Resistance to Change

A Functional Analysis of Responses to Technical Change in a Swiss Bank

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Thesis submitted for the degree of

Doctor of Philosophy

University of London

London School of Economics and Political Science

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November 1992

To

Margrit and Walter

'Menschwerdung ist nur zu haben durch Widerstand
im Denken, Fühlen und Handeln' (Otto F Walter)

'When resistance does appear, it should not be thought of as something to be overcome. Instead, it can best be thought of as a usual red flag - a signal that something is going wrong' (P L Lawrence, 1954)

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Keywords:

Resistance to change, self-active systems, self-monitoring, functional analysis, pain analogy, banking software project, narrative interviews, acceptance research.

Abstract:

This thesis demonstrates the signal function and diagnostic value of user resistance in a software development project. Its starting point is the critical analysis of managerial common sense which negates resistance, or sees resistance to change as a 'nuisance' and as the manifestation of an individual or structural 'deficiency'; these notions prohibit change agents from appreciating the signal function of resistance to change in organisational processes. The first source of evidence is the literature on impacts, attitudes, and acceptance of information technology internationally and in particular in Switzerland. The second source is the tradition of psychological field theory which I reconstruct as the 'feeding the reluctant eater' paradigm, a form of social engineering. The third source is an empirical study of the semantics (semantic differential and free associations) of 'resistance to change' among management trainees in the UK, Switzerland and the USA (N=388).

The thesis develops and investigates a concept of resistance that is based a pain analogy, and on the notions of self-monitoring and self-active systems. An organization which is implementing new technology is a self-active system that directs and energetizes its activities with the help of internal and external communication. The functional analogy of the organismic pain system and resistance to change is explored. The analogy consists of parallel information processing, filtering and recoding of information, a bimodal pattern of attention over time, and the functions of attention allocation, evaluation, alteration and learning. With this analogy I am able to generate over 50 hypotheses on resistance to change and its effects on organisational processes.

The evidence for some of these hypotheses is explored in an empirical study of a Swiss banking group. The implemention of computer services between 1983 and 1991 is reconstructed in the central bank and 24 branches. Data includes the analysis of two opinion surveys (1985 n=305; 1991 n=326), documents (n=134), narrative interviews (n=34), job analyses (n=34), field observations and performance data (n=24). A method is developed to describe the varying structure of organisational information processing through time. The content analysis allows me to describe when in relation to the action, how intense, and in what manner 'resistance' becomes an issue between 1983 and 1991. The fruitfulness of the pain analogy is demonstrated (a) by shifting the analysis of resistance from structure to process and to that of an independent rather than to that of a dependent variable; (b) by shifting the focus from from motivation to communication; (c) by eroding the a priori assumption that resistance is a nuisance; and (d) by indicating the diagnostic value of "bad news" in organisational communication; resistance is diagnostic information; it shows us when, where and why things go wrong.

Acknowledgements

I am indebted to various people in the UK and abroad, who showed interest in this thesis-in-becoming, and offered me their support. Particular thanks belongs to Mario von Cranach, University of Berne, who laid the intellectual ground and encouraged me to go to London; George Gaskell, Rob Farr, Andy Wells, and Hamid Rehman at the LSE provided moral and intellectual support at various stages; the Beavers' Bar was an important venue in that respect; John Durant, The Science Museum and Imperial College, London, offered me a working environment to complete the thesis as well as to develop it further. Thanks also to my supervisor, Patrick Humphreys, who stimulated my instincts with his subdued interest over the years. I am very grateful to my commilitants at the LSE, particularly to the 'Discussion Group on Phenomenology' (Sandra Jovchelovitch, Angela Stathopoulou, Ingrid Schoon, Alan Porter, Peter Flügel) for several years of challenge, social support, and friendly companionship, who after all do not belief that 'pain' is a good analogy for resistance; a special thank to Jane Gregory (Imperial College) for the numerous comments on my Germanic English and to Marie-Claude Gervais for the help with the French abstract; last but not least my thanks to the interview partners at Raiffeisen Switzerland, in particular to J Schafflützel and Peter App, who showed unusual interest and provided generous conditions for the field work.

Parts of the thesis have been presented to the British Psychological Society Occupational Section Conference in Bowess-on-Windermere, January 1990, and was subject of an article in the Financial Times on 30 April 1990; The Science Museum Seminar on the History and Public Understanding of Science, 1991; Cornell University, Department of Communication, February 1992; at various stages to the LSE Department of Social Psychology research seminar, and in a paper to the journal 'Systems Practice' (Bauer, 1991). An immediate outcome of this thesis is an international conference on 'Resistance to new technology - past and present' in April 1993 which I am organizing at the Science Museum in London.

This research was made possible with financial support from the following institutions: Swiss National Research Foundation (no 87BE15); Kanton Thurgau; Burrus Foundation; British Council; Raiffeisen Switzerland; Swiss Foundation for Applied Psychology; and The S&H Biäsch Foundation.

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iv. List of Definitions:

Resistance as a temporary organisational network

D2.1: Resistance is the lag of the diffusion process. It is a relative characteristic of one diffusion process in comparison another.

D9.1: Resistance to change is a temporary network of communication, that includes some members of the change agency and of the client system who are in conflict with each other, that is informal and not anticipated by the change agency in form and content, and that processes the information according to which the project needs alterations.

D9.2: The resistance system includes all events of resistance and all communication, formal or informal, about these events.

D8.1a: Relevant communication is any verbalization, oral or written, related to the change project. Communication is the process and its outcome can be recorded. For purposes of analysis the process is time sampled.

D8.1b: The sampled outcomes of communication are presentations, which contain information about the project; informations are conceptual distinctions that may make a difference for action.

D9.3a: Formal communication of resistance is any communication that is documented. Formal communication is a slow process.

D9.3b: The content of documents defines the narrow span of organisational attention.

D9.4: Informal communication of resistance is any communication, be it project-related or not, that is not documented. Informal communication is a fast process.

D9.5: A project proposal defines the expectations that the change agency has towards the client system. Expectations can be behavioural, to do with what is to be done, or attitudinal, to do with what is the right mind set.

Modulation of resistance and modes of presentation

D9.6a: Modulation of resistance means informal and formal communication of resistance are different.

D9.6b: Modulation of resistance takes at least three forms: gate control, symbolic misrepresentation, and lack of consequences for action.

D9.7: Gate control means resistance is documented selectively, compared to informal communication. Other problems of the project have priority of attention.

D9.8: Organisational denial means resistance is not formally documented, even so it might be observed informally.

