of the same bone structure since we later on wanted to compare them and see differences and similarities in the result. We have divided them into four different key areas – *work routines, tools, decision about tool, and tool satisfactory*. The questions within the first category are more structured than the others. The other three categories are more varying depending on each company and we had to adjust ourselves to the answers for carrying on the interview with more specific questions. For more information about the interviews see the appendix. Finding the answers to these questions would give us an insight how the companies think and why they made their choices regarding groupware. This information was very useful when we drew our conclusions and tried our hypothesis.

2.1.4 Tools

In all the interviews we used an MD recorder. After the interviews we listen through the disks and selected the most interesting parts and wrote them down on a paper and structured the interview. If we would not have used an MD recorder, we might have missed parts of the interviews, due to the difficulty of taking notes from an interview and at the same time asking questions and listening. The interviews can be found in the appendix at the end of the report.

2.2 Questionnaire

2.2.1 Procedure

We have done questionnaire among the same two company areas as before mentioned - industrial and IT- companies. We have sent a questionnaire to 30 companies, 50% to each area of company, by e-mail. Unfortunately we had few responses from the companies. According to Ejlertsson (1996) it can be difficult to get response from companies with questionnaires by e-mail. A rule of thumb is that the answers one receives are 70-75% from

the number first sent out. One can send out a reminder, and then the answers might increase. Other solutions to the problem can be to try and reduce the fall off by changing the media and use telephone for conducting the questionnaire. This can sometimes be more successful according to Ejlertsson (1996). We used telephone in order to reach the companies that did not answer the questionnaire by e-mail, in order to get more answers for our study. We used the same questions and structure as the questionnaire that we had sent out.

2.2.2 Preparatory work

We have found the companies through the yellow pages in the phone book over the county Blekinge, and the yellow pages on the Internet. It was hard to find companies because the phone book and the Internet do not always make it visible what main activity the companies have. We could only collect the companies that had specified their main activity. To find the correct data about how many IT- versus industrial companies there are in Blekinge, we contacted Statistics Sweden[3] but unfortunately it was too expensive to get the information we needed.

We found 15 industrial companies and many more IT- companies in the yellow pages. Since we wanted to compare the results of the two different types of companies we randomly chose 15 IT- companies that we had colleted. When we chose the companies we did not favourites any company. We sent the questionnaire to the companies that we could collect from the possibilities we had. Unfortunately we cannot do a generalization for the whole county because we do not know how many percent of each type of company that exists in Blekinge.

2.2.3 Questions

The questionnaire consists of eight questions that are designed for the different kind of companies to give us an answer of what kind of groupware they use. The first three questions are related to the companies, which way they work, how many employees and if the company is a part of a concern. These questions can be relevant to the companies' groupware choice. The rest of the five questions are related to the companies' groupware such as; what kind of groupware they use, their opinion of how well it works in the company, if they are missing any functions and who decides to purchase it. These questions are useful for us to get an

[3] The government in Sweden where they produce and make available official statistics relating to different areas of society over Sweden

overall picture of the companies' groupware choice and their opinion of the groupware. The questions are formulated and created to supplement the qualitative interviews and to support our hypothesis.

2.2.4 Structuring and standardisation

We have used a very high grade of structuring in our questionnaire, and when we use the term structuring we mean the same definition as we did in the interview, i.e. the definition by Trost (1997). This is important, since we want to have data to make statistics from, i.e. if one get a question to fill in the prewritten answers of ones favourite colour, there is not a possibility to make statistics if people fill in many different colours.

The majority of the questions within the questionnaires are not leading ones, and all the multiple-choice questions are designed according to standards collected from Ejlertsson (1996). The standardisation of the questionnaire is high but not completely standardised. Some of the questions are semi-structured.

The populations in the questionnaire are IT- and industrial companies that are registered in the county Blekinge and have no more than 200 employees.

The questionnaire will be examined and the answers will be divided into categories, according to the questions. The questionnaire relates to our theories and our hypothesis. This connection helps us examine our theories. Some of the questions will help us draw parallels in the discussion chapter.

2.3 Literature study

We have studied literature in order to be able to make this study as interesting and adequate as possible. We started by looking through general books about groupware, and continued by searching in different databases, for instance ACM[4], Kluwer, and Emerald, in order to find journals related to our topic. We searched for words like "groupware", "CSCW"[5], and "collaboration". We also skimmed through a couple of bachelor thesises from previous years,

[4] Association for Computing Machineries
[5] Computer Supported collaborate work

which have been quite helpful. Additionally, we have used some of the research material available in the school library. For us, the journals and research material have been very important, since there has been investigations on areas connected to ours. The books have been used mainly for basic facts, as well as for writing the background chapter.

3. Literature study

This chapter aims to give some basic knowledge in the area of groupware, in order to increase the understanding of the study. The area of groupware is rather complex, and therefore we will try to explain all the elements necessary for apprehending the study as a whole. We will explain the key factors of our study in depth, but also briefly look into some connected areas not essential, but still interesting, for this study.

3.1 Collaboration

The definition of *collaboration* is, according to Khosafian and Buckiewicz (1995, p 324):

> *"The ability of two or more people or groups to transfer data and information with the capability of on-line interactions. The distinguishing feature is the ability for many-to-many interactions and information sharing, unlike e-mail where the interaction is one-to-one or one-to-many"*

We are however of the opinion that the term collaboration concerns all kind of cooperation via a computerised system[6]. According to Ellis et al (1991), collaboration is one of the cornerstones of group activity. They emphasise that sharing information is a prerequisite for effective collaboration, and a way to increase the effectiveness of collaboration further can be to coordinate the group's activity (1991).

Khoshafian and Buckiewicz claim that collaboration in essential for the productivity within a business (1995). When collaborate work is a part of an environment, a number of key advantages present themselves, which help the *individual worker* as well as the *team* and the *company* as a whole (Khoshafian & Buckiewicz, ibid). Some applications available for the individual to use in the home or office can be (Khosafian and Buckiewicz, 1995):

- Word processing
- Personal spreadsheets and databases
- Authoring and presentation

[6] For our definition, see "definitions" in the beginning of the thesis

- Calendaring and personal notification
- Project planning
- E t c

Of course, since the goals and scope are a bit different for a team, the applications also differ (Khosafian & Buckiewicz, ibid). Most of these applications are extended versions of the ones listed for personal use:

- Corporate database access
- E-mail and workflow systems
- Document management systems
- Group calendaring
- Group co-authoring
- Group meetings

For the entire company, e-mail is perhaps the most successful application of groupware, but other Internet services such as forums and newsgroups can also be useful (Khosafian and Buckiewicz, 1995).

New technology for mixing data, voice, and video are changing peoples' collaboration routines (Khosafian and Buckiewicz, 1995). They explain that the result of this fast technological evolution and the different possible orders and interdependencies, is a growing extent of new functionalities and unexplored potential (1995). According to Khosafian and Buckiewicz, collaboration does not merely mean congruence of area, but also of the purpose. When collaborating, the supposition is that people are moving in the same direction, as well as striving towards the same destination without interfering with each other (Khosafian & Buckiewicz, 1995).

According to Coleman (1997), collaboration is effected by cultural as well as technical aspects. He explains that the technical aspects are mainly the dispersion networks, while the cultural aspects are represented by the increasing globalisation (1997). The enhancement of globalisation leads to greater involvement with other cultures, which in turn leads to increased interaction over the globe.

3.2 Groupware

The word groupware consists of two elements, *group* and *ware* (Ciborra, 1996). *Group* is a socio- organisational element, which means *"a collective way of working, collaboration, the intimacy of staying together and sharing"* (Hackman 1990, cited by Ciborra 1996). *Ware* is a technical element, meaning artefact or tool (Ciborra, 1996). The word *Groupware* compounds these two elements (Ciborra, ibid).

