THE INTRODUCTION PROCESS
OF THE GROUPWARE PRODUCT

Pasi Hakkarainen

University of Jyväskylä

Agora Center

Agora Learning Laboratory

1 Introduction

The introduction of a software or groupware product is a complex and important event in the product life cycle. Besides the application features, the success of the new product is related to the introduction process itself. The difference between groupware and 'individual' software is that groupware is not useful if there are not enough users and this highlights the importance of the introduction process especially with groupware products. The way groupware applications are introduced has an influence on the adoption process of the product. With the planning of the introduction, applications may be introduced so that the product adoption process is also supported.

The introduction process is examined from product and groupware perspective. Reports aim is to present a framework about introduction process and issues related to that process. The report concentrates both on software and product introduction. Level of analysis is mixed, but report emphasizes more on groups than individual or organizational level. The aim is to build a very extensive framework about the issues related to groupware introduction process. The scope is not very outlined but the report raises issues from software, groupware, product, social and knowledge management areas. The influence of product features itself is not examined but the introduction process.

Research questions concern about required definitions and introduction process itself.

> ➢ What is groupware product introduction?

> ➢ What factors have an influence on groupware product introduction?

Used research method is literature survey. Survey focus on basic theories related to research questions and experiences from software or groupware implementation. Framework can be used in evaluation and planning of factors and actions related to introduction process. Research differs from previous research in three issues: 1) connecting software and product life cycles, 2) concentrating on groupware's special features in technology diffusion and 3) in aim to build an extensive frame about issues related to introduction process. My own contribution is the combination and categorization of previous experience and theories about the research area- which is '***the framework about groupware product introduction processes'***.

The introduction process is presented in the second chapter with the product and software life cycles. Then the groupware is defined and the special features about groupware introduction are pointed out. Then the dominating 'diffusion of innovations'-theory is presented and it's suitability for the research is evaluated. Chapters 5 to 13 each present one specific area which can be seen as a

factor influencing on introduction process. Chapters 14 and 15 are the summary and conclusions of the report. The structure of the report is presented in figure 1.
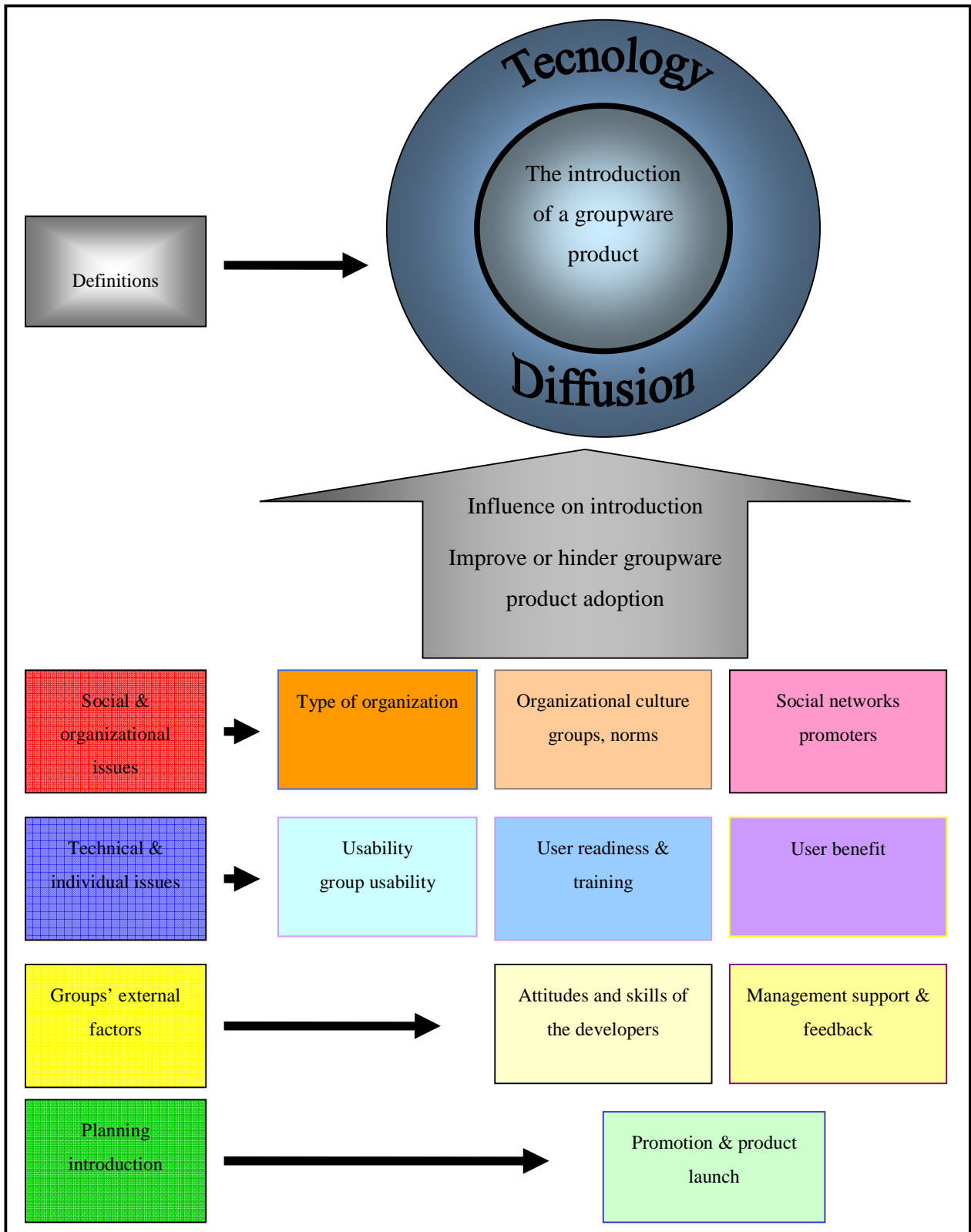

Figure 1 the structure and the content of the report.

2 Software & Product Introduction

Software life cycle is the time which is passed from the introduction of the software to the withdrawal of the product. Life-cycle model is a way to divide the software development work to different phases. One of the most used software life cycle model is the waterfall model, which one version is presented in figure 2. Maintenance is customers' problems solving, correcting errors, software update and adding new features to the software. Organizing maintenance is essential especially in large customer projects. (Haikala & Märijärvi, 1998. 25, 29)
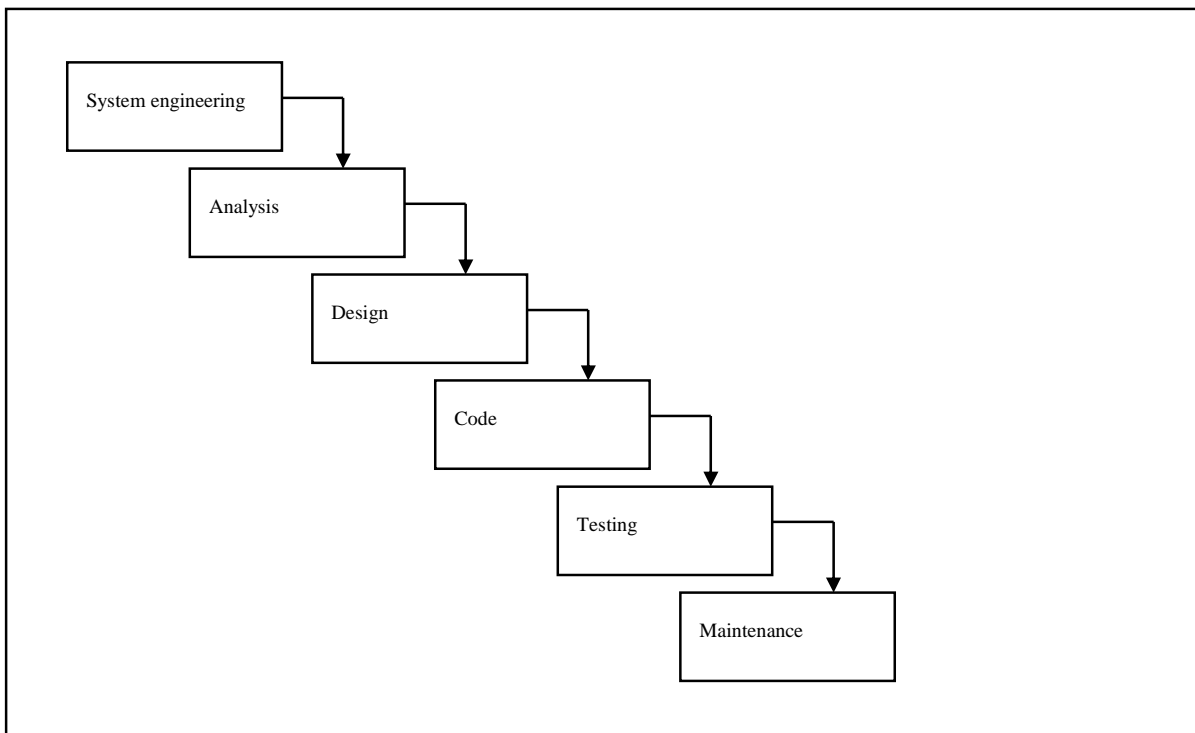

Figure 2 the classic life-cycle model: the 'waterfall model' (Pressman, 1994. 24).