D8.2: To operationalize gate-keeping one (a) measures the intensity by counting the difference between incoming and outgoing messages per time unit, (b) assesses the type by identifying the censurship instructions, and (c) characterizes the gate-keeper's position within the network.

D8.3a: To operationalize the censorship effect of parallel processing one compares the content of informal and formal communications.

D8.3b: It is weak censorship, when an issue is presented informally but not formally.

D8.3c: It is strong censorship when clear formal instructions to censor can be identified.

D8.4: Being vague is operationalized by an issue, that has been identified clearly in one interview or document, and is presented ambiguously in a later interview or document.

D9.9: Vague presentations of resistance are formal accounts that divert from the clearer descriptons in informal communications.

D8.5: Contextualizing means identifying an issue with a marginal group in the organisation, or as a problem with very specific conditions.

D9.10: Contextualizing means presenting resistance events as particular events in time and space; hence no implications for the project.

D8.6: Simplifying means a problem is structured by solutions, i.e. with few features and directly linked to known actions. A rule of thumb is a good example.

D9.11: Simplification means resistance events are accounted for monocausally and by easy solutions, e.g., rules of thumb.

D8.7: Assimilation is either strong or weak. A strong assimilation means a new problem is structured to conform to an older familiar one. A weak assimilation is the use of metaphor or analogy to define the problem.

D9.12: Assimilating resistance means identifying and explaining events in terms of past experiences or metaphorically.

Content of presentations

D9.14: Organisational presentations of resistance are content analysed from formally written documents.

D9.15: Informal communication is content analysed a) from interviews with members of the task force, or b) from participant observations.

D9.16: Resistance is localised when change agents identify people in the organisation who reject informally their proposals for changing work procedures with new technology.

D9.17: The intensity of resistance is measured whenever change agents talk about resistance in comparative terms.

D9.18a: Resistance reaches the threshold of attention when the change agency formally investigates users' requests for software, hardware or orgware beyond initially planned participation.

D9.18b: A formal investigation is done (a) by defining a special task for a change agent, or (b) by consulting an external expert.

Functions of resistance representations

D9.19a: Resistance evaluates the project when the change agency formally collects information about specific deficiencies of the project in terms of hardware, software and orgware.

D9.19b: Hardware refers to matters of computer hardware and the phyiscal work environment: VDU,

keyboard, processor capacity, furniture, climate etc.

D9.19c: Software refers to matters of programming such as (a) the layout of the user interface, (b) the steering of the dialogue, and (c) the security of manipulations. The elaborate concept of 'user-friendliness' summarizes the criteria for good software.

D9.19d: Orgware refers to all matters of project organisation, job design, training, user information and participation as far as it is part of the project planning.

D9.20a: Criticism is valid or invalid depending on the attribution of error by the change agency. Attributions draw upon the knowledge and the experience of the change agency.

D9.20b: Valid means the project deficiency is outcome of an error of the change agency.

D9.20c: Invalid means the problem is attributed to deficiencies of the users' skills or attitudes, and hence does not call for alterations of hardware or software.

D9.21a: A user request is feasible or unfeasible depending on the skills and resources available to the change agency.

D9.21b: A user request is feasible if it can be altered within the contraints of time and money, and unfeasible if it can not.

D9.22: Resistance is effective when alterations are made, and the specifics of these alterations are defined by formal presentations and analysis of user resistance.

D9.23a: Alternations are new tasks of the change agency which change the project design.

D9.23b: Alterations are either strategic, concerning long-term planning, or are fine tuning, concerning details for adjustment.

D9.24: The resource of the change agency increases when change agents explicitly state their learning experience in the project, and what they will do differently in the future.

D9.25: The resource of the client system increases when users gain time (a) for specific training, (b) for getting aquainted with the new technology of their job, and (c) setting up new social contacts.

D9.26: Resistance is organisationally presented by written materials, which identify disagreements with the client system, localise, and classify specific criticisms as valid or invalid, feasible or unfeasible for alteration.

D9.27: Transfer of information means the formal documentation of resistance contains information about resistance and possible solutions which one part of the change agency knows, but the other part does not.

D9.13: Lack of consequences means resistance is formally documented, but necessary resources are not allocated (a) to analyse user requests or (b) to coordinate alterations of the project.

v. Hypotheses Generated and Partially Tested

'Resistance to change' in the organisational literature

H4.1: Most analyses value resistance negatively: it is a nuisance to be overcome.

H4.2: Resistance is mostly presented as a 'deficit phenomenon'.

H4.3: Resistance is mostly a dependent variable.

H4.4: 'Feeding the reluctant eater' is the paradigm of the Lewinian analysis of resistance to change

H4.5: A careful phenomenology of resistance has been replaced by pragmatic analyses from the point of view of the change advocate.

The Semantics of 'resistance to change'

H5.1a: 'Resistance to change' connotes mainly negatively.

H5.1b: 'Resistance to change' is a deficit concept.

H5.2a: The negative connotation of 'resistance to change' is consensual.

H5.2b: 'Resistance to change' is a deficit concept in German as well as in English.

H5.3: Swiss German connotes 'resistance' less negatively than English.

H5.4: 'Resistance' connotes less negatively for the Swiss than it does for the British, for the British less negatively than it does for the North Americans.

H5.5: 'Resistance to change' and 'to be conservative' connote more similarly for the Swiss than they connote for the British and the North Americans.

H5.6: 'To be conservative' connotes differently in the Anglo-Saxon context and in the Swiss context.

Resistance as self-monitoring subsystem: representations

a) the existence and manifestation of resistance: process

H9.7: In cases where organizational presentations of resistance do not lead to alterations in the project, formal prevention of resource allocation occurs.

H9.8: The frequency of presentations of resistance fluctuates characteristically over time: higher at the beginning, lower after that, and higher again later, declining again or remaining on a high level after that.

H9.9: During periods when resistance is not formally communicated gate control and misrepresentation of resistance are working.

H9.24: If some change agents doubt the successful continuation of the project due to user responses, they will come up with an organizational presentation of resistance.

b) The content of resistance representation: structure

H9.1: Resistance to change deploys an organisational conflict about how to increase efficiency.

H9.3: Resistance events implicitly or explicitly express criticism of hardware, software or orgware of a computer project.

H9.6: Resistance is localized relative to an informal image of the organization.

H9.10: Organisational presentations and informal communication of resistance differ in content.

H9.11: Organisational presentations assess resistance and convey decisions about alterations of the project.

H9.12: By informal communication of resistance options of design and alterations to the project are explored.

H9.13: In localizing resistance the potential influence of relevant organisational positions is assessed.

H9.14: Resistance focuses the attention of the change agency on user requirements for hardware, software and orgware.

c) Resistance as dependent variable: conditions

H13.1: The larger the bank the more likely it is that it will accept a new computing solution.