Groupware is an extensive term, with a number of disciplines and fields that could be called its ancestors (Khosafian and Buckiewicz, 1995). The roots of groupware comes from client/server computing, and still exists in most groupware systems (Khosafian & Buckiewicz, 1995). Examples are e-mail systems, which is often considered the first successful groupware application; human-computer interaction systems, like graphical user interface environments that increase the multimedia information exchange over networks; and hypertext, which supplies an associative model of information (Khosafian and Buckiewicz, ibid).

According to Khosafian and Buckiewics (1995), cooperation, collaboration, and teamwork are necessary for all organisations' survival. They claim that "working together is a fundamental requirement for building and sustaining a strong and healthy organization" (1995). Groupware is the technology that enables organisations to do this (ibid). So then what characterises a groupware? According to Khosafian and Buckiewiczs (1995), any computerised system that enables groups of people to collaborate for some purpose can be called groupware. E-mail, electronic meeting systems, and desktop video conferencing are some examples of groupware (Coleman, 1997). Other terms than groupware are sometimes used for this kind of technologies, for instance: Group Decision Support Systems (GDSS's), Group Support Systems (GSS's), and Electronic Meeting Systems (Coleman, 1997).

But groupware is not only about technology, it is also social (Coleman, 1997). Coleman calls groupware *a collaborative technology*, which means that it affects how people communicate with each other (Coleman, ibid). When affecting communication, Coleman (1997) means, the way people work as well as the structure of the organisation get affected. He comes to the conclusion that groupware is both people as well as a tool for people to use (1997).

Technologies supporting cooperation are used more today than ever before, according to Coleman (1997). The purpose of using groupware is that it supports the efforts of e.g. teams that require people to work together, even though they are in fact not together in neither space nor time (Coleman, 1997). According to Chaffey (1998), groupware improves organisations' efficiency in the following ways:

- Increasing information sharing
- Reducing communications overheads
- Providing coordination

Groupware can be large applications, containing many different applications (Chaffey, 1998). Examples are Lotus Notes, Novell's Groupwise, and Microsoft Exchange (Chaffey, 1998; Coleman, 1997; Khosafian & Buckiwicz, 1995). Chaffey uses the term *Multifunction groupware application* for this type of groupware (1998). The word groupware can also include smaller programs such as a single mailing program, a discussion database, or a group calendaring system. Chaffey calls these *Single function groupware applications* (1998).

Figure 1. Chaffey's table of groupware functions in different types of software

Type of software	**Functions available**	**Examples**
Single function groupware Application	*E-mail, Text based conferencing Document sharing*	*Eudora, FirstClass*
Multifunction groupware Application	*All of above*	*Lotus Notes, Microsoft Exchange, Novell Groupwise*

Groupware can also be classified by where and when they are used (Chaffey, 1998). *Where* refers to whether the people who want to communicate are in the same location or not, while *when* refers to whether the communication takes place in real time (synchronous) or at different times (asynchronous)(Chaffey, ibid).

Figure 2. Chaffey's model of Groupware support for different business situations

	Synchronous	**Asynchronous**
Different place	Supported by chat & Videoconferencing Groupware	E-mail, text conferencing and workflow management systems to support a dispersed team.
Same place	Normal face to face Meetig or team work supported by white boarding proximity. groupware	E-mail and workflow management to support a team working in
	Same time	**Different time**

3.2.1 Single function groupware applications

A single function groupware application consists of one program, such as an e-mail program, document sharing, and text- based conferencing. These will be explained further below:

<u>E-mail</u>

An example of a single function groupware application is e-mail. According to Chaffey (1998), e- mail is said to be the most successful of all groupware tools. According to a journal of Robertson et al (2001), a case study is performed where e- mail and Lotus Notes are compared within Knowledge Intensive Firms (KIF)[7]. We interpret that our definition of IT companies is included in KIFs, which makes this journal relevant for the study. In their case study they find out that the introduction of an e-mail program in the organisation was considered useful and efficient for communication (2001).

E- mail possesses several advantages compared to regular mail (Chaffey, 1998). Above all, it is faster, both to send and receive (Chaffey, ibid). In order to send an e- mail, the user writes his/ her message in a ready form, as well as he/ she can assign priority and add attachments

[7] "These [KIF] are organizations, such as R&D [research and development] labs, high technology and consultancy firms, which employ predominately high-qualified individuals who are engaged primarily in work of an intellectual nature" (Alvesson, 1999 cited by Robertson et al, 2001: p334)

(Chaffey, 1998). Chaffey (1998) points out the attachment function as being practical, since it enables the user to send documents e t c. Other useful functions that Chaffey (ibid) mentions are *notification, group broadcasting, and security.* When one uses the function *notify*, an indication is sent to the sender if the receiver has opened the e- mail. This can be used in order to make e-mailing more efficiently, since one knows if a message has been received but ignored (Chaffey, ibid). In such a situation, Chaffey (1998) writes, the sender can urge on the action. *Group broadcasting* enables the user to e- mail a group of people, for instance can the manager send a mail to a specific department (Chaffey, ibid). This is primarily useful when the user is able to re-use the groups, otherwise he/she will have to multiply address the e- mail each time.

Text based conferencing & Document sharing

Below we will briefly explain *text based conferencing* and *document sharing*. These are also single function groupware applications, but will not be discussed further in this study. However, we want to mention them in order to exemplify some SGAs apart from e-mail, and their uses.

According to Chaffey, *text based conferencing* is popular within the business world since it enables decision makers to operate even when geographically dispersed (1998). Text based conferencing is often asynchronous, which can benefit the participants by giving them the possibility to consider their answers or look up information needed for the conference (Chaffey, ibid). Chaffey (1998) explains that conferencing allows many people to participate in a discussion about a certain topic, in contrast to e- mail, which is normally intended for a small number of people receiving the message.

A negative aspect is however that the user needs to open the application in order to see if there are any new postings (Chaffey, 1998).

Document sharing enables several people to work on documents together (Chaffey, ibid). This function can for instance make it possible for different authors to make revisions in the text, which are shown in a particular colour or style, depending on which person did the revisions (Chaffey, 1998). Deletions can for instance be shown as strike-through, and insertions as underline according to Chaffey (ibid).

3.2.2 Multifunction groupware applications

MGAs are, as one might guess, a large system containing several programs (Chaffey, 1998). Examples of MGAs are Lotus Notes, Microsoft Exchange, and Novell Groupwise (Chaffey, 1998). These all contain the standard programs such as e-mail, document sharing, text-based conferencing e t c, among with a lot of other functions (Chaffey, ibid). We will look closer at Lotus Notes and MS Exchange in this chapter, since those will appear later on in this study.

Lotus Notes, Domino

One fundamental thought with Lotus Notes is that as much as possible of information should be stored and treated electronically (Dahlberg, 1997). The groupware Lotus Notes are a set of tools for gathering, organising and disseminating information (Burke & Calabria, 1999). In the journal of Robertson et al, previously mentioned in the e-mail section, Lotus Notes was introduced in an organisation. Lotus Notes was at first successful, but the usage was partial and limited. By the time the research ended, the use of Notes had diminished further.

In the current version of Lotus Notes (release 5.0) there has been made some changes, the client and the server do not need each other anymore to function. They are now independent from each other, so Notes can function alone and be connected to another server as the Domino Server can function alone and serve data to all sorts of clients (Burke & Calabria, ibid).