There are numerous variations of software systems life cycle. Another of them is presented in figure 3. Sommerville (1985) presents a 'macro' life cycle model which includes: 1) requirements analysis and definition, 2) system and software design, 3) implementation and unit testing, 4) system testing and 5) operation and maintenance. In 'operation and maintenance' the system is installed and put into practical use and normally it is the longest life cycle phase. The activity of maintenance involves correcting errors which were not discovered in earlier stages of the life cycle and improving the implementation of system units and enhancing the system's services as new requirements are perceived. (Sommerville, 1985. 2-3)

The reason why the operation and maintenance phase does not simply follow the system testing phase is that the maintenance activity may involve changes in requirements, design, and implementation or it may highlight the need for further system testing. (Sommerville, 1985. 4)

Requirements

Design

Implementation

Testing
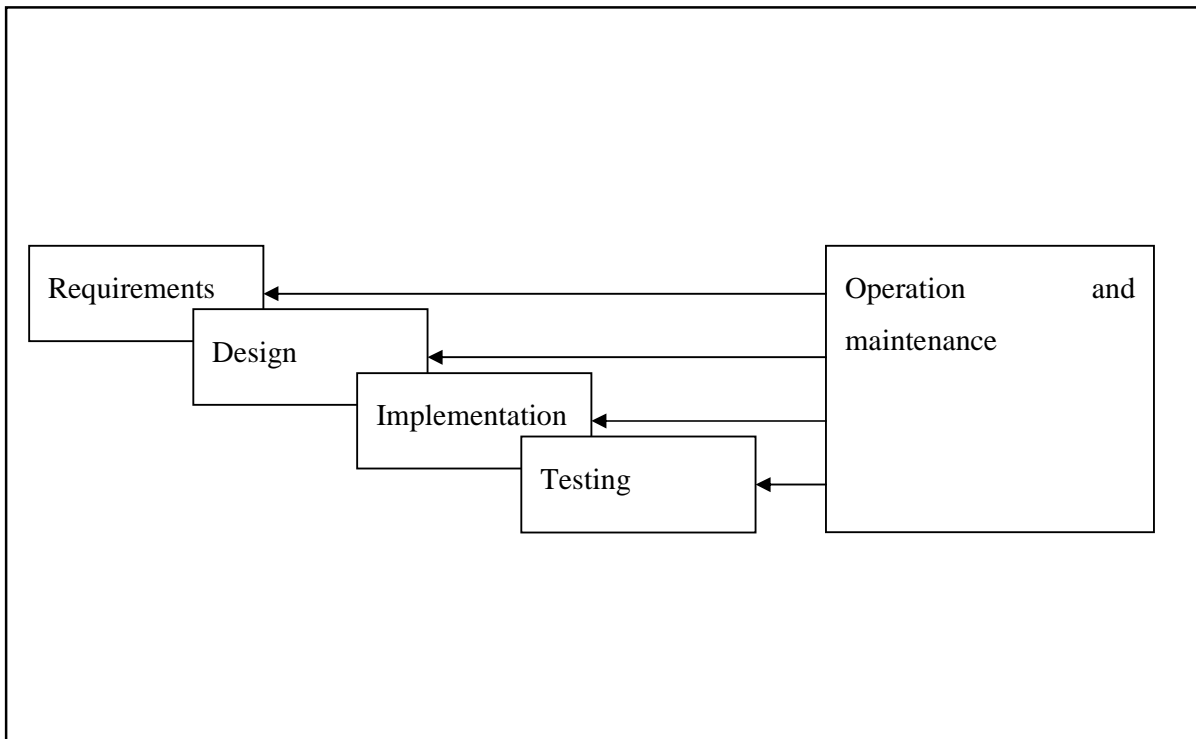
Operation and maintenance

Figure 3 The software system's life cycle (Sommerville, 1985. 4).

Another way to approach the software product life cycle is the 'product' approach. To say that a *product* has a *life cycle* is to assert four things:

➢ products have a limited life

➢ product sales pass through distinct stages, each posing different challenges, opportunities, and problems to the seller

➢ profits rise and fall at different stages of the product life cycle

➢ products require different marketing, financial, manufacturing, purchasing, and human resource strategies in each stage of their life cycle (Kotler, 1997. 345)

Product life cycle (PLC) is typically presented as a bell-shaped curve presented in figure 4. This curve is typically divided into four stages: 1) introduction, 2) growth, 3) maturity, and 4) decline. However, not all products exhibit a bell-shaped PLC. (Kotler, 1997. 346; Bennet, 1988. 319-320, 521)

Introduction is a period of slow sales growth as the product is introduced in the market. Profits are nonexistent in this stage because of the heavy expenses incurred with product introduction. It is often difficult to designate where each stage begins and ends. (Kotler, 1997. 346)
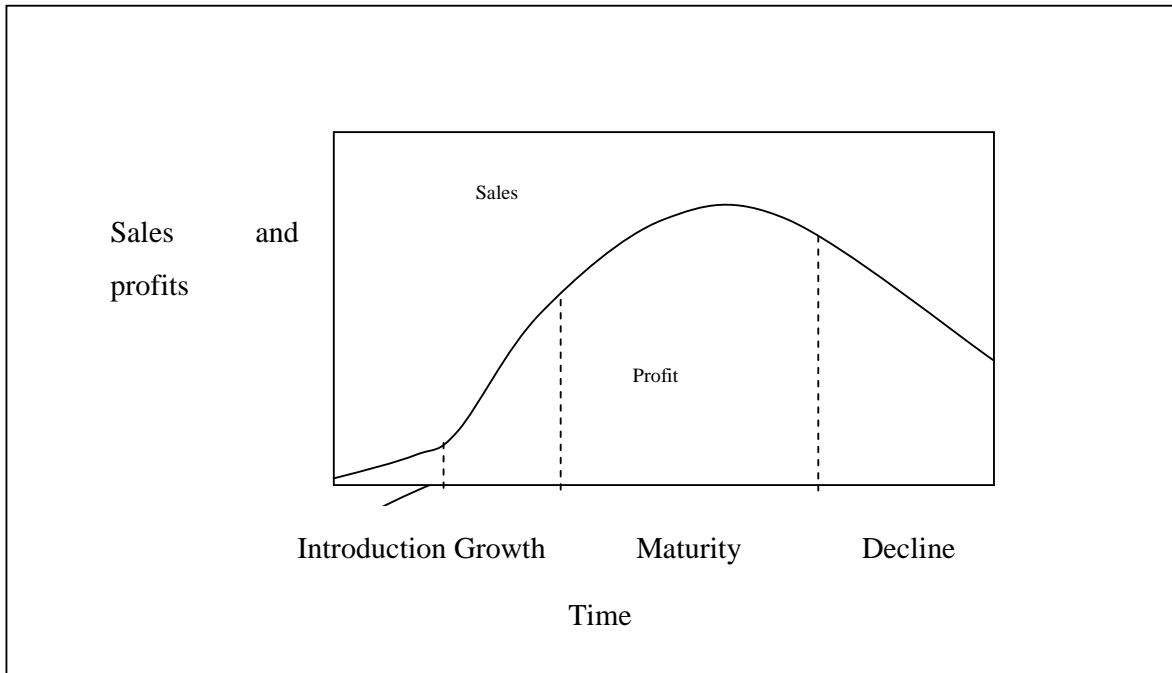

Figure 4 Sales and Profit Life Cycles; bell-shaped PLC (Kotler, 1997. 346).

The software life cycle presented by Sommerville and the PCL presented by Kotler differ with the meaning and position of introduction: in software life cycle introduction is the latest phase but in the PLC it is the very first phase of the life cycle. However both life cycle approaches can be used for examining the software product introduction.

In this report the introduction is seen both as software and product introduction. Introduction cannot be totally separated from the other phases of the software or product life cycle. This is because the previous and following phases have an influence on introduction phase. Introduction should be considered already during the requirements specification and the success of the implementation of the introduction has an influence to the actions of the latter phases of the product life cycle.

The importance of the introduction process is known:

> *The different experiences indicate that the way groupware is introduced and maintained in organizations is a crucial success factor. (Pipek & Wulf, 1999. 199)*

Also Bikson & Everland (1996, 429) say that: implementation processes, the series of decisions and actions by means of which a new technology is incorporated in the day-today work of an

organization, will have as strong an influence on outcomes as properties of the technology per se or the prior work context – and probably stronger.

The introduction process can be seen begun with the very first actions of the introduction process, which can be for example the installation of the software, training or the first time when coming introduction is informed for the personnel related to the process. The end of the introduction is more difficult to define. One not defined concept at this stage is the end of the introduction process.

The interest groups of the introduction consist on designers, training personnel, end users, and managers from the operational level to the top management. It is not only the end users whom are important. The management attitudes and support is important and managerial staff has to also be included to introduction process.

The planning of the introduction should be done not later than after testing phase. Planning should contain the time table of the introduction, training, user identification management, informing, guidance & technical support and software & hardware maintenance. (Törmälä, Harju, Junttila, Liimatainen, Riihilä & Tolmunen, 2003. 65) The difficulty of planning is also recognized: The changes in both the social and technical systems cannot be predicted in advance, except in the most general terms (Bikson & Eveland, 1996. 428).

3 Groupware's Position

In this chapter groupware is defined and the level of analysis is presented. Also groupware features exploitation in knowledge management is presented. Finally the importance of critical mass is highlighted.

3.1   Groupware

Groupware can be defined as computer based systems that support groups of people engaged in a common task by providing an interface to a shared environment (Ellis, Gibbs & Rein, 1991. 40). Grudin (1993) gives groupware a quite large definition and claims that groupware is computer applications that support groups (Grudin, 1993. 97). Later groupware has been truncated from application level and claimed that it can be just features embedded into software:

> *"[…] groupware is often not a large, expensive system: It can be a small application or even a feature" (Grudin & Palen, 1995. 265)*

Groupware has its roots in three distinct application areas: electronic messaging, information management, and workflow/process automation. Information and knowledge are shared in support of three functions: communication, collaboration, and coordination. This Lotus Development Corporation's groupware model is presented in the figure 5. (Lotus Development Corporation, 1995, 9)
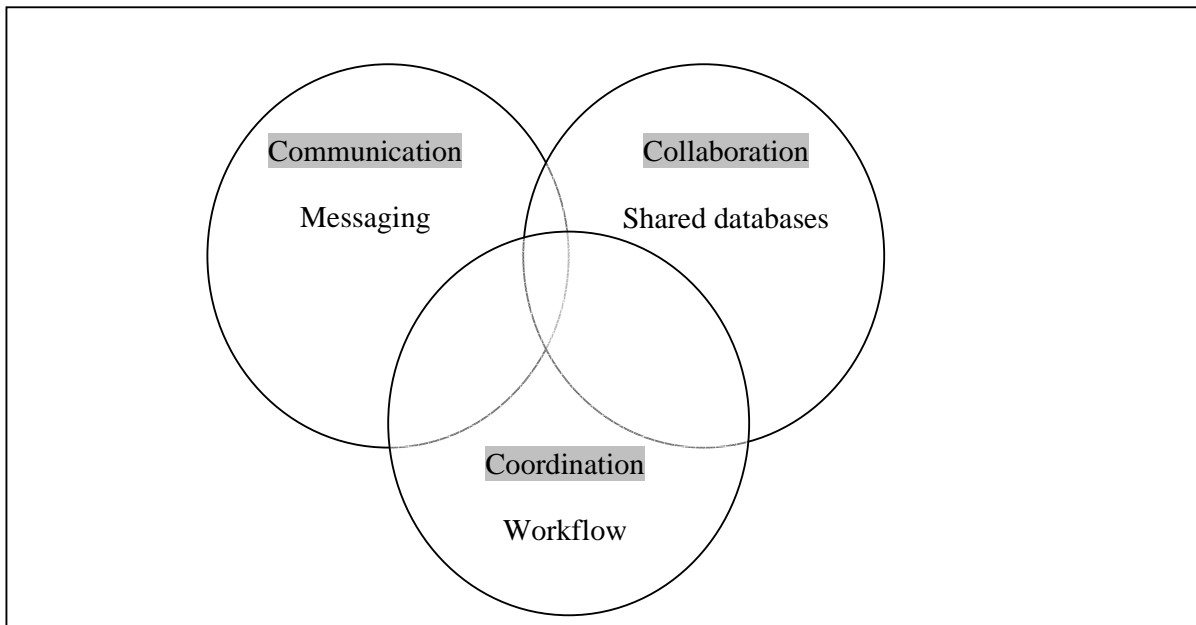

Figure 5 the category of the groupware functions (Lotus Development Corporation 1995, 31).