H13.2: The smaller the market share the higher the acceptance of the new computing solution.

H13.3: The older the branch the lower the acceptance of the new solution.

H13.4: The Romand banks are more likely to accept the new computer solution than the Swiss Germans and Swiss Italians banks.

H9.2a: The implementation of a new computer system brings disruptions of work routines, additional workload.

H9.2b: Additional workload is related to resistance to change.

H9.4: The bigger the additional work load, the more likely is resistance.

H9.5a: Users are differentially prone to resist changes in technology depending on their skill level, their work motivation, and their concern for work efficiency.

H9.5b: The lower the level of skill, the more the resistance to change, as training means more work effort.

H9.5c: The higher the intrinsic work motivation, the more resistant people are, provided new technology disrupts their work routine.

H9.5d: The more efficiency orientied the client system is, the more critical it will be, provided new technology disrupts their work routine.

d) Resistance as independent variable

Attention allocation function

H9.15: The more the change agency perceives the users as powerful, the more likely it is that resistance reaches the threshold of attention in the organisation. Empowered resistance is documented.

H9.19: Resistance sets the agenda and limits the freedom of the change agency in matters of hardware, software and orgware.

H9.23: Resistance that remains informally communicated, that is not organisationally presented, is not effective (formal integration).

H9.25: Organisational presentations are less rich in options for diagnosis and action than informal talk on a particular issue.

H9.26: When observations of resistance or plans for action divert among change agents, an organisational presentation of resistance is made.

H9.27: Prolonged modulation of resistance, by gate-keeping, censorship, misrepresentation or denial, or the prevention of resource allocation, increases the probability of project failure.

H9.28: Prolonged organisational denial of resistance escalates into a structure of entrenched conflict and an inflexible organisational culture.

Evaluative function

H9.16a: Change agents classify user criticism into valid and invalid, feasible or unfeasible points, when interpreting user resistance.

H9.16b: The more elaborate the skills and the knowledge of the change agency are, the more they classify points of criticism as valid.

H9.16c: The greater the resources available, the more points of criticism are classified as feasible by the change agency.

H14.1: Resistant banks are more critical of the computer project

H14.2: Good performer resistance is more critical than bad performer resistance

H14.3: Resistant banks are represented by bankers who see themselves self-reflectively as resistant.

H14.4: Self-conscious resistance is more critical of the project, than not self-conscious.

Alteration, Learning and slowing the pace function

H9.17: Alterations to the project design draw upon expert knowledge and diagnosis-action schemata that guide the change agency's alterations to the project.

H9.18: Effective resistance slows the speed of project compared to the planned schedule, or compared to similar projects.

H9.20: The outcome of effective resistance is not the halt to the project, but to direct alterations to the project (The resistance paradox).

H9.21: Effective resistance increases the resources of the change agency.

H9.22: Effective resistance increases the resources of the client system.

H14.5: Critique that is based on resistance to change strengthens rather than weakens the link to the system (integration function).

Corrigenda

Whenever the word 'critique' is used in the text it needs to be replaced by 'criticism', in particular between page 400 and 408.

1. Introduction and Overview

This thesis investigates 'resistance to change' and its effects in the context of the introduction of information technology in a Swiss bank. In reconstructing a computer project over the period of eight years, from 1983 to 1991, the study is a process study. I have been guided by four objectives: to show that people had at times good reasons to resist computers in their work place or in their private domain; to criticize the way 'resistance' is conceived in the organisational literature; to unfold an analogy to the pain system as an alternative; and to develop a method of analyzing organisational communication to demonstrate the contributions of resistance to change in an empirical study.

I characterize the international debate on acceptance and the social consequences of computers. This debate presents many good reasons why people have resisted, and might still resist computers at their workplace or in their homes. The international debate is the background of the debate in Switzerland, which is the immediate context of my empirical study. I see my analysis of resistance as a contribution to achieve social acceptability of a new technology.

The organisational literature - I am looking at organisational sociology, social psychology and management studies - traditionally in studies of systemic changes and the problems arising thereof. The organisational literature is a source of concepts and related knowledge that managers are likely to encounter during training, and which guides the ways they frame problems, make decisions, and act. I present a review of influential writings on 'resistance' to agents of change which gives a view on 'social representations' of resistance in the managerial world. 'Resistance to change' is not just what it is; rather different conceptions of 'it' make a difference for action.

My criticism of dominant concepts of resistance obliges me to work towards an alternative. The framework of **self-monitoring subsystems** and an **analogy** to the organismic pain system is a fertile source of ideas, as it suggest a number of hypotheses on resistance to technical change and its effects. This framework suggests a functional analysis of resistance to change. Resistance is an independent variable and a useful source of information. This contrasts to most of the literature where resistance is nearly always the dependent variable.

I will demonstrate some of the uses of resistance for the implementation of a new computer system in a **case study** of a Swiss bank. A method to analyze organisational communication over time is developed which allows me to characterize when in relation to the project, how intense, in what manner, and to what effect 'resistance to change' emerges as an issue in organisational communication. Several hypotheses on the occurrence, manifestation and the functions of resistance to change are tested. The method of analyzing organisational actions and communication allows me to compare different actions and to test hypotheses within a single framework.

Why 'resistance to change' ?

Until the 1970s most books on social or organisational change contained a chapter on 'resistance to change', or at least referred to it in the index. This is no longer the case. To continue to use the term requires some justification. To use the term 'resistance' in this study means to import an loaded expression, which I will briefly explore with the help of a thesaurus and dictionary. Roget's Thesaurus (1990) cross-references three areas of meanings for 'resistance', all of which seem to be important for the present context. First, it is an abstract relation defined in connection with electricity and energy. Resistance poses an abstract and conceptual problem. Secondly, it refers to a quality of matter, and as such is alluding to metaphysical assumptions. Resistance is inherent, unavoidable, and in the 'nature' of things. Thirdly, resistance is a form of collective volition and therefore a social-psychological issue. The Oxford Dictionary lists 11 linguistic forms; the verb 'to resist' can be replaced by 'to withstand, to prevent, to repel, to stand against, to stop'. 'Resistance' as a noun is used in four contexts: to describe human actions, the power or capacity of such actions, the opposing relation of forces, and the non-conductivity of electricity, magnetism or heat. For human action 'resistance' means the 'refusal to comply with some demand', active or passive; and the clandestine insurgence against occupying forces of which the French, German or Italian 'Résistance' (Widerstand, Resistenza) during the Second World War provide an example.