Lotus Notes and Domino is a MGA that include three basic products (Burke & Calabria, ibid)

- The Domino Server
- The Notes Client
- The Domino Designer Application

In the latest version of Lotus (R5) *The Domino Server* are actually several servers, which offer different levels of functionality and these are (Burke & Calabria, 1999):

- **Domino Mail Server**- here is basic email and collaboration services.
- **Domino Application Server**- this is the standard Domino server, it includes the feature of the Domino Mail Server, to which it adds Web application services and connectivity to data sources external to Domino.

- **Domino Enterprise Server**- this includes all the capabilities of the other two servers and adds server clustering for increasing data availability.

All information is saved in databases as documents. The document can contain many different kinds of information as text, pictures, calculations, sounds and so on. All the databases are stored in a server, the Domino server. All information in the database can be shared with all clients with authority (Dahlberg, 1997). There is also something that is called Notes-application and that contains several databases that are used for a special task. One application can be a document database, which contains all documents to a certain project. In the same application there is a discussion database that is used for discussions between the members in the project (Dahlberg, ibid). This function can be compared to the project place in SGA. Here are some examples of Notes applications that are built in the server system (Dahlberg, ibid):

- **Discussion databases**- has functions to contribute a comment, keep order at comments and supervise the written material.
- **Document storage databases**- used to share documents in a group of clients. They functions I.e. who is approving documents etc.
- **Project databases**- is functioning the same way the document storage database, but have also functions structure distributed information and keep status on these.
- **Register databases**- are used to store information in form of register for costumers and address book over the company's employees.
- **Information databases**- is used for searching in the existing databases for information, for example manuals, and news databases.

For the databases to update regularly to keep the latest version, Notes has developed something that is called "replication". The replication is synchronized copies of the database that is stored on the client. The replication synchronizes with intervals to the server (Dahlberg, 1997).

The Notes Client can retrieve mail from POP3 and IMAP mail servers (Burke & Calabria, 1999), conferencing databases, and other groupware applications, business process applications, the World Wide Web, and other Internet applications such as Usnet News, Gopher, and FTP etc (Coleman, 1997). It has also a Personal Information Manager with address book, email, calendar, task manager, and information management features.

The *Domino Designer Application* is a special software that gives the user and database developer the opportunity to modify database elements (Londergan & Freeland, 1999). In more detail, one can create, manage, and deploy interactive applications to the Domino server (Burke & Calabria, 1999). It is the Notes client that gives application developers access to the development tools. There is a possibility to develop new applications in Domino with LotusScript, which is a basic-compatible, object-oriented programming language. The Notes database acts as a container for Java Applets, which mean that the developer can create Java applets with their editor of any choice etc.

Microsoft Exchange

Microsoft Exchange (MS Exchange) is a communication program, which is used for email, voice mail, voice mail integration capabilities, fax, scheduling, and document sharing, and other forms of group-programs for communication. MS Exchange is a client/server messaging system, which means that a domain server and clients are connected together as a network ("Bonnier", 1997; Coleman, 1997).

One of the major programs in MS Exchange is the scheduling process, which is an electronic calendar where one can book meetings and plan an ordinary working day. It is possible to show meetings for separate days or for a hole week or month. It is also possible to create a task management that follow project in progress ("Bonnier", 1997).

Intranets

An intranet is used to connect a company through a network, so that employees have access to company information through regular Internet tools (Chaffey, 1998). Intranets uses Internet standards and protocols, making it possible for the employees of e.g. a company to collaborate more efficiently (Greer, 1998). An advantages of the intranet is that one can use the existing LAN[8] or WAN[9] equipment for setting it up, thus it can both save time and reduce costs (Greer, 1998).

Some activities and information the intranet can be used for is the following (Greer, 1998):

[8] Local Area Network
[9] Wide Area Network

- Company news
- Corporate policy
- Project management
- Knowledge repositories
- Product pricing information
- Sales reports
- Employee locator and skill directories
- Stock prices

An intranet is a good place to post information, but can also be used for discussion groups, scheduling meetings, and collaborating on shared documents (Greer, 1998). These things can lead to a faster way of working (Greer, 1998).

Internet and intranets make use of the same technology, but there are dissimilarities as well (Greer, 1998). First of all, the Internet does not belong to one person or organisation, actually anyone around the globe can get connected to it, if they have a computer, a modem, and a connection to the Internet (Greer, 1998). The intranet, on the other hand, is private, and thus owned by the organisation it is serving (Greer, 1998). According to Greer (ibid) only people with access can use it.

According to Greer (1998), there are five functions that constitute the core of an intranet. Greer claims that when an intranet has these functions, its organisation can publish information, as well as store, retrieve, and manage the information (1998). The intranet can also make the collaboration between members of the organisation easier (Greer, ibid). The core functions are the following (Greer, ibid):

- E-mail
- File sharing
- Directories
- Searches
- Network management

On an intranet, these functions can run on platforms using the open standard Internet technologies (Greer, 1998).

3.2.3 Problems of groupware

According to Coleman, groupware provides tools to solve collaboration-oriented problems (1997). However, one should not merely focus on technical issues, since that would lead to an expensive failure (Coleman, ibid). He means that it is of great importance to see to the whole picture, when working with groupware (1997). The probability of success increases a great deal when focusing more on the "people issue", rather that on the technical one (Coleman, 1997). He further points out that the support from the corporate culture is necessary in order to succeed with the implementation (1997). Other issues that are of importance when addressing groupware success are economy and politics (Coleman, 1997). When considering all these aspects, the following formula has been developed by Coleman (ibid):

Groupware success= technology + culture + economics + Politics

4. Result

4.1 Interviews

In this study we have carried out four qualitative, semi structured interviews. The interviews were conducted at two IT- companies (Dimension AB, and Ericsson Software Technology AB) and two industrial companies (Swedematic AB, and IC1). At Dimension AB we interviewed Mr Hägg who worked with sales. Even though he did not work explicitly with groupware systems, he still had some knowledge about the systems used in the office in Karlskrona, and how well they functioned within the organisation. Thus, we decided to carry out the interview despite his position. At Ericsson we interviewed a project leader named Mr Christiansson. When it comes to the industrial companies we interviewed Mr Jarltén at Swedematic and Mr A at IC1, both these persons are in decision making positions regarding groupware. First we contacted the interviewees by e-mail, presenting ourselves, the purpose of the interview, and the subject of interest. We got great response, thus none of the companies hesitated to be a part of our study. The interviews were held at the respective offices.

When we contacted the companies for interviews, we wanted to interview persons that was in a decision making position regarding groupware. The reason of this was that we believed that the people responsible of the systems also possess knowledge about the particular system, and knows why the current system is used in the organisation. Unfortunately, it was not always possible to get an interview with a person in such a position. In the cases where the interviewees were not in a decision making position, we interviewed persons that had knowledge about the company's groupware.
We are aware of the fact that interviewing only one person from each company does perhaps not give a valid result, since one person cannot express all the employees' opinions

Additionally we have only interviewed one person per company because it would be too time consuming to provide more than one person to interview for the companies. Being aware of this matter we conducted questionnaires (chapter 4.2) in order to support our interviews and to be able to draw conclusions.

We have chosen to structure the result of the interviews in the same way as we structured the questions for the interviews, thus we have divided it into the four key areas the questions addresses – *work routines, tools, decision about tools, tool satisfactory.*

*4.1.1 Interview with **Dimension AB***

Dimension is an IT-company, with focus on the business- critical systems that constitutes the infrastructure within the digital economy. This company can be found in seven cities in Sweden, and through subsidiaries, they are also active in Norway, Denmark, Latvia, and Litauen.

The interview with Dimension took place at their office in Karlskrona, where 10 people currently work. The interviewee was Mr Hägg, who works with sales. We held the interview in Swedish, and in order to facilitate the work, as well as to be able to focus entirely on what was said, we used an MD recorder. We have reconstructed the most important parts of the interview in a document[10], which we have used when writing this chapter.