Groups are different than organization and individuals. The model presented in figure 6 place groupware in the software universe somewhere between single-user applications and information systems that support organizations. Groups are not organizations and groupware is different from large systems. Groupware targets smaller groups than systems serving organizational goals. (Grudin, 1994. 93 - 95)
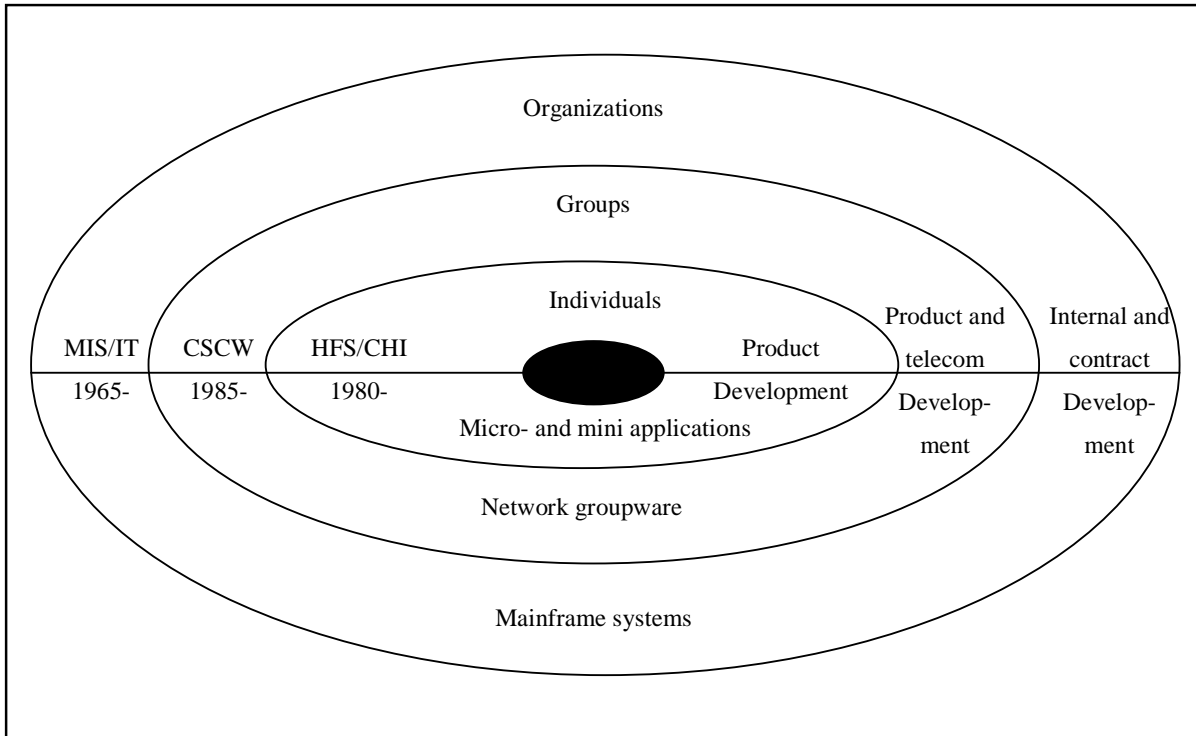
Figure 6 Software development and research contexts (Grudin, 1994. 94).

3.2   Knowledge Management Tools

Knowledge management is the name given to the set of systematic and disciplined actions that an organization can take to obtain the greatest value from the knowledge available to it. "Knowledge" in this context includes both the experience and understanding of the people in the organization and the information artifacts, such as documents and reports, available within the organization and in the world outside. Effective knowledge management typically requires an appropriate combination of organizational, social, and managerial initiatives along with, in many cases, deployment of appropriate technology. To structure the discussion of technologies, it is helpful to classify the technologies by reference to the notions of tacit and explicit knowledge introduced by Polanyi in the 1950s and used by Nonaka to formulate a theory of organizational learning that focuses on the conversion of knowledge between tacit and explicit forms. (Marwick, 2001. 814)

Table 1 shows some examples of technologies that may be applied to facilitate the knowledge conversion (socialization, externalization, internalization & combination). The individual technologies are not in themselves knowledge management solutions. Instead, when brought to market they are typically embedded in a smaller number of solutions packages, each of which is designed to be adaptable to solve a range of business problems. Examples are portals, collaboration software, and distance learning software. Each of these can and does include several different technologies. (Marwick, 2001. 815-816)

Tacit to Tacit	Tacit to Explicit
E-meetings	Answering questions
Synchronous collaboration (chat)	Annotation
Explicit to Tacit	*Explicit to Explicit*
Visualization	Text search
Browsable video/audio of presentations	Document categorization

Table 1 Examples of technologies that can support or enhance the transformation of knowledge. (Marwick, 2001. 815-816)

The importance of individuals and interaction between individuals in knowledge management and learning is noticed also in other research. As following two examples illustrate, interaction is essential in organizational learning and knowledge exchange.

At fundamental level, knowledge is created by individuals. […] The organization supports creative individuals or provides a context for such individuals to create knowledge. Organizational knowledge creation, therefore, should be understood in terms of a process that "organizationally" amplifies the knowledge created by individuals, and crystallizes it as a part of the knowledge network of organization. In this line, it is possible to distinguish several levels of social interaction at which the knowledge created by an individual is transformed and legitimized. In the first instance, an informal community of social interaction provides an immediate forum for nurturing the emergent property of knowledge at each level and developing new ideas. (Nonaka, 1994. 17)

All learning takes place inside individual human heads; an organization learns in only two ways: (a) by the learning of its members or (b) by ingesting new members who have knowledge the organization didn't previously have. (Simon, 1991. 125)

Examples about the use of groupware in knowledge management can be seen in applications or features which support communication and collaboration between individuals. These kinds of features can be used to support organizational learning and knowledge exchange. Organizational learning and knowledge management are important issues which can be supported with groupware.

3.3   Critical Mass

Most groupware is only useful if a high percentage of group members use it (Grudin, 1994. 96).

Although the promise of work enhancement may encourage use, groupware tools are prone to a vicious circle that restricts the realization of system borne work enhancements (figure 7). The key determinant in this vicious circle is the level of effort. (Cockburn & Jones, 1995)
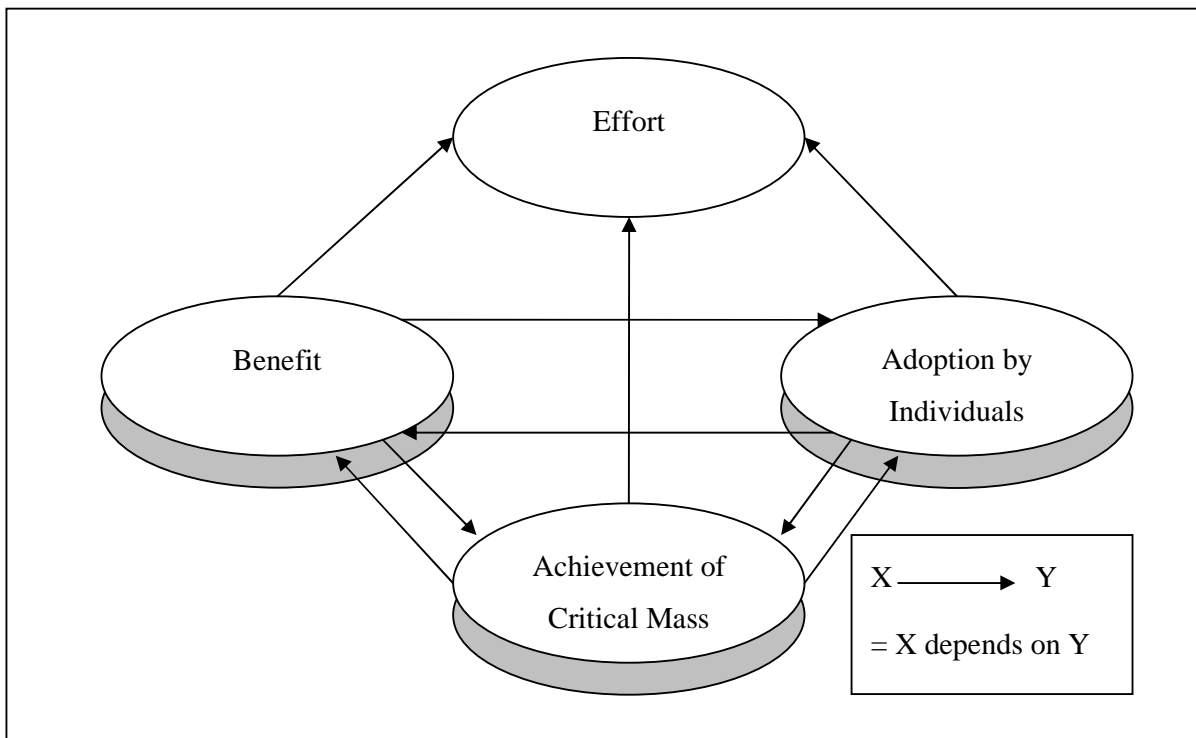
Figure 7 the "vicious circle" of dependencies in groupware adoption (Cockburn & Jones, 1995).