Several reasons may account for the recent non-use of the term 'resistance to change' in the social science context. First, some authors who are sensitive to language have noticed that the way 'resistance to change' is used takes in most cases the

perspective of the change agent and blames, pathologizes or objectifies the resistant part: resistance is bad and deficient; and resistant is always the other, hence the other is to blame. Such concepts of resistance often mask the issues. To avoid such a conceptual trap it has been recommended that the term be scrapped and the problem under be analyzed under a different heading (Reverendi, 1975; Crozier and Friedberg, 1977, 34; Brotherton, 1988). Secondly, for others such as Luhmann (1983) 'resistance to change' is conceptually outdated. The notion of 'resistance' is tied into open systems thinking of managing change which has been replaced progressively by a new way of thinking for understanding autonomy. The use of the term 'resistance' implies an observer perspective without the awareness of perspectivity, which is incompatible with the analysis of autonomous, self-referential systems. Thirdly, the usage of the term 'resistance' has been called an 'epistemological error', because what is 'resistance' in the eye of the beholder is but the unfolding of the inherent logic of a system that is misunderstood. The use of the concept says more about the observer than about the observed (Böse and Schiepek, 1989, 173). Fourthly, some authors argue that 'resistance to change' is empirically hard to find, or even no longer exists, historically confined to a certain period of industrial development and labour relations (TenHorn, 1989). This argument is finally a problem of definition; depending on what one defines as resistance to change, it either still exists or is a only historical event. Fifthly, in the discussion of new technologies such as nuclear power, biotechnology and information technology, 'resistance' term has been replaced by the euphemism 'acceptance', albeit more for rhetorical than for epistemological reasons. Acceptance research takes the place of studies of resistance to new technology, with a loss of conceptual sophistication; and the blame for the problem remains externalized to the acceptor. In a simple way acceptance and resistance are complementary; low acceptance means high resistance and vice-versa. For the sake of rhetoric is seems more useful to talk about acceptance than about resistance, just as it seems more reassuring for the stake holders to perceive a bottle of wine half full than half empty.

Despite the criticism, with which I basically agree, and the available alternatives to the concept of 'resistance', I come to a different conclusion and prefer to keep the term for three reasons. First, I think the study of resistance to change is worthwhile and by using the term it is possible to link in to a body of research that goes back to the

earlier work of Kurt Lewin. Rather than discarding the term altogether because of bad connotations I opt for a **reconceptualization**. Secondly, such a reconceptualization can draw on residual meaning of 'resistance' in common language that points to an activity that is organized, reasonable, legitimate and often even heroic. As such a concept of resistance may well be used as a self-concept, though this is rarely done in the organisational context. . . . Reconceived resistance is no longer a nuisance or an expression of a motivational deficit, but an important source of information about how to continue a task realistically. **Resistance reveals reality**. Thirdly, the problem of perspectivity is overcome by contrasting several perspectives and by research feedback. At least three angles of observation are involved in the study: observing resistance, observing others communicating about resistance, and reflecting one's own observations of resistance as methodology. Resistance to computers is an issue of a particular communication system, and the study of that resistance is a contribution to that communication system. Hence, the empirical study becomes part of the very social system it studies.

A study in four parts

The design of the whole thesis is guided and integrated by what vonCranach and colleagues (1982, 50) have described as '**the complete research situation**', which is the juxtaposition of several observations: In the first gaze the situation and its context is explored. This is done with an analysis of the acceptance debate, on attitudes and the diffusion of computers, and by a literature review on resistance to change. In the second gaze one observes observations of bystanders outside the immediate context. This is done by a small exploratory study on the semantics of resistance. The third gaze focuses onto the observer himself. Conceptual and methodological reflections on resistance to change form a major part of an empirical case study. This leads to the fourth gaze that focuses on the self-observations of the participants in an empirical case study. This is done in an empirical case study with interviews and documentary analysis. Outsider observations and insider self-observations can be compared and may be similar if social representations are the basis of both observations. The thesis has four major parts corresponding to the four gazes.

In the first part I review and criticize two traditions: acceptance research in the

context of information technology, and organisational studies of resistance to change that make use of Lewinian concepts. This review recollects issues and results of diffusion research, attitude and public opinion research, and the debate on the social acceptability of new technology with a particular reference to Switzerland in chapter 3. I use it to characterize the context of the empirical case study in a Swiss bank. Resistance is a matter of perspective; it is attributed to various actors at different times, has an object, displays various forms, and has conditions that explain its likelihood as a dependent variable. In field theory 'resistance' is conceived either as 'barrier to locomotion' or as a 'counterforce to change'. The paradigmatic orientation that seems to underlay Lewinian studies is **'feeding the reluctant child'**, a form of 'matronizing' or benevolent social engineering. I would like to preserve the careful phenomenology of resistance of these studies and show the need for an alternative conception of resistance to change.

Part two is an explorative study of semantics to test the claim that 'resistance' connotes a negative meaning and is related to notions of deficit. The connotations to 'resistance to change' among an international sample of management trainees are investigated with the help of free associations and semantic differentials. A contrast is made between 'resistance to change' and 'to be conservative' to show that these two terms are not emotional synonyms.

Part three is the theoretical part of the thesis. An alternative concept of resistance is developed which rests in the tradition of system thinking and takes from recent developments in continental social psychology. Action psychology is an attempt to integrate concepts of Social and Work Psychology around the concept of activity. In the particular Bernese contribution actions are conceived as self-active systems on the level of individuals, groups or organisations that display complexity and historicity, and require multi-level analysis. **Self-monitoring**, i.e. exploring the internal needs of the system, is a crucial part of activity. The concept of self-monitoring allows me to unfold a functional analogy between the organismic pain system and resistance to change, and to explore its signal function. What pain is for the living organism, resistance is for the organisational action: a signal that something is going wrong, and hence the course of action must change. Resistance and pain are important sources of information, the disregarding of which can be dangerous for the continuation of any project, be it

individual or collective. The **pain analogy** generates within its limits various ideas and many testable hypotheses, and it refocuses the analysis from that of motivation to that of communication, and from structure and dysfunction to process and function. I summarize definitions and hypotheses at the beginning of the thesis.

Part four is an empirical case study of resistance to a new computer system for several hundred branches in a Swiss bank between 1983 and 1991. The study includes a description of events in terms of a self-active system with two basic stake holders: the taskforce with the brief to develop software, and the client system, the local bank branches and their customers. To collect data I use interviews, documents, questionnaires, and participant observations. Resistance is measured externally with the help of attitude surveys, diffusion data, and with participant observations. To that I contrast staff ratings and the content of interviews and documents, which I call the internal observation of resistance. Differences between these two perspectives are explained by characteristics of self-monitoring such as 'gate keeping' of relevant information and secondary coding of relevant information. Resistance is filtered and transformed in characteristic ways in organisational communication. The content analysis allows me to describe (a) when in relation to the action, (b) how intense and (c) in what manner 'resistance' becomes an issue between 1983 and 1991. An evaluation of the computer project from the point of view of local users is fed back to the responsible members of the task force. The effect of resistance and of the study itself on the course of the project are explored in a pre-post design.