Work routines

Mr Hägg informs us that within Dimension, the employees work in different ways, either in projects or individually, from home or at the office. But commonly, he says, there is a core of people that constitutes a specific project, and it is up to these people to contact other employees, with different competences, when necessary.

Tools

The employees use e- mail, telephone, and telefax as collaboration tools. This can differ a little between the different offices, but generally they are more or less the same, especially the e- mail, which is used in all offices. Additionally, they sometimes place common documents on some of the project sites on the web. The reason why they use these groupware tools is because, as Mr Hägg says[11]:

> *"They are easy to use, one shall not make things more complicated then they are, in large systems there are a*

[10] Appendix 1
[11] Freely translated by the authors.

load of functions which you never use, that are super-fluous"

Dimension AB also has an intranet, which cover the Scandinavian countries. Although it does not serve the purpose of a collaboration tool.

Decisions about tools

The IT management in Stockholm makes the decision about which collaboration tools Dimension AB uses, according to Mr Hägg. However, as he adds, they often have contact with other IT departments in Sweden/ Scandinavia, which makes it possible for the employees to be a part of the decisions. IT management in Stockholm only decide on which large systems to introduce, concerning the entire company, for instance an intranet, he says. That the different offices uses e- mail and telephone is up to the employees themselves, he adds.

Tool satisfactory

He is of the opinion that the employees within Dimension AB are satisfied with the tools at hand, which they make extensive use of, and that there is no need for supplements. He says that they would not like to have an MGA, like for instance Lotus Notes because, as he concludes[11]:

"We would not make use of all the functions that Lotus have, IBM tends to build too large systems, and besides that it is expensive with support and installation and so on"

4.1.2 Interview with ***Ericsson Software Technology AB***

The main activity at Ericsson Software Technology AB is system development, system management, and installation. These three departments each have about 20 employees.

On Ericsson, our interviewee was Mr Christiansson. He works as a project leader at Ericsson in the development department. Mr Christiansson has knowledge about the groupware systems within the three departments in Blekinge. The interview took place in one of the

conference rooms in Blekinge Institute of Technology, since Ericsson's Ronneby office is located in the very same building as the Institute.

Work routines

In Ericsson, most of the collaboration takes place within the offices, however communication among the offices also occurs according to Mr Christiansson. Within Ericsson, the work is in nearly every case carried out in projects. The communication here is mainly face-to-face, and the e-mail program within MS Exchange. They also use a virtual project room on the Internet, which Ericsson has developed. Mr Christiansson believes that the most important and also the easiest way of communicating in projects are face-to-face. There is also a possibility to work from home or other places away from the office, but it requires that one is reachable via e-mail or telephone.

Tools

Ericsson is standardising their programs so that all offices around the world use the same programs. This standardisation is called ESOE (Ericsson Standardization Office Equipment). It contains a set of standard applications that every office should use, so that all documents are written in more or less the same way, and thus can be opened anywhere in the world, Mr Christiansson explains. MS Exchange is one of these standard tools, but at Ericsson in Ronneby, it is merely used for e- mail and looking up employees' phone numbers e t c from a record, he adds. He explains[12]:

> *"One of the reasons why we use MS Exchange is because Ericsson is distributed all over the continent"*

Ericsson uses MS Exchange, which is an MGA. However this has to do with Ericsson being a multinational company, which includes other departments than IT related ones. The standardisation concerns the whole company and particular offices and departments around the world (including e.g. production departments) have to follow these guidelines. The needs of these departments have to be considered when the management make decisions on which tools to standardise.

[12] Freely translated by the authors.

Ericsson also has an intranet, which is accessible from all Ericsson offices around the globe, but they are not using it as a collaboration tool.

Decisions about tools

It is the management in Stockholm that decides on which programs that shall be standardised. Otherwise the decision-making is quite distributed in the departments, says Mr Christiansson.

Tool satisfactory

Mr Christiansson is of the opinion that it was a good idea to standardise the programs so that the formats are the same everywhere.

*4.1.3 Interview with **Industrial Company 1***

This industrial company is a production, marketing, and sales company. In the office in Ronneby, about 110 people are employed. Except from the Ronneby office, this company has several offices in Sweden: Malmö, Stockholm, Göteborg, Jönköping, Örebro, and Sundsvall. It also exists in other European countries such as Norway, Denmark, Iceland, Holland and England. The person we interviewed works with project oriented IT support, among other things.

Work routines

Mr A informs us that within IC1 it is possible to take the laptop (which can be connected to the desktop via a docking station) and work anywhere one likes. Afterwards, Lotus updates the changes in the laptop, and saves it on the server, with the mechanism "replication"[13].

Tools

IC1 uses Lotus Notes R5, version 08. The main functions used by IC1 within Lotus Notes are e- mail, a calendar, and information handling in databases. They also use an address book when they need to get in contact with other employees. IC1 has made use of the possibility to program their own applications within Lotus Notes. The most used application is an Intranet, which they have named "Infonet". This is an intranet within the companies in Sweden. However, every country has a database, which exists as copies in all the other countries servers. These are updated on a regular basis, so that everyone has the latest version. Every

[13] See chapter 3.2.2 under Lotus Notes

country has a local server, where copies of all the databases within the whole company group are stored. When one country changes anything in their database, it sends out signals to the other databases that there has been a change, and the databases update their copies. The databases are linked together. The local database is updated automatically on certain intervals. All IC1 offices around Europe do not necessarily have to use Lotus Notes, but they are connected via the databases.

Decisions about tools

The interviewee Mr A was the person who introduced Lotus Notes in IC1. The system was introduced about 12 years ago, when they decided to computerise the document handling. The Lotus Notes platform seemed to suit the company well. They also visited a company in Denmark that had introduced the system, to see what is was like. The Danish company was very satisfied with Lotus Notes, and this contributed to that IC1 chose this system.

Tool Satisfactory

Lotus Notes serves a good purpose, according to Mr A. Currently, a change of tools is not an option. It would be too time consuming to move the databases and rebuild applications. Mr A says that it could cost about half a million Swedish crowns to change system.

*4.1.4 Interview with **SwedeMatic AB***

SwedeMatic is a manufacturing industry with automated production and processing systems, providing tailor-made, integrated solutions for a variety of finishing processes. SwedeMatic is a subsidiary to another company, which do not have any purpose of its own, but is a holding company. SwedeMatic also have two sales offices in Germany.

The person who we interviewed was Mr Jarltén, who works as a computer technician at SwedeMatic, mainly with maintenance.

Work routines

Within SwedeMatic, the employees work exclusively in projects, while making models and producing tailor-made solutions of different kinds. The possibility of working away from the office is there, however, as far as Mr Jarltén is aware, it has never been realised by any of the

employees yet. *"It is good to be at the office, where one have colleagues for consultation"*[14], he says. If working away from the office, there are no requirements for being available in any way, as long as the time plan is followed.

Tools

The tool used for collaboration within SwedeMatic is MS Exchange, which is a multifunction groupware application. The most frequently used programs are the e- mail server (on the work stations, Outlook is used for e- mailing) and the calendaring program. According to Mr Jarltén, they could not manage without the calendar. The employees at SwedeMatic have synchronised the calendar, so that they can see when the others are available e t c. Another program within MS Exchange, which they use is the address book, where they keep all their customers' addresses, as well as employees. Apart from these programs, no other ones are used. Mr Jarltén says that MS Exchange contains a great deal of additional programs, but SwedeMatic do not make use of them.