BENEFIT AND BENEFIT-LAG Willingness to adopt a system is dependent on the benefits derived from its use, and during adoption this is primarily determined by immediate gains. All computer systems, however, suffer from "benefit-lag," the period during which the effort put into mastering a system out-weighs benefit received. (Cockburn & Jones, 1995)

ATTAINMENT OF CRITICAL MASS Achieving critical mass depends on adoption by a sufficient group of individuals. Sufficiency in this context is contingent of the group, individual, and task requirements: in one group task the main factor for might be the number of collaborators, and in another, the involvement of particular individuals might be the main determinant. (Cockburn & Jones, 1995)

ADOPTION BY INDIVIDUALS Personal use of systems in encouraged if the rewards for doing so are clearly apparent: personal use is most likely to be stimulated by personal benefits. (Cockburn & Jones, 1995)

THE VICIOUS CIRLE OF ADOPTION Critical mass depends on adoption by individuals which is encouraged by benefits, but the benefits are contingent on a critical mass of users. All these properties must be simultaneously available before groupware can become successful. This situation appears to foretell a gloomy future for groupware. (Cockburn & Jones, 1995)

Groupware requires more careful introduction (implementation) in the workplace than product developers have confronted (Grudin, 1994. 97). The 'vicious circle' highlights the importance of the successful groupware introduction in user adoption process. Often a critical mass of use must be reached before a technology provides a net benefit (Markus, 1987 in Grudin & Palen, 1995). The need to *achieve the critical mass* in the early phase of groupware product life cycle raises it as one of the most important objectives and indicators of the groupware introduction process.

4 Diffusion of Innovations

Diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system. Diffusion is a special type of communication concerned with the spread of messages that are perceived as new ideas. The four main elements in the diffusion of new ideas are 1) the innovation, 2) communication channels, 3) time, and 4) the social system. (Rogers & Scott, 1997)

An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption. The ***characteristics of an innovation***, as perceived by the members of a social system, determine its rate of adoption. The characteristics which determine an innovation's rate of adoption are: 1) relative advantage, 2) compatibility, 3) complexity, 4) trialability, and 5) observability. These characteristics are presented more detailed in chapter 13. (Rogers & Scott, 1997)

The second main element in the diffusion of new ideas is the ***communication channel***. Communication is the process by which participants create and share information with one another in order to reach a mutual understanding. A communication channel is the means by which messages get from individual to another. ***Mass media channels*** are more effective in creating knowledge of innovations, whereas ***interpersonal channels*** are more effective in forming and changing attitudes towards a new idea, and thus in influencing the decision to adopt or reject a new idea. Most individuals evaluate an innovation, not on the basis of scientific research by experts, but through the subjective evaluations of near peers who have adopted the innovation. (Rogers & Scott, 1997)

The third main element in the diffusion of new ideas is ***time***. The time dimension is involved in diffusion in three ways. First, time is involved in the ***innovation decision process***. The innovation-decision process is the mental process through which an individual (or other decision making unit) passes from first knowledge of an innovation to forming an attitude towards the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision. An individual seeks information at various stages in the innovation decision process in order to decrease uncertainty about an innovation's expected consequences. The second way in which time is involved in diffusion is in the ***innovativeness of an individual*** or other unit of adoption. Innovativeness is the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a social system. There are five adopter categories, or classifications of the members of a social system on the basis on their innovativeness: 1) innovators, 2) early adopters, 3) early majority, 4) late majority, and 5) laggards. The third way in which time is

involved in diffusion is in *rate of adoption*. The rate of adoption is the relative speed with which an innovation is adopted by members of a social system. The rate of adoption is usually measured as the number of members of the system that adopt the innovation in a given time period. As shown previously, an innovation's rate of adoption is influenced by the five perceived attributes of an innovation. (Rogers & Scott, 1997)

The fourth main element in the diffusion of new ideas is the *social system*. A social system is defined as a set of interrelated units that are engaged in joint problem-solving to accomplish a common goal. The members or units of a social system may be individuals, informal groups, organizations, and/or subsystems. The social system constitutes a boundary within which an innovation diffuses. How the *system's social structure* affects diffusion has been studied. A second area of research involved how *norms* affect diffusion. Norms are the established behavior patterns for the members of a social system. A third area of research has had to do with *opinion leadership*, the degree to which an individual is able to influence informally other individuals' attitudes or overt behavior in a desired way with relative frequency. A *change agent* is an individual who attempts to influence clients' innovation decisions in a direction that is deemed desirable by a change agency. The fourth area of research involves the types of *innovation decisions* (whether individual adoption decisions or organizational decisions, and whether they are made by an authority or by consensus). (Rogers & Scott, 1997)

Some factors presented in diffusion theory have also been reported. Grudin & Palen (1995, 263) say that versatile functionality and ease of use associated with discretionary products appeared to be factors leading to groupware adoption. Other factors included organization wide infrastructure and substantial peer pressure that developed over time. (Grudin & Palen, 1995. 263)

Also critic against diffusion of innovation theory is presented. (Lyytinen & Damsgaard)

5 Organization Characteristics

The organization structure itself can be hindering or supporting factor in groupware adoption process. In this chapter examples about organization structure and levels of analysis are presented. Experience about the influence of these factors to introduction process in not reported widely.

According to Friedlander & Brown (1974) organization can be descript with three elements: Organization consists 1) people, 2) techniques and 3) structures and processes which regulate organizations functions (in Honkanen, 1989. 11). Laudon & Laudon (1998) define organization as a stable, formal social structure that takes resources from the environment and processes them to produce outputs. This definition focuses on three elements of an organization: 1) inputs from the environment, 2) production process and 3) outputs to the environment. Capital and labor are primary production factors provided by the environment. The products and services are consumed by environments in return for supply inputs. Organizations have internal rules and procedures. Organizations are social structures because they are a collection of social elements, much as a machine has structure- a particular arrangement of valves, cams, shafts, and other parts. All organizations have some structural characteristics: clear division of labor, hierarchy, explicit rules and procedures, impartial judgments, technical qualifications for positions and maximum organizational efficiency. (Laudon & Laudon, 1998. 76-78)

Also the state of the organization, for example a change, is a noteworthy factor. ***Organization development*** exists when organization is changing. Different organizational development methods are related to common social change approaches. In such kind of development three different methods can be used: 1) appeal to common sense and that people understand their own benefit, 2) people's attitudes, norms and thinking are changed with training, 3) changes are implemented just by authority and power. (Halonen, 1989 15, 17)

5.1   Organization's Levels

Organization can be examined and categorized with the levels of the organization. When analyzing information technology and organization an important issues raise from the level of analysis. In their research Markus & Robey present three different levels of analysis: individuals, organizations, and society. Problems of inference may arise when concepts are defined and data are collected at levels of analysis inappropriate for the theoretical propositions being examined. For example, research interested in organizational goals often collect data on the goals of key individuals. (Markus & Robey, 1988. 593).

Another, the customary division of levels of analysis into "macro-level" and "micro-level" theories reflect disciplinary boundaries. The concepts in macro-level theories are properties of large-scale collectives (organizations, populations, societies) and micro-level theories are properties of individuals and small groups. Analysis level can also be mixed. (Markus & Robey, 1988. 593).

Simplified levels of analysis can also be broadened. In figure 8 Laudon & Laudon (1998. 87) present more detailed category of organization levels.
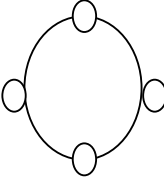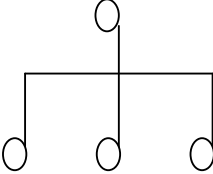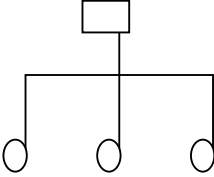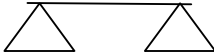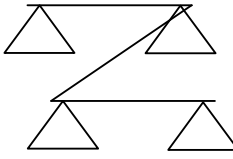
Organizational level		Activity	Example Support system.
Individual		Job, task	PC application; personal client database; decision-support system
Team		Project	Product scheduling; access to mainframe data; access to external data sources; dynamic information requirements; group DSS; groupware
Department		Major function	Accounts payable; warehouse; payroll; human resources; marketing; stable information requirements; MIS; major transaction systems
Division		Major product or service	Systems to support production, marketing, administration, and human resources; access to organizational financial and planning data; MIS; ; major transaction systems, on-line interactive systems
Organization		Multiple products, services, and goals	Integrated financial and planning systems; MIS, on-line interactive systems, ESS
Inter organization		Alliance, Competition, Exchange, Contact	Communication systems; intelligence, observation, and monitoring systems
Organizational network		Sector of economy: related products, services; interdependencies	Informal communication systems; industry and sector-level formal reporting systems

Figure 8 Organizational levels and support systems. Systems are designed to support various levels of the organization. (Laudon & Laudon, 1998. 87)

5.2   Organization Structures

Juuti (1989) presents seven different formal organization structures: 1) line organization, 2) line-staff organization, 3) functional organization, 4) profit centre organization, 5) project organization, 6) matrix organization, and 7) netlike organization. (Juuti, 1989. 214-223)

LINE ORGANIZATION

Line organization is the basic way to organize. Line organization's features are:

- ➤ its structure is purely hierarchic

- ➤ every member in the organization has only one actual superior, who controls everything

- ➤ official channels cannot be overtaken

- ➤ management becomes easily authoritarian

- ➤ personnel's work motivation is usually weak

- ➤ there are several conflicts between management and employees

Line organization's benefit is that the power and responsibilities can be easily defined. (Juuti, 1989. 214-215)

LINE-STAFF ORGANIZATION

When the amount of information increased, the superiors of the line organization were not able to handle their tasks alone. Thus, increased number of experts was needed to help the line organization. These experts were designated with common noun: *staff*. Staff has a permission to give advise direct to the line organization considering their own special area. The disadvantage of the organization is that there exist conflicts between the line and the staff. In line-staff organization it is important to assure, that responsibilities are clearly defined to avoid conflicts. An example about line-staff organization is presented in figure 9. (Juuti, 1989. 215-216)

Benefits of the line-staff-organization are:

- ➤ organization can benefit from the expertise of the staff

- ➤ line organization is free from duties which may be complied more effectively by the staff (Juuti, 1989. 216)
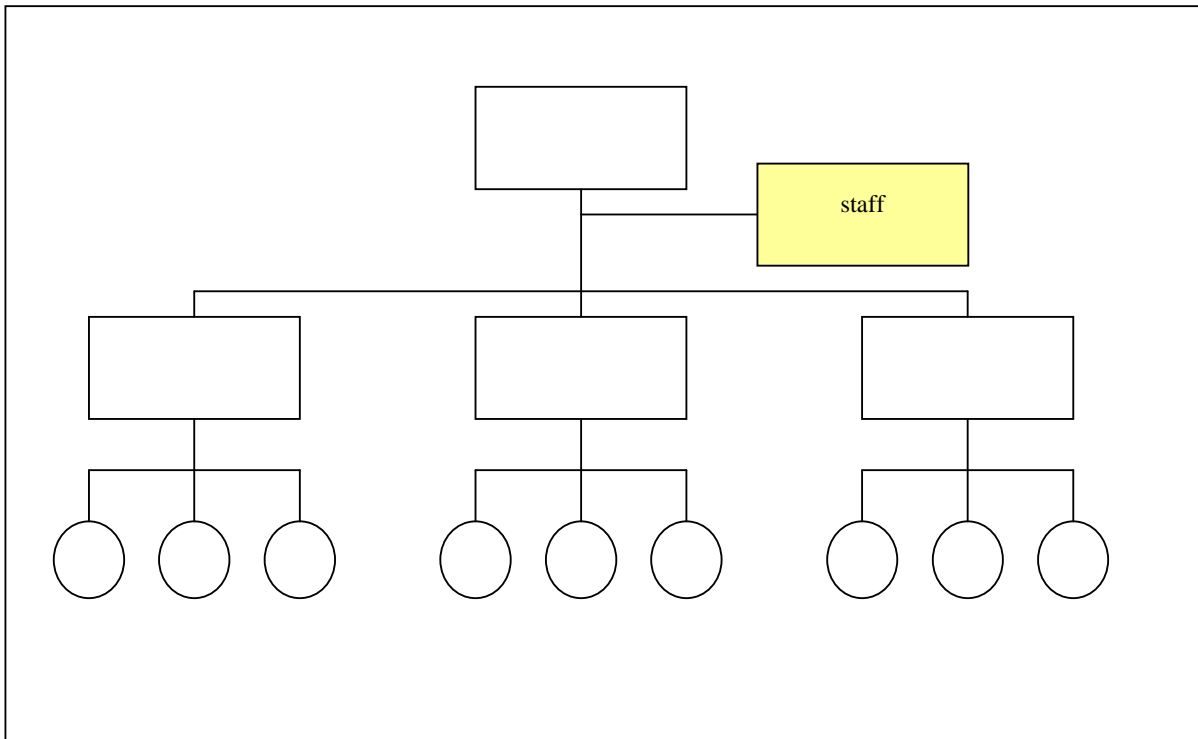
Figure 9 Line-staff organization (Juuti, 1989. 216)

FUNCTIONAL ORGANIZATION

Traditionally organizing has been implemented hierarchically and function-specifically. In functional organization each function has its own department. The guidance of the functions is executed according to principles of hierarchy. Functional organization is based on specialization. Each person becomes a specialist of his/her own area on the expense of the holistic view. Each department emphasize the importance of own area and conflicts are probable. Functional and hierarchical structure cannot develop but increasing hierarchical levels. The structure of the functional organization is presented in figure 10. (Juuti, 1989. 217)

Management

Production   Sales   Marketing
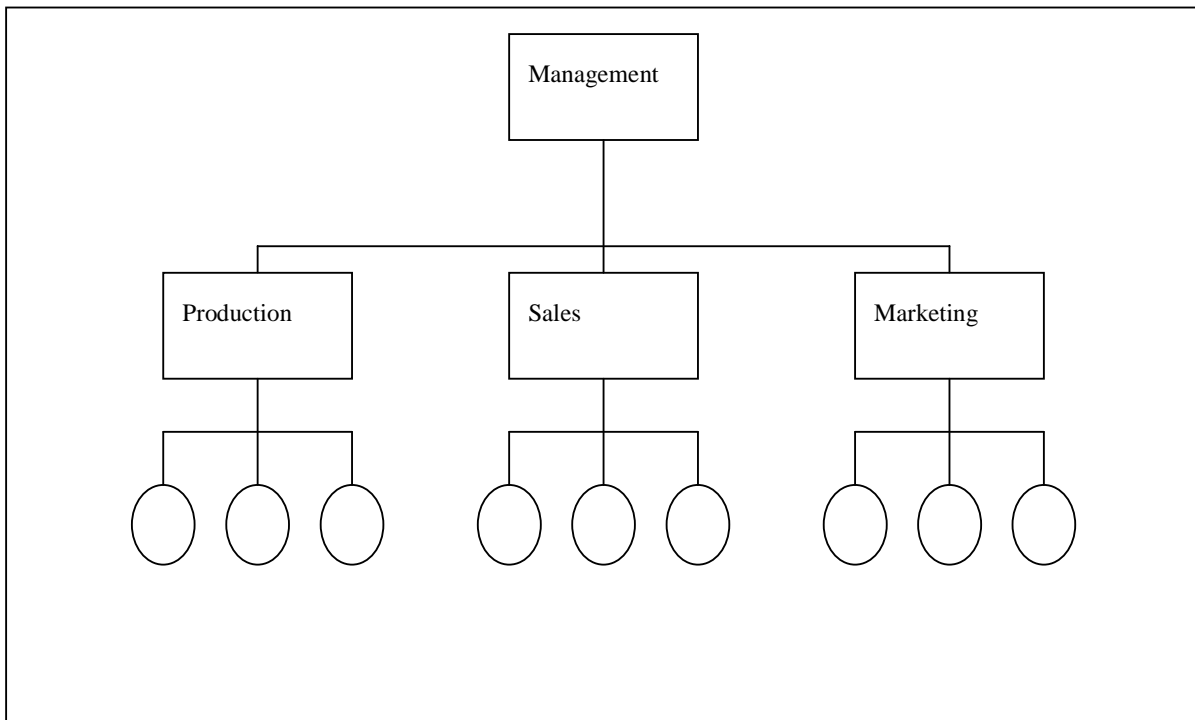
Figure 10. Functional organization. (Ruuska, 2001. 40)

The benefits of the functional organization are:

- organization structure is obvious; each person understand his/her own task

- each department has a possibility to orientate to the development and exploitation of own specific area

- the coordination of working methods inside department is lubricate (Juuti, 1989. 217)

The disadvantages of the functional organization are:

- opinion disagreements between departments may escalate to conflicts

- organization's collective view is fragmented

- the coordination of the departments consumes time and energy (Juuti, 1989. 217-218)

- functional structure is impractical in change situations(Ruuska, 2001. 41)

Weaknesses of the functional organization are well known. When the organization grows it becomes easily a stage of misunderstanding, conflicts and plotting. (Juuti, 1989. 218)

PROFIT CENTRE ORGANIZATION

In profit centre organization each business idea is given own operational precondition and possibilities to evolve as it was an independent business organization. Independent profit centre

units are established on certain product or market area. Profit centre organization suites such environments, which are not complicated or fast changing, but need relatively fast acclimatization and quite complex problem solving. In profit centre organization every function concerning a single product or business idea are controlled by one manager. There is a possibility to reward successful units. The weakness of the organization is redundant work. Also the balancing between central administration and profit centers is continual. (Juuti, 1989. 218-219)

PROJECT ORGANIZATION

Project is a temporary and objective orientated organization (Ruuska, 2001. 43). Project organization enables that organization's expertise can be connected to certain task for certain time. Project organization is effective in situations, which require planning, research, idea generation and cooperation between different experts.

Project organization can be used in tasks which are:

> uniquea and possess defined objectives

> significant

> complex and demand cooperation between experts

Project has a manager, who is responsible about project implementation and realized results. Project manager ensure that project has enough resources and is not overran by routine tasks. In project work group work is essential. The members of the project team have to cope with uncertainty, because issues related to work are new and unpredictable. (Juuti, 1989. 220-221)

MATRIX ORGANIZATION

When product or project organization is added to functional organization the result is matrix organization. In matrix organization the functional and project organization are working simultaneously and equally in guiding the personnel and functions. Chiefs of the functional departments hold the responsibility on human resources but personnel is placed in projects according to figure 11. Vertical hierarchy is broken by horizontal guidance which usually has a larger influence. The balance between functional and project organization is maintained by top management. Matrix organization is quite flexible. It can be used in fast changing and quit complex environments. Working in a matrix organization can also be quite stressful. Confused distribution of work, time pressure and conflicts in role differentiation cause stress for employees. (Juuti, 1989. 221-222)
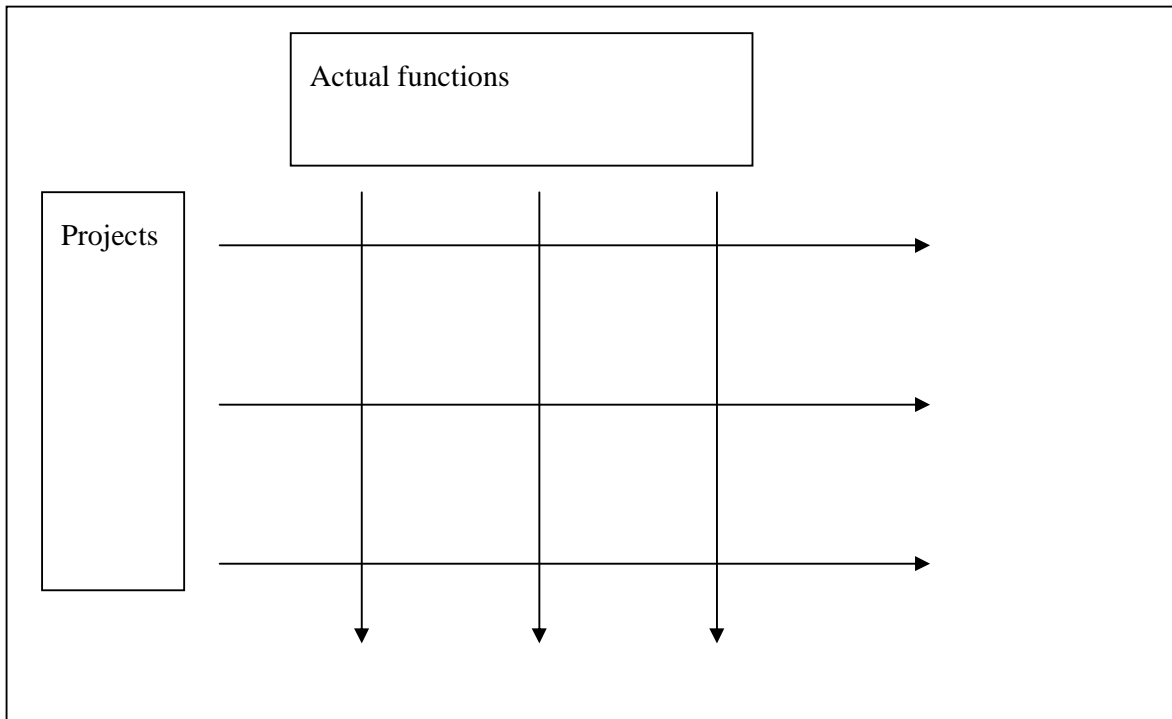
Figure 11 Matrix organization (Juuti, 1989. 222).