Part I

Acceptance Research and Resistance to change

2. Acceptance Research and Computer Technology

'Acceptance of new technology' is a term that was born out of the debate about nuclear power in the 1970s and is used to investigating what is called the 'crisis of technology, technostress, technofear or future shock' (in German: 'Technikfeindschaft, Technikmuedigkeit'; Peter et al.,1986). I will use the notion of 'acceptance' to subsume three different research areas: first the diffusion of new technology; secondly the acceptability and guidelines for design, social and organizational impacts of computers; and thirdly public opinions and attitudes to computers. For every usage of 'acceptance' I investigate how the notion of 'resistance to change' is implicitly or explicitly deployed. A critique of the notion of 'acceptance' and related empirical research is useful for three reasons: First, acceptance research is a way of studying resistance to computing. Acceptance is a euphemism for the social problem of resistance to new technology. At least in German it was a newly coined word in the political vocabulary in the 1970s. To talk about acceptance rather than resistance is like describing a glass of wine as half full rather than half empty. 'Full' connotes positively, and 'empty' connotes negatively. A positive term may be more useful for the promotion of technology as it captures a problem with a term with less problematic connotations. In English the term 'acceptance' seems to carry the older meaning of 'agreeing to pay the bill'. It looks likely that we are confronted with an attempt of solving a social problem by language hygiene. Acceptance and resistance refer implicitly to measures which are complementary: the higher the acceptance of computing, the lower the resistance to computing, and, vice versa, the lower the acceptance, the higher the resistance. Secondly in the course of that review I introduce some concepts and methods which are used later in my own case study in a Swiss bank. Thirdly I will review a number of studies which are relevant for the study of resistance to change in the sense that they draw attention to negative consequences of the implementation of computers. Evidence shows that there are many good reasons to resist certain developments of that new technology. Some of these motives, voiced in a wider context, can be recognized in my case study. Undesirable consequences of computing fuel people's scepticism. They are the kinds of developments that people try to prevent in resisting the new technology.

2.1 Diffusion research of computer technology

In diffusion research acceptance refers to the extent that a product has penetrated the target market. The individual decision to buy a product is understood as an expression of acceptance. The act of purchasing is the criterium of acceptance. An innovation cycle, which consists of the invention of the product, its innovation as a marketable application, and its diffusion in the social system. The diffusion is defined as

> 'the process by which an innovation is communicated through certain channels over time among the members of a social system' (Rogers, 1983, 5).

Innovations may be new ideas, practices or objects which spread in a social system. A social system consists of members or units of adoptions which are either individuals, households or organisations. These adopters are often classified in early adopters, late adopters and non-adopters. The belonging a single member to one of these groups is predicted on socio-demographic variables (education, status, income, occupation etc.), attitudes and personality variables. Once a new idea, practice or object like a computer has been adopted, the amount of usage per day or week, and the variety of usage are of further interest in diffusion research (Dutton et.al. 1987). Diffusion processes follow a characteristic pattern which can be mathematically describes in an S-shaped curve: slow diffusion in the beginning, fast in the middle, slow diffusion again towards the end, when nearly all the members of the social systems have adopted the new idea, practice or object. The computer seems the most rapidly diffusing technology known in history. In the USA the per capita diffusion of computers (terminals, word processors, and personal computers) has reached the same level in 20 years for which the diffusion of the telephone needed 75 years (Gantz, 1986).

International differences in computer diffusion concern science policy people. The variance is an indicators for the competitive power of the national economy. Computing is one of the three **strategic technologies** of the post war period together with nuclear power and biotechnology (OECD, 1989). Countries with a lag in computer diffusion promote its development and use: allocation of R&D money; education of

engineers sufficient in numbers and qualifications; and public campaigning for new technology. The new technology is important less to reduce employment than to increase and to change the output, hence to produce at lower costs, and to secure the competitiveness of the economy in the long run. They advocate the cushioning of the immediate adverse effects of job losses by unemployment and training schemes (Cyert and Mowery, 1989). The diffusion of computers reflects the combined efforts in producing, improving and marketing of computer technology. All other notions of 'acceptance' research contribute directly or indirectly to this process.

2.1.1 Models of the diffusion process

Mathematical diffusion models describe, explain and forecast the course of an innovation in a social system. A mathematical model of diffusion postulates a number of elements (Mahajan and Peterson, 1985):

- a serious of data points n(t), which reflect the number of **adopters** n of the innovation at a given time t.
- a **starting point** of the diffusion t[0] with a number of initial adopters n(t[0]).
- a **social system**, within which the diffusion takes place. N[t] refers to the number of potential adopters in the system at time t.
- The **S-shaped diffusion curve** (logistic function) with the slow beginning, the acceleration, a point of inflection, and the deceleration towards the end of the diffusion process.
- the **speed of adoption**, which is the slope of the curve at any time point. The first derivative of the logistic function:

$$\text{(I)} \qquad \frac{dn(t)}{dt} = f\{a,b,n(t)\}\ \{N(t)-n(t)\} \quad [\%\text{units/time}]$$

- **parameters** of the rate of adoption. They are uncontrollable characteristics of the system (a) and the controllable actions of the change agency (b) that influence the process. Different models of diffusion specify different sets of parameters.

A number of assumption underlay that basic model: a) The innovation does not change over time; b) there is deterministic regularity in the system; the future is a function of the past. No new influence arises during the course of innovation, all relevant information is captured; c) the postulated influences expressed in the parameter f(a,b) are constant over time; d) the social system is stable as a unit; e) the diffusion process is binary: adoption or not; f) only one adoption by any unit; g) An adoption cannot be rescinded.

Models of diffusion are based on the common assumption that adopters imitate each other, and that the potential adopters N(t) can be separated from the cumulated number of adopters n(t). In several ways the more sophisticated models try to overcome the constraints that are set by the assumptions of the basic model of diffusion. A variable number of potential adopters N(t) is introduced, reflecting the case in which the social system is extending or contraction during the diffusion process. The continuum of time is extended to a continuum of time and space (Hagerstrand, 1967). The parameters g(t) is stated as a function of various internal (a) and/or external factors (b) depending on the actions of the change agency like profitability, investment, pricing, advertising and promotion, product tailoring, perceived quality of innovation (Mahajan and Peterson, 1985, 51-54).