Decisions about tools

It was Mr Jarltén himself who decided that SwedeMatic should use MS Exchange, since he is the one most familiar with the area of computing. He chose between MS Exchange and Lotus Notes. According to Mr Jarltén the both systems are equivalent. Since they use Microsoft Office, it is good to use programs that have more or less the same environment. People get familiar with it, and it is easier to work in familiar programs. Another reason for finally deciding on MS Exchange was due to colleagues in other companies, who used MS Exchange, and recommended it to Mr Jarltén.

Tool Satisfactory

The company uses another program for customer records called "contact". He thinks it would be good if MS Exchange and contact could be connected. Since SwedeMatic only uses a small percentage of the programs within MS Exchange, Mr Jarltén is of the opinion that it is unnecessary with such a large system, although right now, he thinks that there are no better alternatives. He explains that they could develop a system themselves to use, but it would be complicated if they want to change the operating system in the future. He concludes[15]:

[14] Freely translated by the authors.
[15] Freely translated by the authors

"...[S]o we have chosen to purchase ready programs, and adjust ourselves to them instead [of adjusting the programs to our work routines], it is easier and works quite well"

4.1.4 Findings

1. The result from the interviews with the IT companies shows that Dimension mainly uses e- mail, which is a single function groupware application, and is therefore an important finding for this study. Ericsson however, uses MS Exchange, which is an MGA. This is due to that Ericsson has their standardisation ESOE within the concern. Another reason for using MGA is that the whole combine Ericsson consists of more than only IT- departments and when Ericsson made a decision about the standardisation they had to take all departments' needs into consideration.
    - Dimension AB chose e- mail because the functions within it were considered sufficient for the collaboration they perform. They also make use of a project place on the web, where they can place common documents e t c. They do not wish to introduce a larger system. The interview reveals that Dimension is of the opinion that a large system for collaboration can be too expensive, compared to the functions they would use within it. The main reason why they do not have an MGA is that it would be unnecessary since they already have the functions they need in the e- mail application.

    - Ericsson Software Technology AB is also of the opinion that e- mail is a good tool for collaboration. They use the e- mail program within MS Exchange. The reason for using MS Exchange is due to the standardisation ESOE. Like Dimension, Ericsson uses a web place for document sharing e t c. However, Ericsson has developed their own application for this.

When collaborating with people within the same office, which usually is the case in these two companies, e- mail seems to be invincible, together with face-to-face communication, of

course. E- mail has the most important functions for collaborating in a project: document attachment, messaging, and sorting e t c.

2. The industrial companies are using Lotus Notes vs. MS Exchange, which, as explained in definitions, are multifunction groupware applications. This is valuable information, since it supports our hypothesis. However, according to our interviews, they do not by far make use of all programs available in the system.

   - Industrial company 1 only make use of five applications of Lotus Notes R5's (about) 15 available. According to Mr A, they are using the functions necessary for performing their work in a satisfactory way. Even though Mr A, who himself introduced the system, is not sure of which functions that are available in Lotus Notes, he believes that it works well in IC1.

   - SwedeMatic has a similar situation as IC1. They are using another MGA, namely MS Exchange. They are aware of that they are not using, by far, all of the programs available in MS Exchange, however they chose to use it anyway.

   - The reason these two industrial companies have chosen MGAs are, in both cases, that they have been recommended the systems by colleagues. Additionally, it has been important that the environment is similar to other programs used in the organisation, at least for SwedeMatic.

4.1.5 Summary of findings

As we described in our goals (chapter 1.4) we wanted to find out whether there is a difference in the groupware choice depending on the company type. We have discovered that one IT-company differs from the industrial companies. However the other IT- company uses MGA like the industrial companies, which does not support our hypothesis. The reason of this can be, as stated above, that the industrial companies have been recommended the system from colleagues, or that they simply think it is a less complicated solution. In the Ericsson case they

MGA because of their ESOE, and that Ericsson is a multinational company with many

subsidaries including a huge number of departments besides IT. Other possible reasons will be elaborated in the discussion chapter.

4.2 Questionnaire

The questionnaire was first sent out by e- mail, to 15 companies of each kind. However, since only five IT- companies and three industrial companies answered within a little more than a week, we decided to contact the remaining companies by telephone. After this, we had received twelve answers from the IT- companies, and ten from the industrial ones, with one internal fall off. The internal fall off occurred due to one company that did not use any computerised systems at all, and was thus useless for this study. Consequently, we received 22 answers in total, of which 21 have been used for presenting the result. The questionnaire has been answered by the IT manager (or similar) within the companies.

We have chosen to calculate the percentage of each answer. We are aware of that showing the result in this way can be a little misleading, due to the small number of respondents, however, we still consider that this is the clearest way to present the result. We want to point out this matter so that the reader can take this into consideration when reading the outcome of the questionnaires. The internal fall off (one industrial company) is ignored in questions regarding computer systems, and it is not included in the total when calculating the percentage figures.

We also want to point out that the result in this survey cannot be used to draw secure conclusions about companies in Blekinge, since the respondents are too few. We are merely interested in presenting the results of the questionnaire, together with the interviews and literature study, in order to indicate that this could to be a trend within companies. This study can also be used for future investigations.

Question number four, seven and eight are so called open questions, which means that we asked the questions without giving any alternatives. The companies have thus, in these questions, given free answers to the questions, without being bound by any options. Question 5 is reserved for the companies using multifunction groupware applications.

4.2.1 Result questionnaires

Question 1

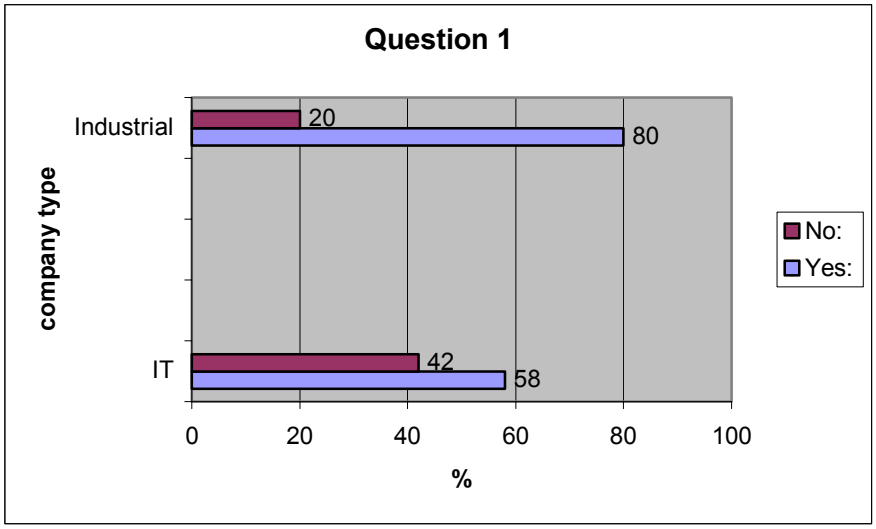

Figure 3. Is the company a part of a combine?

Comments: 58% of the IT companies, and 80% of the industrial companies are part of a combine. This can be relevant for this study, since if they are part of a combine, this can affect the choice of groupware due to standardisation of tools, for instance.