NETLIKE ORGANIZATION

As business turns more complex new organization structures are needed. These flexible and open organizations' structures can be characterized as netlike organizations. Working takes place in small groups and superior is seen as a participative coach. Groups are responsible about distribution of work and results. Group members have an influence on conduct and distribution of the work. Organization structure is like living flexible tissue. Organization management is carried out by shared objectives and culture. In netlike organization everyone communicates freely about their own opinions. (Juuti, 1989. 222-223)

5.3   Conclusions

Grudin (1994, 103) has observed the groupware influence in certain type of organization: By enhancing communication, worker-centered groupware will tend to undermine the authority structure of those hierarchic organizations with relatively incomplete standardization of work processes. Management that has lost some of its ability to control events may find it more difficult to mandate the use of applications that benefit management at the expense of other workers.

The influence of the organization structure on introduction process should be more examined in future. However applications do not have to restrict on formal organizations boundaries. This makes the evaluation more complex.

6 Organization Culture

Culture is usually considered as community's habits, skills, tools and techniques, which are typical for it in certain time. Culture is also related to the way to structure the reality. Culture creates a framework for behavior in certain community. Enterprise culture expresses the way people are used to act in the company. Enterprise culture is built on the traditions and it is related to following issues:

> common understanding about company's **objectives**, **aims** and **justification of existence**

> common understanding about **acceptable methods**

> common understanding about the criteria to **measure the results** (Juuti, 1992. 39-40)

According to Schein (1987) culture can be defined several ways. First, culture is expressed in the regularity of behavior in interaction between people. These regularities can be observed in common **language and rituals**. Second, culture consists on **norms**, which exist in groups and reflect attitudes towards organization. Third, culture is expressed in **expressions which control the activity**. Fourth area is **basic philosophy**, which guides orientation to customers and employees. Fifth issue is the **rules**, which a newcomer has to learn before he/she is accepted to the group. Last area is the **mood or atmosphere**, which dominates in the organization and can be observed in inner and outer interaction. (in Krogars, 1998. 8)

ORGANIZATIONAL CULTURE & TECHNOLOGY DIFFUSION

Wholesale application may require the change of culture. The introduction of learning application can be long-lasting and wide process. It influences the whole organization on every level. The introduction process of learning application is about chancing the culture. (Törmälä ym., 2003. 50)

According to Orlikowski (1992) the effective use of the groupware is related to organization politics, norms and reward systems. If knowledge sharing is not a part of organization culture, knowledge sharing groupware cannot success. (Orlikowski, 1992. 362)

> *The competitive individualism – which reinforces individual effort and ability, and does not support cooperation or sharing of expertise – is counter-cultural to the underlying premise of groupware technologies. (Orlikowski, 1992. 367)*

Dingsøyr and Røyrvik (2003) point out opposite example about organization culture:

According to one developer" people are very good at submitting notes when they think that something can be useful for others". (Dingsøyr & Røyrvik, 2003 88)

To be successful, groupware needs supporting organizational culture. If the culture is very competitive or individual and the group work itself is not accepted, groupware has no chances to success. This creates a demand to define the cultural change needed for successful product adoption.

SOCIAL NORMS

According to Juuti (1989) every group generate social norms typical exactly for that group. Social norms are commonly accepted behavior rules which objective is to maintain the unity inside group members. Social norms define the behavior of group members in different situations. Norms have following characteristics:

- ➢ Norms are generalizations about how group influences on individual. Norms reflect subjects which are important enough to be controlled by the group. Norms maintain the unity of behavior in group.

- ➢ Norms define only behavior not thinking. People do not have to assume norms – only behave according to them.

- ➢ Norms are created only to situation which are seen important by group members.

- ➢ Norms are shaped quite slowly. However, new norms can be adopted with group decision. Norms are shapen usually very slowly. However, group may introduce new norms with group decision.

- ➢ Norms are not same for everybody. Individuals with higher level status have a wider liberty to make exceptions than lover level personnel. (Juuti, 1989. 115-116)

Peer pressure can be seen as an example about group norms. Peer pressure can also play a role in groupware adoption (Pipek & Wulf, 1999. 207).

Grudin & Palen (1995) found widespread reports of peer pressure. Two notable aspects of this pressure were:

- ➢ Aspects of the product interfaces that facilitate the delivery of peer pressure.

- ➢ Adoption was described several times as following a bottom-up pattern from developers to managers and administrative assistants. Pressure on recalcitrant users could eventually come

from every direction, managers, administrative assistants and peers and adoption became nearly universal.

However all persons do not adapt group norms. Dependency on other group members' expertise increases the adoption of the group norms. Adoption also increases when the group size rises from two to four persons but not so much after this. Group can also compel a member to adopt the norms. If the individual does not adjust ones behavior to group norms he/she can be separated from group. (Juuti, 1989. 116-117)

7 Social Worlds, Social Networks

SOCIAL WORLDS

Social world is a concept from the interactionist school of sociology. It has been developed by Anselm Strauss to define a group of people who share some commitment to collective action. ***Social worlds do not*** necessarily ***conform*** to geography or ***organizational boundaries***, being constrained instead by the limits of effective communication. They can be composed themselves of sub worlds. People can belong to multiple social worlds simultaneously. (Fitzpatrick, Kaplan & Mansfield, 1996. 339)

Mark and Poltrock (2001) reported that the majority of people in their case study first learned about new groupware from members of their social worlds. Membership in multiple social worlds can be both beneficial and hindering to groupware adoption. Distributed organizations do not have one adoption context, but many. Thus, various contexts and group configurations are involved in adoption decisions. People are under the influence of several social worlds. (Mark & Poltrock, 2003. 285, 291 & 293)

Groupware diffusion process, which was driven by the users, was a result of communication and transformation of the technology across different social worlds. Mark & Poltrock also discovered that membership in multiple social worlds in an organization creates a tension for the potential adopter who is in a distributed team. Collaborative technology was adopted through social worlds which transcend organizational boundaries. Users inform others about the technology across distance and their communication channels are primarily email, telephone, or audio-conferencing. (Mark & Poltrock, 2003. 284 – 285, 293).

Social worlds can work for and against adoption, depending on the individuals, the collective group experiences, the environmental conditions, and the task. Mark & Poltrock (2003) presented 'gatekeepers' who tried to prevent the use of new technology. Reasons for prevention can be fear of new risks and costs. Prevention can also turn to be an end in itself. However gatekeepers of one social world cannot prevent its members from learning about and being influenced to adopt technology in their other social worlds. A reason to adopt new technology may be that non-users will quickly feel left out (Grudin & Palen, 1995).

SOCIAL NETWORKS

Dingsøyr and Røyrvik (2003, 84) highlight the importance of informal organization and the social integration of the collaborative knowledge tool in the daily work practices of the company.

The development of expertise is not only related to the nature of an individual's knowledge structures but also to that person's access to relevant formal and informal cultural knowledge through participating in an expert community or network. (Palonen, Hakkarainen, Talvitie & Lehtinen, 3)

Organization's official communication system alone is insufficient, if it is not supported with social communication. Orders and guidelines can drift through the chain of command but information should diffuse freely. Social communication cannot be totally controlled. Organization management is not usually even aware about social communication. However, it is important to be aware what social communication is about and how it can be guided and used. Social networks can be categorized under three types:

➢ Contacts with persons well known that is personal network.

➢ Contacts with persons not so well known, but regularly sawn that is organization's grapevine.

➢ Contacts with persons randomly met that is random network. (Ruuska, 2001. 68)

MEDIATORS AND PROMOTERS

Promoters do opposite work than gatekeepers. Mark & Poltrock (2003, 290) identified also promoters of new technology. Promoters are early adopters and the diffuse new innovations. Promoters' methods can be for example "live" training and other kinds of assistance. Another approach found in the literature of success cases is that for the fervent product evangelist who persuades all group members to try the software, thus obtaining the critical mass that brings real benefits to the group. (Grudin & Palen, 1995)

Groupware application enables communication without physical meetings. This may decrease informal communication about private as well as business issues (Pipek & Wulf, 1999. 208). Communication system is useless if it supports only organization's official structure and it is not supported with social communication. Orders and guidelines can be established through chain of command, but information should diffuse freely. Social communication cannot be totally controlled. Organization top management is not usually even aware about informal communication.

8 Usability

The theme of usability is not examined very deeply in this report. Only the definitions and concepts and their relations to technology diffusion are described and the theme of the groupware usability is presented.

Nielsen defines usability: usability is about learnability, efficiency, memorability, errors, and satisfaction. However, the definition from ISO 9241-11: *the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction is a specified context of use* – is becoming the main reference of usability. (in Jokela, Iivari, Matero & Karukka, 2003. 53)

Usability is an important feature, which has a recognized influence on adoption process. For example even minor problems related to usability may have a huge influence on adoption in the future (Törmälä et al., 2003. 51). Grudin & Palen (1995) found evidence that for applications that are only indirectly tied to people's principal work missions, interface transparency and efficiency are particularly important. Where a feature is even slightly obstructed, it can go unused.

GROUPWARE USABILITY

> *Because individuals interact with a groupware application, it has all the interface design challenges of single-user applications, supplemented by a host of new challenges arising from its direct involvement in group processes. (Grudin, 1994. 95)*

Applications can be usable for individuals, but still not adopted. Groupware usability evaluation is more complex than single-user usability evaluation. Existing evaluation methods are not well suited to the needs of groupware evaluation: they either do not deal with collaboration issues, do no use an appropriate level of analysis for concrete assessment of usability in interfaces, or do not adequately represent the variability inherent in group work (Pinelle & Gutwin, 2003).

Problems with groupware usability have also been identified in field research. Application can be usable for single-user, but problems can raise from group level: Writing down what might look like guesses about a situation for scrutiny by management was felt to be problematic in several ways: "publishing" is perceived to have a risk and a price; nor is clear what to write down (Kovalainen, Robinson & Auramäki, 1998. 50).

9 End User Readiness during Introduction and End User Training

End users may confront different kinds of obstacles during different phases. Mark & Poltrock (2003, 284) found that barrier to adoption had changed as the technology spread. Earlier adopters faced social barriers whereas more recent adopters experienced more practical concerns with achieving effective use of the technology. The planning of introduction is based on ensuring the end user technical and mental readiness for new software product adoption. The minimum level of know-how should be defined so that the end user readiness would not be an obstacle for technology diffusion. (Törmälä et al., 2003. 50)

Orlikowski and others have identified the need of training in adoption process. Again the groupware raises the level of needed know-how:

> *The findings suggest that two organizational elements seem especially relevant in influencing the effective utilization of groupware: people's cognitions or mental models about technology and their work, and the structural properties of the organizations such as policies, norms, and reward systems. (Orlikowski, 1992. 362)*

> *Training users on new technology is central to their understanding of its capabilities and appreciating how it differs from other technologies with which they are familiar. (Orlikowski, 1992. 365)*

In Olson & Olson (2000) review of distributed teams and technology use showed that lack of common ground, collaboration readiness, or collaboration technology readiness can lead to technology resistance (in Mark & Poltrock, 2003, 284). When new technologies are introduced, users may have to acquire new skills or learn new working procedures (Bikson & Eveland, 1996. 428)

Training has also been noticed to be a facilitator in technology diffusion by Kovalainen et al and Marek & Poltrock. Informing supports diffusion and one effective informing way to deliver information was training (Mark & Poltrock, 2001. 239).