2.1.2 Criticism of diffusion models

Formal diffusion models have been variously criticized. Formalization is often gained at the costs of unrealistic assumptions and practical insufficiencies. First, the diffusion model are biased towards the point of view of the change agent[1]. It is a tool for the organizers of an innovation, who try to speed up the innovation process (Rogers, 1983). This parameter 'b' captures the influence of the actions of the change agency: e.g. amount of advertising and other investments. Diffusion models are used to calculate and plan investments. Management involves the task to impose new technology on their employees: 'Managers must also impose the new technology on a not always receptive

[1] A change agent is a person who is professionally responsible for initiating, steering, controlling and motivating change processes in an organisation. He or she is most likely in a managerial position (Ottaway, 1983).

workforce' (Randles, 1983, 465). Second, the majority of proposed models are not empirically tested. The validity of different models is unclear and the choice between them is often arbitrary (Bocker and Gierl, 1988). Third, many diffusion models assume a 'natural', endogenous process of diffusion. External influences on the diffusion process are neglected, or are assumed to be constant. This is a doubtful reduction of complexity, which is blind to the influence of the change agency (Bocker and Gierl, 1988). Forth, the diffusion models mostly lack a connection with behaviourial variables. Therefore their practical relevance is doubtful. No rules for actions arise from the models, that renders the models, despite their sophistication, rather useless (Bocker and Gierl, 1988). Fifth, I will later argue that resistance to change is a useful feedback process in the course of innovation. This contradicts directly with an assumption of many diffusion models, that the product is unchanged during the diffusion process. A more realistic model of resistance to technology cannot assume that the technology to be innovated is unchangeable. Horsky and Simon (1983) refer to that point, when they introduce the modification of products, the **tailoring process**, as a variable in the diffusion process. They conclude, however, that the tailoring to user demands influences the total number of potential adopters N(t) and not the parameters a or b. This seems is an odd conclusion. **Tailoring is a task of the change agency** and should be represented by parameter b. I see tailoring as a feedback process in the diffusion process, which accelerates the process after an initial delay.

2.1.2 Resistance in diffusion models

Explicitly diffusion models define resistance as the degree that an new idea, practice or product has not penetrated the social system. Resistance at time [t] is the complement to the acceptance n[t]. The rate of adoption is a function of resistance as shown in (I).

$$\text{Resistance}[t] = N[t] - n[t]$$

Resistance follows a characteristic pattern: high at the beginning; the collapse of resistance in the middle phase; and the residual resistance towards the end of the diffusion process (Watson, 1971). Within that framework resistance is observed from the outside of the social system. I can be defined as follows:

D2.1: Resistance is the lag of the diffusion process. It is a relative characteristic of one diffusion process in comparison another.

This delay is shown in the **time lag** and the **speed** of diffusion. Relative resistance is measured in two ways: First by time **difference in the start time** of two diffusion processes: the bigger the time lag the more resistant is the diffusion process in the second system; Second, by the **slope of the diffusion process** at a given time. The smaller the slope of the graph the bigger is the resistance in the diffusion process. Resistance is the prim delay factor of a diffusion (Hagerstrand, 1967, 271). He defines 'resistance' by the number of contacts made with previous adopters before adopting. (ibidem, 265). Resistance is related to the average size of the adopting units: the bigger the average size of a unit, the lower is its resistance to the adoption (ibidem, 279). Resistance in the diffusion process will have two effects: a longer incipient growth phase and, and a diffusion that is geographically concentrated (ibidem, 272).

2.2 Acceptability: computer technology and options of design

The empirical and the normative meaning of acceptance must be differentiated. The empirical meaning is called 'acceptance'. Acceptance research asks the question 'who does, and who does not use computers, and why not ?', and is interested in managing the non-users. The normative meaning is called 'acceptability'. Acceptability research asks the question 'how must the computer system be designed in software, hardware and task organisation, so that it furthers rather than hinders social values ?', and it is interested in the shape of the technology. Acceptability research aims at giving specific guidelines to the consumer and to the producer. Such guidelines are often based on social norms and values. It transcends the mere empirical question of what people want, and endorses a normative outlook referring to values of enhancing the human development and the well-being of members of the society. I should like to discuss three approaches: the criterion of 'social acceptability', the notion of 'risk acceptability', and the notion of 'technology as an option of design'.

2.2.1 The criterion 'social acceptability'

A normative notion is introduced into the debate on nuclear power by Mayer-Abich (1979) with the criterion of 'social acceptability'. According to that criterion alternatives of technological systems have to be assessed on two issues: a) The compatibility with the existing social order, as it is expressed in the positive social and legal order, and b) the compatibility with the direction of social development, that is expressed in the social constitution (Lompe, 1991, 44). The constitution of society is an open process that specifies the boundaries for the direction of social change, notably in the Western world, freedom and welfare. The notion of social acceptability contradicts the myth of Prometheus, according to which the social order has to be reinvented newly for each technological development. On the contrary technological development is to be tamed within a) the social order, and b) within a political negotiation of the future. The social process ought to constrain technology rather than the other way round. The question about the desirable future must remain open. In principle this criterion makes it possible to think of a situations in which certain developments of computing technology might be restricted, redirected or even aborted, without actually specifying such a situation before hand. For Kling (1980) social accountability of computing is a procedure that brings about social acceptability. The question is: How, where and to whom are computer people accountable ? If computers are a new means of social control, then the problem arises: who is controlling the controllers. Models are needed to control those who provide services and use computing equipment. Accountability is a quality of a computer solution and we want to maximize it. Kling (1980) describes six strategies to enhance the social accountability of computing: competitive market arrangements, administrative authority, professional self-control, regulatory commissions to administer legislative acts, judicial enforcement and review of the law, and citizens' actions. Different ideologies focus on different strategies. **Computing is a political issue.** It is a matter of public affairs to control the wider social implications and costs. This must be done in a quest for reason which transcends instrumental rationality: the question about what kind of organisation or society we want must be kept open (Weizenbaum, 1976; Mettler-Meibom, 1987). It becomes necessary to establish an 'ideal situation of speech' between science, technology and the public,

which furthers collective reason, without jeopardizing the autonomy of scientific research from the political (Witte, 1991).