Question 2

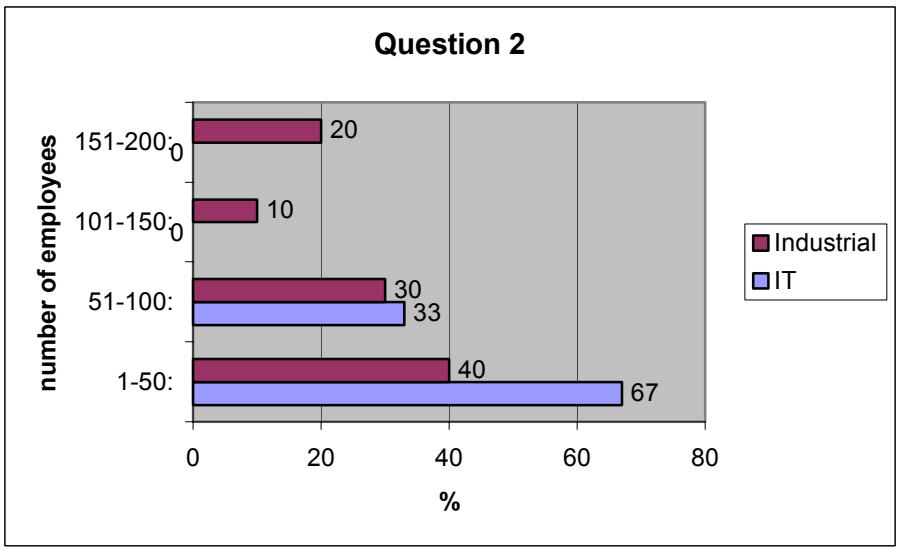

Figure 4. Number of employees in the company.

Comments: 67% of the IT companies were as small as 1-50 employees. 33% were 51-100. The corresponding numbers when it comes to industrial companies are that 40% are 1-50 employees, 30% are 51-100, merely 10 % are 101-150, and 20% are 151-200 employees. We believe that the number of employees is an important issue when it comes to groupware.

Question 3

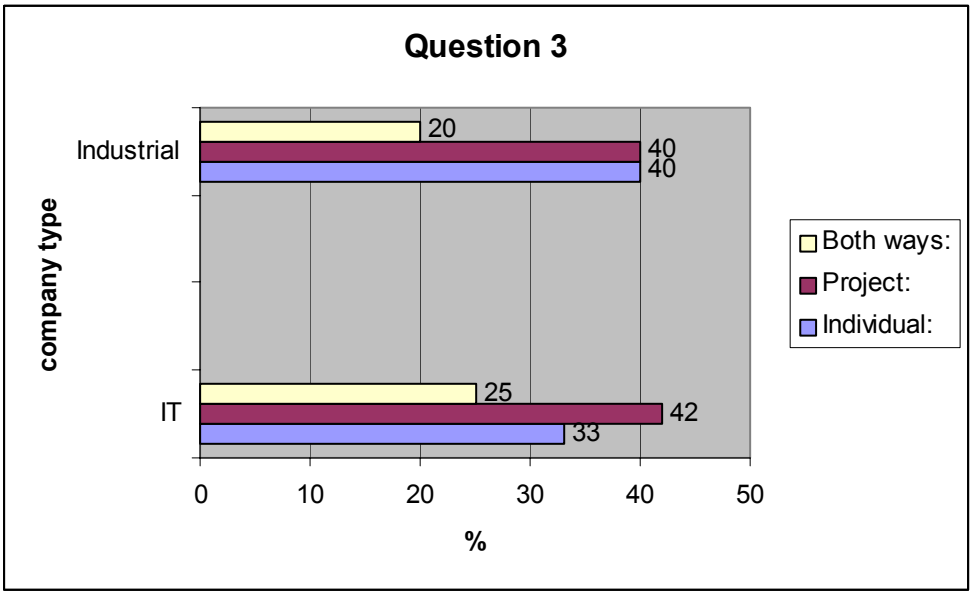

Figure 5. How do the employees within the company work?

Comments: 33% of the IT companies and 40% of the industrial companies work mainly individually, 42% of the IT companies and 40% of the industrial companies works mainly in projects, and the number is 25% (IT) and 20% (industrial) for working in both ways.
This diagram shows that both company types work in quite similar ways. Therefore we exclude that the companies' groupware choice depends on the way they work.

Question 4

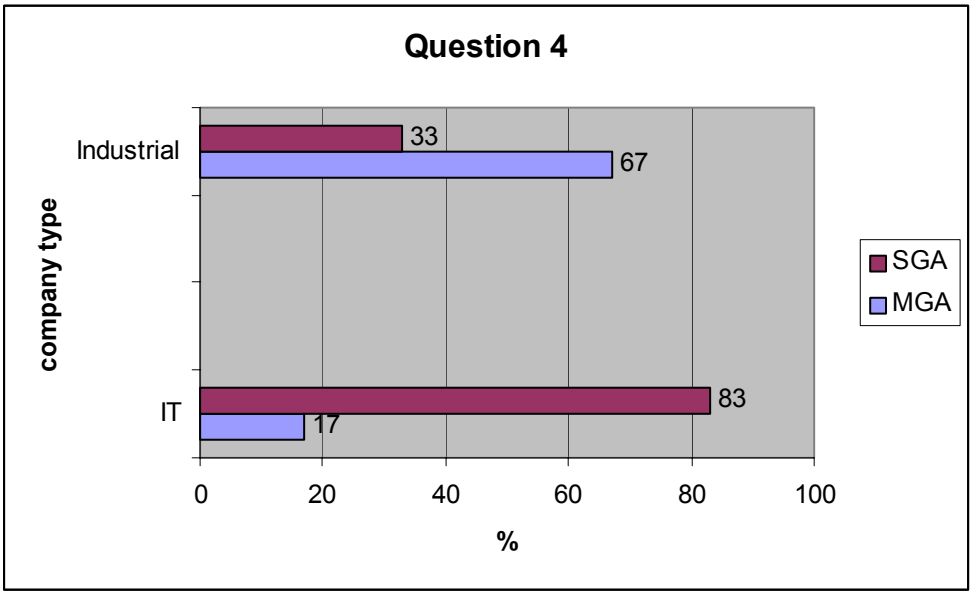

Figure 6. Companies' groupware choice.

Comments: This question concerns the choice of groupware in the organisation. As explained earlier in the text, we make a division between SGAs and MGAs. In the IT- companies, only 17% use MGA, and the remaining 83% use SGA. In the industrial companies, the numbers are a bit different – 67s% use MGA, whereas 33% use SGA. This is a very interesting outcome, since it is in line with our suspicions.

Question 5

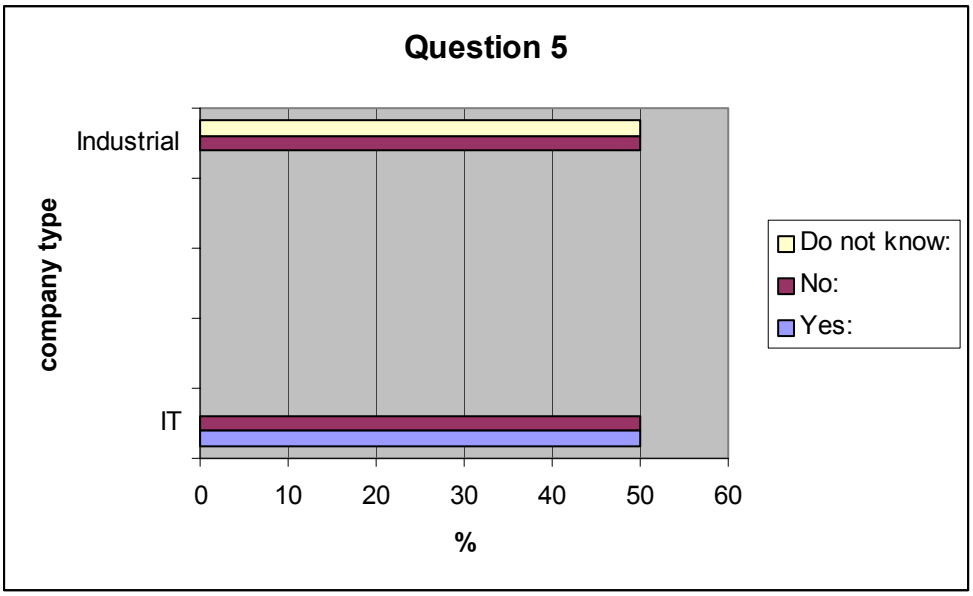

Figure 7. (Only the companies, which use MGA have answered). Do the company make use of the majority of the programs within their groupware?