> *All 35 production line staff received about 4 hours training each, including Windows, Lotus Notes, and the electronic diary: The feedback from the training was positive. This was reflected in a quick transition to "real" use of the application. The paper diary was abandoned soon after. (Kovalainen et al. 1998. 52)*

10 User Benefit – Loss of Not Using

User profit is important feature of the product from the technology diffusion and end user adoption approach. Systems should be designed so that those who used it should be the ones that benefit from it (Kovalainen et al., 1998. 50, Grudin, 1988. 85). End user should also be aware about the personal benefits (Törmälä et al. 2003. 51).

The benefits of using the groupware can exist on several levels on the organization: from individual level to the very top management level.

> *A groupware application never provides precisely the same benefit to every group member (Grudin, 1994. 96).*

There should be a collective benefit from using the application; ideally, everyone will also benefit individually, even if some benefit more than others. However, this ideal is rarely found; most groupware requires additional work form some users, who enter or process information that the application requires or produces. (Grudin, 1990. 98)

Beside the profit other reasons for groupware adoption has been identified. Also desire to see what others are doing can play a role in groupware adoption (Pipek & Wulf, 1999. 207). There is a danger to be an outsider if other members of the group are going to adopt new groupware and use it for communication and collaboration.

11 The Attitudes and Skills of the Software Developers

The influence of the developers and introduction personnel towards end users or introduction process itself is not studied nor reported widely. Isomäki (2002) has studied the conceptions of the system designers about the human being.

Isomäki (2002, 183) says that information systems (IS) designers' understanding of human characteristics and behavior is seen to have utmost importance with respect to designing systems for humans and their behavior as well as to interact with them in mutual understanding during the information system development process in order to build and disseminate humanized IS.

The skills, attitudes and behavior of the introduction personnel are assumed to have an influence on various matters during the introduction. Interesting question might be:

- How are the end users perceived?
- What are the communication and training skills of the introduction personnel?
- What is seen to be important during the implementation?
- Is the introduction seen as an important process?
- Is the introduction process technology or human oriented?
- Are the personnel aware about user adoption process?
- What is the goal of the introduction and how they are defined?

12 Support of the Upper Management

There are divergent findings about the necessity of the management support for groupware diffusion. Studies of the introduction of large systems report, that if application has enough users the support of the management is not crucial (Grudin & Palen, 1995. 263). The need of the support may arise when obstacles for diffusion are identified. Gatekeepers who are hindering adoption may construct barriers to control adoption (Mark & Poltrock, 2003. 288). In these kinds of situations it is important that upper management remove these spontaneous artificial barriers made by gatekeepers who may feel themselves threatened. Upper management advocacy is a key element in large system adoption. In contrast, the use of individual productivity tools or single-user applications has more often been discretionary; an application must offer enough concrete reward for users. (Grudin & Palen, 1995. 265)

On the other hand, interview studies have found that groupware can succeed without managerial mandate. It is unlikely that upper management will become involved in promoting every groupware application of feature (Grudin & Palen, 1995. 263). Mark & Porltrock (2003) found no evidence for formal mandates to adopt the groupware and claim that technology diffusion was not driven by managers. . However, the support of the management can be understood variety ways.

13 Software Product Promotion

Promotion has its own task in the marketing mix: to communicate to consumers and customers what the other marketing elements can offer. The promotion element of the marketing mix (promotion, product, price and distribution/place) includes five major elements: 1) personal selling, 2) advertising, 3) sales promotion, 4) publicity, and 5) direct marketing. These elements are often used in concert. In general, promotion has four aims: to inform, to persuade, to remind, and to reinforce. (Bennett, 1989. 12, 511; Kotler & Armstrong, 2004. 482-483)

Informing: Almost all promotion conveys some kind of information about the product: availability, features, name, and use – in short, what functional and psychological needs the product is designed to satisfy. Information can be provided both directly and indirectly. ***Persuading:*** In addition to informing, promotion attempts to persuade the audience to move towards some action or attitude. ***Reminding:*** A third aim of promotion is to remind consumers that a product is still available. Reminder promotion is often used for products in the latter stages of their life cycles to offset competition from newer products. ***Reinforce:*** Promotion reinforces consumers' satisfaction after a purchase is made. One aim of reinforce is to make new owners to feel and talk favorably about their purchases. (Bennett, 1989. 511-512)

ELEMENTS OF PROMOTION

Marketers use four complementary methods to communicate through promotion: personal selling, advertising, sales promotion, and publicity. Most promotion campaigns use all four methods to some degree. (Bennett, 1989. 512) Kotler & Armstrong (2004) present also the fifth element of promotion: direct marketing. The elements and objectives of promotion are illustrated in figure 12.
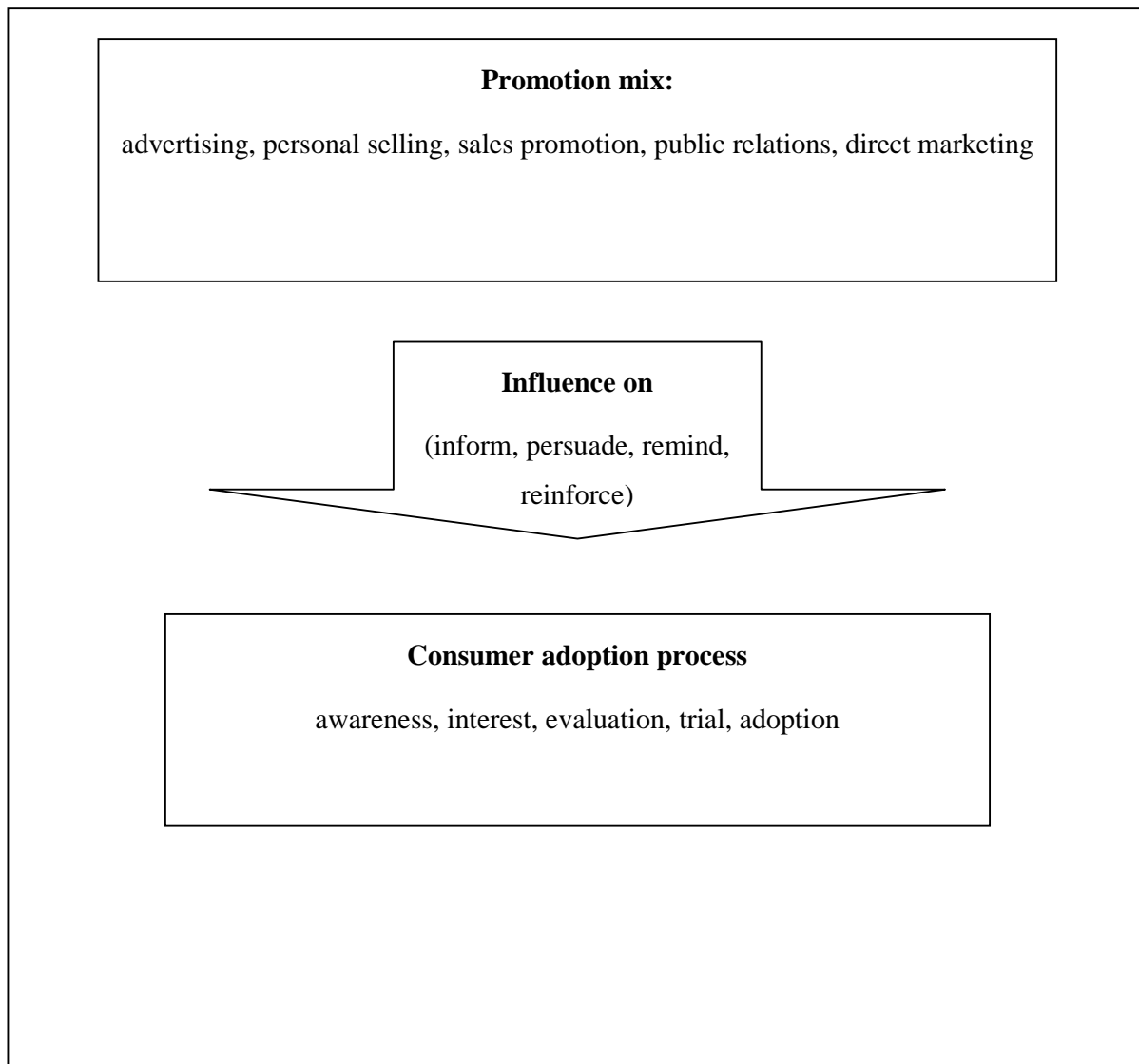
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┌─────────────────────────────────────────────────────────────────────┐
│   ┌─────────────────────────────────────────────────────────────┐   │
│   │                      Promotion mix:                         │   │
│   │                                                             │   │
│   │  advertising, personal selling, sales promotion, public     │   │
│   │  relations, direct marketing                                │   │
│   └─────────────────────────────────────────────────────────────┘   │
│                                                                     │
│               ┌──────────────────────────────┐                      │
│               │        Influence on          │                      │
│               │                              │                      │
│               │   (inform, persuade, remind, │                      │
│          ╲    │        reinforce)            │    ╱                 │
│           ╲   └──────────────────────────────┘   ╱                  │
│            ╲_____      _____╱                   │
│                             ╲    ╱                                  │
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│   ┌─────────────────────────────────────────────────────────┐      │
│   │              Consumer adoption process                  │      │
│   │                                                         │      │
│   │     awareness, interest, evaluation, trial, adoption    │      │
│   └─────────────────────────────────────────────────────────┘      │
│                                                                     │
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Figure 12 Promotion elements and objectives.