2.2.2 Risk acceptability

The consequences of new technologies are assessed as risks for the health and well being of the population or sectors of the population. Risk was at times defined as the probability of loss on an otherwise beneficial course of action. More recent 'risk' has taken the meaning of costs and negative outcomes per se. It is product of the probability of certain events times the costs caused by these events. A certain high risk is either due to high probability of small damage, or due to high damage with a lower probability, or due to a medium probability with medium damage. When risks are **individualised**, the individual takes the responsibility of being confronted with the damage that might occur. When risk is **socialized**, a collective is sharing the burden, and the individual is buffered by social insurance. Risks are **objectifiable** as expert judgement or as a matter of risk perception in a social group. Risks are omnipresent in all activities of our life, but we feel secure in some of them, insecure in others. The extent of control is crucial to give rise to a feeling of security. Security involves value judgements about the threshold levels of risk, below which we feel secure, above of which we feel insecure. To feel secure, means to accept the risk. Value judgements are assessed empirically as risk acceptance: what risks do people see and take ?, and it can be described as risk profiles. Such profiles depict the risks people take in their daily activities. Risk acceptance may be different for different areas of new technology and for different subgroups of society. It can be shown that people feel much more secure in situations where they can control the danger, than in situations where the danger is out of control. Professionals in dangerous task areas are expected to take higher levels of risks in their activity than are lay people. Smoking might well be more risky than nuclear power stations in objectifiable expert terms. The latter, however, are perceived as being far more risky because they are out of the individuals control.

Risk assessment has at least two problems: risk identification and management. Identification refers to the problem of proving the existence, assessing the level of risk,

and establishing causal links. Management refers to the ways a risk is distributed and covered in a population. Both are matters of societal debates among interest groups. In the area of computing at least three risks have emerged so far: health problems due to exposure to Visual Display Units' radiation, posture problems and Repetitive Strain Injury. Risks are discussed normatively as **risk acceptability** (Kuhlmann, 1979): what risk should people accept based on a set of general values ? Risk acceptability is discussed as a generalized norm. Risk acceptance and acceptability might not match in cases where people accept risks because they have no choice of doing differently. Such risks are socially less acceptable, and therefore elicit social actions to mend the situation. Risk acceptability marks a value on a scale of absolute security (risk=0) and maximum risk (risk=1). Risk acceptability must be defined for different technologies. Risk are relativized towards other risks. Risk acceptability is dynamic and reflects the social discourse . A risk well accepted at one time may be unacceptable at another time as the case of passive smoking exemplifies very well.

2.2.3 Technology as a design option

The psychology of work activity (Hacker, 1986, Ulich 1991) starts from a definition of the 'human' design of work. It stresses human autonomy, the human sense of self-determination, and human potential for positive and negative development, the broadening or narrowing of skills, the scope of social interaction and personal resources. Theoretical and empirical research analyses, evaluates and (re)designs human work and organisational structures. Work systems are evaluated with regard to the happy coincidence of **economic effectiveness** on the one side and **human autonomy** and **potential for human development at work** on the other side. Research starts from the non-contradiction of these two elements of analysis. These efforts reflect a view of technology which more and more technologist and social scientists, particularly in Europe, subscribe: the notion of **technology as an option** (Ulich, 1991). Such a notion explicitly contradicts technological determinism (Gutek et.al.,1984; Ulich et.al. 1985, Blackler, 1986; Roe, 1989). This view opposes **technological determinism**, which assumes a unidirectional influence from technology onto social structures, and

contradicts the Taylorist dogma of the 'one best way' (Taylor, 1911): a technical tool can be designed in various optimal ways, and the way it is implemented in work and everyday life can vary while producing the same optimal results. The aim of design shifts from the quest for the 'one best way' (one optimum) to the offer of functional equivalents (several optima) from which to choose in a flexible manner. The outcome of technology is mediated by its social organisation. This allows scope for human action and negotiation. Functional and normative criteria are necessary to choose design options and to evaluate them in different situations.

Ergonomics of hardware guides the design of the work stations (VDU, keyboard, desk and chairs: aspects of lightning, noise, climate etc.) and its environment according to standards of average human anatomy and functioning. Software ergonomists study and provide recommendations for an adequate user-interface. Two examples may be mentioned here. Shneiderman (1988) classifies five different styles of human-computer-interaction, each having advantages and disadvantages: menu selection, form fill-in, command language, natural language, direct manipulation. Zimolong (1986) postulates criteria for the design of expert systems in process control decision making: functionality, similarity of machine and user knowledge base (declarative and procedural), adaptability of the system.

Work psychologist criticize the narrow focus of ergonomics on the isolated work station, and, by contrast, stress the social nature of work. Work tasks are constrained by work organisation as well as software design. This shifts the attention onto the holistic design of work via the design of new technology and organisation: engineers are not only designing technical tools but forms of work. The designer attention has to broadened onto work activities as the intrinsic outcome of his practice. Such research delivers guidelines linking hardware and software design, task design and organisational design (Hacker, 1986; Spinas et.al., 1983; Ulich et.al, 1985; Ruch et.al., 1989). Software and hardware determines what is to be done and how that is to be done by the user. The design of software and its organisational embedding affects the levels of monotony, fatigue, satiation, stress, satisfaction, and work motivation, leisure activities of the user, hence the level of absenteeism, turnover, and hence the total effectiveness of the organisation (Hacker, 1986, Frese, 1987, Wall & Martin, 1987, Ulich, 1991).

2.2.4 Resistance and acceptability of technology

The debate on acceptability of new technology deploys two notions of resistance: negatively, the anachronism of the designers and, positively, the rejection of technological fix. First, resistance to new forms of work organisation is due to widespread prejudices among managers and engineers (Blackler, 1986; Ulich, 1991). Management defends traditional, often Taylorist work organization even in the face of strong empirical evidence, that alternative models work equally well or even better. This process is partially explained by the **vicious circle of management ideologies** (McGregor, 1970). Certain assumptions about human nature are sustained in a circle of self-fulfilling prophecies: People do not take responsibility, and show no initiative, that is why they need tight control and strict rules guidance. By consequence they are unlikely to show responsibility and initiative, which in turn leads to tighter control and strict rule etc.. Old engineering practices persist only qua tradition, for which any rational is lacking, maintained only by habit and myths about its functionality. An explanation given by what is called the **'QUERTY' phenomenon** (David, 1985): present options are held in the grip of events long forgotten. The arrangement of the keyboard originates from the times of mechanical typewriters. The keyboard was laid out to reduce the typing speed, because the mechanism would frequently block itself. The mechanical technique has gone, but not the layout of the keyboard. Although more efficient layouts are known for a long time, the standard is frozen not least in widespread typing skills, no supplier can afford to challenge these skills. The present standard of keyboards is suboptimal, but sufficient. For the advocates of human work organisation the strategy to overcome the resistance of decision makers is a mixed bag: to conduct research, to provide evidence for rational arguments, to arrange for publicity, to professionalize work psychology, to train managers and engineers who design future technology, and to raise the attention to new organisational concepts among employers and labour organisations at the same time.