Comments: This questions is reserved for the companies which use MGAs, thus 36% (8 companies) of the companies in total. Of the 17% IT- companies (two companies) which use MGA, one claims to use the majority of the programs within it, and one says they do not. Within the industrial companies 67% (six companies) use MGA. Of these, no one thinks they use the majority of the programs available, 50% think they do not use the majority of the programs, and 50% do not know. Sometimes it can be hard to know to whether or not the majority of the programs are being used, since it is often the case that the user is not aware of which programs that exist in the system, when not using them. It is also interesting that as many as 50% think that they are not using the majority of the programs. We got this result in one of the interviews as well, that even though many programs are not being used, they have still chosen to get a MGA. This can have a number of reasons.

Question 6

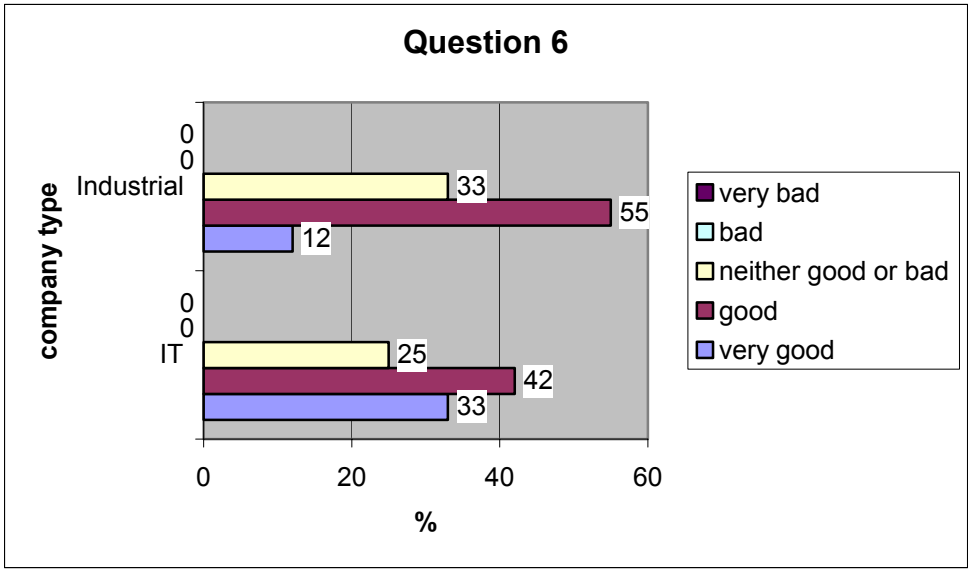

Figure 8. How satisfying are the groupware to the companies?

Comments: This question concerns groupware satisfactory. The respondents were asked to choose how well they thought their groupware works in the organisation on a scale from one (1) to five (5), one being very bad, five being very good. The companies gave quite similar answers on this question. Among the IT- companies, 33% chose number “very good” (5),

42% chose “Good” (4), and 25% chose “Neither good or bad” (3). The negative options were not chosen by any company. Among the industrial companies, 12% said that their groupware works “very good” (5), 55% chose “Good” (4), and 33% chose “Neither good or bad” (3). Here, the negative alternatives were not chosen either. The IT- companies were a bit more satisfied with their groupware than the industrial companies.

Question 7

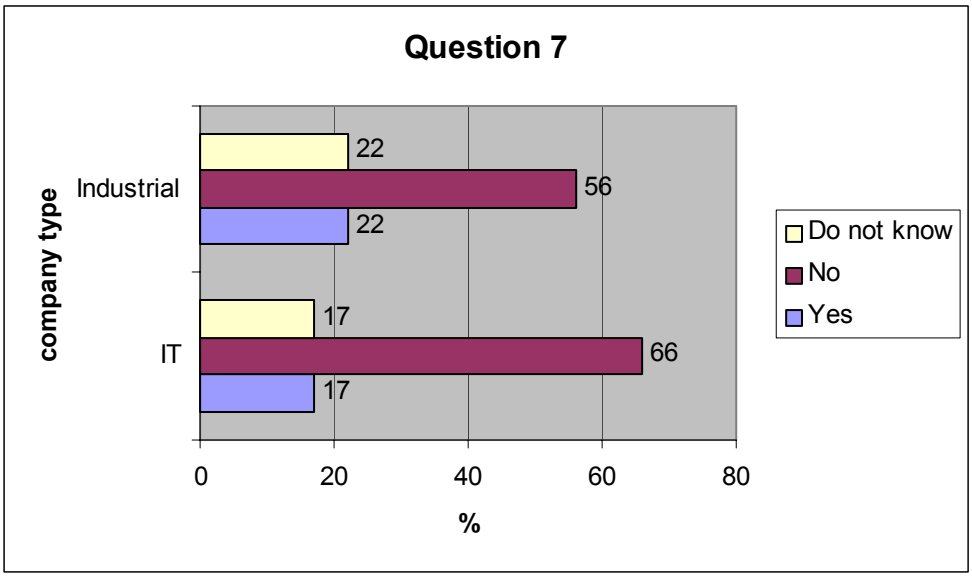

Figure 9. Do the companies miss any function in their groupware that would be useful?

Comments: 17% of the IT companies were of the opinion that their groupware was lacking one or more functions that would be useful for the employees. However, 66% thought that there were no functions missing. 17% did not know. 22% of the industrial companies thought that some function were missing in their groupware, and 56% thought that no function was missing. 22% did not know.

Question 8

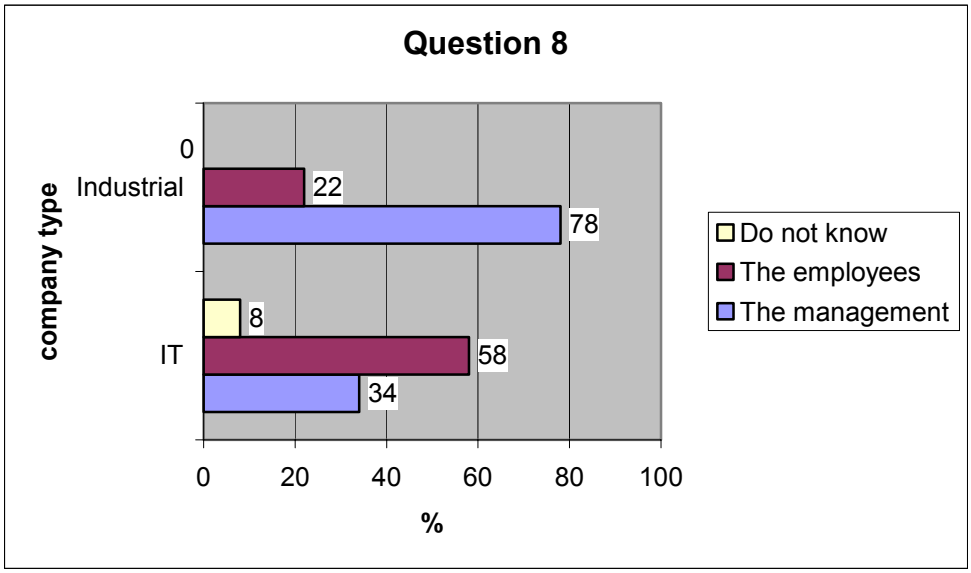

Figure 10. Who decides what groupware is used in the company?