Personal selling includes all promotional efforts made by the organization directly to reach individuals, or groups of individuals, on a personal basis. This form of promotion embraces the full spectrum of human interaction – from a team of highly trained engineers explaining a sewage system to a city council to a single salesclerk suggesting a shirt to someone browsing in a clothing store. *Advertising* is the most visible element of the promotion component. Advertising is any paid form of non personal communication, usually delivered through mass media by an identified sponsor. *Sales promotion* consists of short-range tactics that are intended to achieve specific objectives within a target market. Sales promoting can include for example coupons, sponsorship of sport events, etc. *Publicity* is a form of promotion composed of newsworthy messages sent through the media on a non paid basis. Typically large organizations establish public relations departments to generate their own publicity. Like advertising, publicity is transmitted by the media, but it is not

controlled by its subject as easily as advertising. Although publicity is considered to be 'free' because the media are not paid, costs are incurred by marketers. (Bennett, 1989. 512-513)

Direct Marketing has many forms: telephone marketing, direct mail, online marketing etc. Direct marketing has four distinctive characteristics. Direct marketing is *nonpublic*: The message is normally directed to a specific person. Direct marketing is *immediate* and *customized*: Messages can be prepared very quickly and can be tailored to appeal to specific consumers. Finally, direct marketing is *interactive*: It allows a dialogue between the marketing team and the consumer, and messages can be altered depending on the consumer's response. Thus, direct marketing is well suited to highly targeted marketing efforts and to building one-to-one customer relationships. (Kotler & Armstrong, 2004. 482-483)

ADOPTION PROCESS

Management must understand *consumer-adoption process* to build an effective strategy for early market penetration. *Adoption* is an individual's decision to become a regular user of a product. The consumer-adoption process is later followed by the *consumer-loyalty process*, which is the concern of the established producer. The adoption processes have been observed to move through the following five stages: 1) *Awareness*: The consumer becomes aware of the innovation but lacks information about it. 2) *Interest*: The consumer is stimulated to seek information about the innovation. 3) *Evaluation*: The consumer considers whether to try the innovation. 4) *Trial*: The consumer tries he innovation to improve his or her estimate of its value. 5) *Adoption*: The consumer decides to make full and regular use of the innovation. (Kotler, 1997. 335)

Another adoption process, an innovation adoption process presented by Rogers, has also five stages: 1) knowledge of the innovation, 2) persuasion to use it, 3) decision to adopt it, 4) implementation of the innovation, and 5) confirmation that adoption was appropriate. (in Mark & Poltrock, 2001. 233)

People differ markedly in their readiness to try new products. Personal influence plays a large role in the adoption of new products. Personal influence is more important in the evaluation stage of the adoption process than in the other stages. It has more influence on late adopters than early adopters. And it is more important in risky situations than in safe situations. Products have characteristics, which affect their rate of adoption. Five characteristics are especially important in influencing the rate of adoption of an innovation. The first is the innovation's *relative advantage* – the degree to which it appears superior to existing products. The greater the perceived relative advantage is, the more quickly it will be adopted. The second is the innovation's *compatibility*- the degree to which it matches the values and experiences of the individuals in the community. Third is the innovation's

complexity – the degree to which it's relatively difficult to understand or use. Fourth is the innovation's *divisibility* – the degree to which it can be tried on a limited basis. The fifth characteristic is the innovation's *communicability* – the degree to which the beneficial results of its use are observable or describable to others. Other characteristics that influence the rate of adoption are cost, risk and uncertainty, scientific credibility, and social approval. The new product marketer has to research all these factors and give the key ones maximum attention in designing the new-product and marketing program. (Kotler, 1997. 336-337)

PROMOTION MIX & SOFTWARE INTRODUCTION

The usability of promotion mix elements, for example advertising, in software introduction can be identified:

> *Most encountered it for the first time when it was installed on their computers. Without explicit information about what Notes is and why Alpha had purchased it, these individuals were left to make their own assumptions about the technology and why it was being distributed. […] If people have a poor or inappropriate understanding of the unique and different features of a new technology they may resist using it, or may not integrate it appropriately into their work practices. (Orlikowski, 1992. 364)*

14 Summary & Conclusions

Groupware introduction can be seen as a special case in software introduction. Groupware introduction is more challenging than with other software. The need for critical mass is highlighted. The use of 'diffusion of innovation' theory in groupware introduction is not adequate alone. Groupware has some special features, like critical mass, which is not included to diffusion theory. Diffusion of groupware differs from single user adoption process.

The perspective of introduction should be widened from software life cycle to combined software and product life cycle (figure 13). Introduction process should not be totally separated from other phases from software or product life cycles. The level of analysis is also problematic. All factors, like organization culture and technical skills, cannot be examined from group level alone.
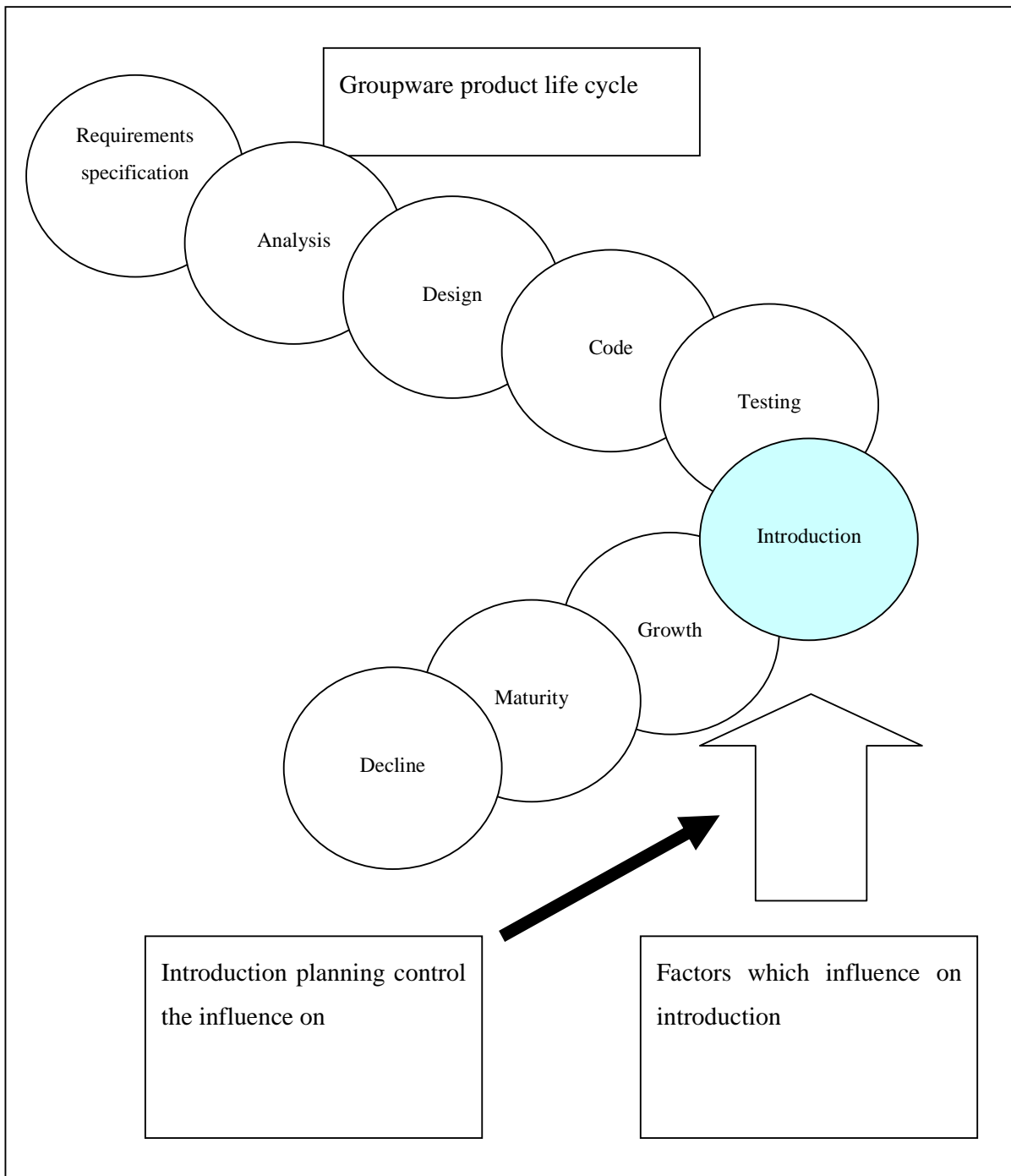
Figure 13 Framework of groupware product introduction

The classification of factors influencing the introduction process is also challenging. In this study several factors are presented and the extensive category is to be done later. Present findings are presented in figure 14.

Subject	Influence
Organization Structure	The influence of organization structure has to be studied more.
Organization Change	The influence of organization change has to be studied more.
Organization Culture	Organizational culture can support or hinder groupware adoption.
Group Norms	Peer pressure can support or hinder groupware adoption.
Social Worlds	People are under the influence of several social words. Social worlds can lead to fast innovation adoption.
Mediators & Promoters	In social worlds it can exists either gatekeepers or mediators.
Usability	Poor usability usually hider the adoption
Group Usability	Poor group usability may exist even with good singe user usability.
End User Skills	Adequate end user skills are needed during introduction process. Needed skills can be technical or social.
End User Training	End user training can support introduction widely. Besides acquired skills, training can be used also to inform the users about new technology.
User Benefit	User benefit exists on multiple levels, from individuals to organization.
Software Developers Skills & Attitudes	The influence of software developers skills and attitudes on introduction process has to be studied more.
Upper Management Support	There are conflicting findings about the need of management support during introduction.
Product Promotion	Product promotion can be used as o tool while planning introduction process.

Figure 14 Factors influencing the introduction process of groupware product

The need for introduction process planning is clear. Future research could concentrate on success factors in introduction process. There are several ways to plan and implement the groupware product introduction process. Instead of focusing on every factor related to introduction process it could be more suitable to create a 'strategy' for introduction process.

Kotler and Armstrong (2004, 483) present two strategies for promotion planning:

Marketers can choose from two basic promotion mix strategies – push promotion or pull promotion. […] A push strategy involves "pushing" the product through distribution channels to final consumers. The producer directs its marketing activities (primarily personal selling and trade promotion) toward channel members to induce them to carry the product and to promote it to final consumers. Using a pull strategy, the producer directs it marketing activities (primarily advertising and consumer promotion) toward final consumers to induce them to buy the product. If the pull strategy is effective, consumers will then demand the product from channel members, who will in turn demand it from producers.

There is also a strong need to activate user to participate to the introduction process and planning.

➢ Users know how they really work.

➢ User participation is needed to configure and further develop the groupware's functionality reliably.

➢ User participation is crucial for sustaining a high level of interest in the ongoing change process.

Users can be prepared and motivated for participation through workshops and interviews. (Pipek & Wulf, 1999. 210-211)

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