Comments: In 34% of the IT companies, management decided what groupware to use. In 58% of the IT companies, the employees were a part of the decision. 8% did not know. In 78% of the industrial companies, the management made the decisions concerning groupware, in 22% of the industrial companies the employees were a part of the decision.

4.2.2 Findings

1. Concerning whether the companies use MGA or SGA for collaboration we have found that the majority of the industrial companies use MGA. We find this rather interesting, since our suspicion is that MGA is used mainly by industrial companies. This finding thus supports our hypothesis.

    - As many as 67% of the industrial companies use MGAs, which means that less than half the industrial companies use SGAs

2. The IT- companies use mainly SGAs. E- mail is the tool used in all the IT-company- respondents in our questionnaire, in some cases they use a project place on the web, as a supplement. Also in this case the findings support our hypothesis

- Among the IT companies, 83% use SGAs, while 17% use MGAs.

4.2.3 Summary of findings

As in the interview findings, there is a difference between the company type and the groupware choice also according to the questionnaire respondents. The reasons and suggestions for the future for these companies will be addressed in the discussion that follows.

5. Discussion

5.1 Companies and their choice

The qualitative interviews as well as the quantitative questionnaire have indicated that the groupware choice within a company can depend on which kind of company it concerns. One of the companies interviewed (Ericsson) uses MGA, but as indicated in the questionnaire only 17% uses MGA within the IT-companies. According to us Ericsson is one of the few IT-companies that uses MGA. The majority of the questionnaire shows that IT- companies seem to favour SGAs such as e- mail programs, while industrial companies choose MGAs as MS Exchange or Lotus Notes for collaboration. The reasons why IT companies choose SGA can be, as Mr Hägg at Dimension AB explained, that they do not need all the programs provided in MGAs. Instead they use an e- mail application, where the basic functions such as document attachment and messaging services is provided, and when necessary, they additionally make use of a project place on the Internet. So then what is the reason for that the industrial companies do not follow this path? This can have a number of reasons, which we will present as follows.

5.2 Reasons for groupware choice

The reason for choosing a specific groupware can, according to us, be related to the particular organisation and its needs. An example of this is that SwedeMatic chose MS Exchange due to that they had certain demands (the calendar program, in this case), not fulfilled by an SGA according to Mr Jarltén. Another reason for choosing MS Exchange was that the Microsoft environment would be similar to the Office programs already used the organisation.

According to us, other possible reasons for that industrial companies more often tend to choose MGAs can be that, as Coleman (1997) claims, MGAs provide a friendly user interface, and relatively simple administration. Additionally, the organisation does not have to introduce several programs, each for a single purpose, which has different software environments that the employees will have to get acquainted to.

In the surveys in this study, a number of industrial companies happened to be larger than the IT- companies. 30% of the industrial companies that were respondents to our questionnaire had more than 100 employees, while none of the IT- companies were of that size. This can of course be a contributing factor to the dissimilarities within the groupware choice. However, we are of the opinion that it is more to this outcome than the number of employees. 67% of the
industrial companies use MGAs, which shows that not only the larger industrial companies choose MGAs.

Another reason can be that the employees within the IT- companies are more knowledgeable about computer systems e t c, due to that they work within the computer science area. When acquainted to different systems, their own groupware needs might be easier to recognise. The only program they really need is the e- mail and its functions, which is reliable according to Yourdon (2000). Other programs are superfluous, claims for instance Mr Hägg at Dimension AB. Also according to the investigation conducted by Robertson et al (2001), the introduction of e- mail was more successful than the one of Lotus Notes. In this investigation, the e-mail program is recognised to be *"…a useful and efficient tool for communicating to significant numbers of people across divisions"(Robertson et al, 2001: p343).* According to us, the investigation conducted by Robertson et al, can also be applicable on the IT- companies in our study.

5.3 Measures

When it comes to IC1, we scrutinised which programs they actually use in Lotus Notes. We found that they use e- mail, calendar, address book, and databases. The calendar is just used for personal purposes by IC1, even though it is possible to use it in order to look up when co-workers are available e t c. The e- mail application, as well as the address book and calendar, can for instance be found in the program Outlook by Microsoft, which is a much smaller program, containing almost only the applications they are using. However, their database system is not easily replaced, since they have built it themselves in Lotus Notes. Due to this, the databases are structured the way they want. Also, according to Mr A, the databases are rather complicated, and should therefore not be replaced.

Thus, as the situation is currently, it might not be a good idea to through away the whole system and introduce a new one. Since IC1 has used Lotus Notes for more than 10 years, it is well incorporated in the organisation. It might be expensive, according to Mr A, to change such a well established system. Additionally, all the employees are familiar with it, which also is of great importance to bear in mind when seeing to the best for the organisation.

SwedeMatic is satisfied with MS Exchange, but mean that it really is too large for their organisation. They are aware of that they are paying for programs that they do not use. All the programs they are currently using, except for the calendar, can be replaced by SGAs. However, there are no SGAs available that provides this extended calendar program. If it in the future will come such an SGA, it might be a good idea to consider a change, in order to make use of the whole system, and get value for their money. It would be especially good if it were a Microsoft system, so that the environment remains the same.

As mentioned earlier, Ericsson Software Technology AB uses MS Exchange. Within MS Exchange, they only use an e-mail program and a calendar. Since Ericsson here in Blekinge is a part of a multinational company, they have to adapt to ESOE, where MS Exchange is a standard set by the management in Stockholm. Since Ericsson has many departments except for the IT- company in Ronneby, they have chosen a groupware that will work for all departments around the world. Consequently, there is no possibility of changing groupware tool in their situation being a part of a multinational enterprise. According to us, the fact that this IT- company uses MGA is due to the standard, and the IT department has not made this decision.

Dimension AB uses SGA for collaboration and is satisfied with that. An MGA would be unnecessary since they have all the functions they need in their current program. No groupware change is necessary.

6. Conclusion

After performing this study, where we have conducted a literature study, interviews, and a questionnaire, we have come up with a number of inferences.

According to our study most industrial companies use MGAs for collaboration. Unfortunately the companies do not make use of the majority of the programs within the systems. The reasons why they still choose MGAs are, among others: the computer systems knowledge in the company, the simple and user- friendly interfaces of MGAs, and the services that follow the system. Additionally to these reasons it is often not desirable to change systems within an organisation, due to that they are incorporated in the employees' work routines.

The IT- companies had a totally different outcome than the industrial companies. Most IT-companies use SGAs, and all their collaboration needs are satisfied by the existing programs. Thus, no other programs or computer systems are needed.

6.1 Contribution to computer science

The reason for doing this investigation was to acknowledge the possible differences in groupware choice within different kind of companies. We suspected that industrial companies more often choose multifunction groupware applications, while IT- companies use single function groupware applications. We also suspected that the majority of the programs within the MGAs were not used. We believe that companies, both industrial and IT, can learn from this study, by acknowledging the importance of introducing the right groupware into the organisation and not purchasing an MGA without making use of its programs.

6.2 Discussion of improvements

Since the area of groupware is large and complex, we have not been able to see to all aspects when writing this thesis. Therefore we will make some suggestions that could improve it further:

- Do case study, where one can go into dept in a company and thus be able to draw conclusions regarding the company's groupware choice.
- Look into other aspects such as security issues and/ or economy issues.

7. Literature list

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- Appendix –

Appendix 1: Interview Dimension AB

Appendix 2: Interview Ericsson Software Technology AB

Appendix 3: Interview Industrial Company 1

Appendix 4: Interview SwedeMatic AB

Appendix 5: Questionnaire