Second, the debate on social acceptability of computing dignifies resistance to change with the moral patina of the socially alert. Resistance may be an expression of the quest for the 'common good', freedom and welfare, as opposed to the furthering of particular interests. Resistance to computing is the rejection of the prometheus-myth.

Technological fix is unacceptable and must be questioned in the light of the 'generally desirable state of affairs', which only politics can determine. Resistance renders public, what the technologist wants to turn into a private decision.

2.3 Social impact analysis of computing

A third notion of acceptance investigates the impacts of computer technology, i.e. the consequences for the individual, the organization and society (Danziger, 1985). Such consequences are traced in an early phase in order to identify trends and to feed back the results into the development either as reinforcement (positive feedback) or as warning signals (i.e. negative feedback). Impact analysis are multi-disciplinary projects that accompany new technology in early phases. The goal is to establish a **taxonomy of impact** and possible measurements, which can function as an **early warning system** for undesirable side effects, and to set up a balance sheet of benefits and social costs to take them into account in political decision making. Kling (1980) puts the key question: what difference does it make, with or without computer ? Impact analysis is not devoid of theory. Different theoretical 'spectacles' highlight different impacts, propose different technological ideals, and invoke different analytic concepts. In a review of Anglo-Saxon studies since 1950, Kling distinguishes six different approaches to the social analysis of computing: rational, structural-cybernetic, human relations, interactionist, organizational politics and class politics. The first three take primarily a managerial point of view, while the second three take the point of view of staff and/or clients, assuming conflicting interests (Kling, 1980, 72). In the early phase until 1969 impact analysis of computing is speculative, exploring the new uses of computers, but anticipating the major problems arising: deskilling jobs, unemployment, the differential development of jobs in production and in clerical work, and the intrusion of privacy with the help of powerful data processing systems. After 1970 empirical studies become more prominent that investigated the impact of computers on organisational and public life. Kling summarizes the evidence in seven areas: politics of innovation, working life, decision making, management control, organisational power, privacy and social accountability. I will follow that classification.

2.3.1 Organizational impacts of computing

Computing has impacts on the politics of innovation, affect the quality of working life, shifts organisational power, changes of the decision making process, and in changes the way management controls. Each of these impacts is briefly described. Kling and his colleagues introduced the useful notion of computers as **'problem generators'**, rather than a problem solver. To run a computer is a problem and requires an infrastructure. Computing is no longer adequately conceived by the isolated 'tool-metaphor', like a screw driver or a hammer, but needs the 'package or web metaphor' (Kling, 1980, 79; Kling and Scacchi, 1982, 6). The new metaphor draws attention to the context only within which the computer can worked: not only hardware and software, but the infrastructure of adequate skills, organisational and technical support, and attitudes and beliefs about what the computer is good for. The analysis refocuses to the analysis to what people are actually doing with computers in contrast to what they should do and what the computer allows to do. Computing studies finally become socially realistic. Computers do not do anything to anybody by themselves. The impacts of computers are the outcome of a network of human actions. Human networks can take into account past computing experiences (Kling, 1980, 100). Predictions of negative impacts of computing often work as self-destroying prophecies, as they instigate actions which reverse the predicted trend.

Impacts on the politics of innovation

The politics of innovation in an organisation influence when, how fast, and how computing is introduced and whom it will mainly serve. Reasons publicly given and actually endorsed reasons for the adoption of a computer strategy have to be separated: to increase the efficiency, to enhance organizational control and power, and to buy the symbolic power of the computer as an icons of progress are equally possible reasons for adopting a computer system. Roe (1989, 7) summarized the European politics of automation in six characteristics: the automation process is dominated by technical experts; user participation occurs on a small scale in spite of lip-service being paid; people are being poorly informed about automation, the training and guidance is

insufficient; many automation projects were ineffective and failed because of poor planning and disregard of social and organisational aspects; and despite all that is the level of resistance low disregarding some exceptions like the printing industry and Eastern Europe.

Impacts on working life

Evidence shows that if the design recommendations are not met for task and workplace design the user's health, safety and well-being are at risk, as well as work effectiveness and job satisfaction. Up to 40% of office workers report insufficient design of software and hardware. VDU work bears physical risks for neck, back and limbs resulting from static postures, as well as eye-problems and head-aches. Required are adequate design, limiting working time at VDU's and task requiring wider motility (Roe, 1989). Repetitive Strain Injury (RSI) is the most recent problem.

Impacts on the distribution of organisational power

Roe (1989) has shown for the European case how new organisational units emerge (data processing units). The linking of data processing between different functional units changes the organisational integration. However, no clear picture emerges. All kinds of structural changes and stabilities can be found. There seems to be a slight reduction of managerial posts, in decision making both centralization and decentralization happen, decentralization is fostered by distributive data processing in recent years. Decentralization of decision making goes together with centralization of control. Impersonal and anonymous means of performance controls are introduced. Communication among staff increases at higher levels, decreases on lower levels. Generally a bureaucratic tendency with increasing standardisation and formalization of information processing and work procedures seems to prevail. New technology is a **'booster variable'** (Roe, 1989, 9; Weizenbaum, 1976), i.e. it enhances the pre-existing organisational design: bureaucracies become more bureaucratic, decentralized organisations become more decentralized.

Littek and Heisig (1986) report on the introduction of new technology in Germany in the early 1980s, 150 qualitative interviews with clerical staff in three industrial companies. The technical and organisational changes have been accepted,

despite job losses and work intensification (higher workload and time pressures). Individual and collective **resistance was marginal** at the time. They explain this result by strategy of change, which was used. 'Taylorism' partitions work to a maximum, and separates strictly between planning, doing and controlling of a task. In a reversal of the strategy jobs are newly combined and the responsibility of staff is extended. This is called the **'strategy of responsible autonomy'** of technological change. Researchers identify identification of the staff with their tasks, a efficiency orientation of staff and management, and high levels of qualification as preconditions of such a strategy. This strategy leads to staff competition and ends in a threefold spilt: First, the **'winners'**, a highly qualified group of staff, actively participating in the changes. They try to prevent any development which may be to their disadvantage by intervening and getting involved with the implementation of new technology. Second, the **'lucky survivors'** maintain their past social and economic position without getting actively involved. Third, the **'losers'** are socially and economically down graded, and who show a defensive-hopeless attitude towards the new technology. That group combines mainly elderly staff and non-specially trained staff. They are marginalised and run the risk of losing their jobs. The strategy of responsible autonomy goes together with the externalization of problems. Littek and Heisig draw three conclusions from their study: First, the present technological change is not a simple top down implementation process but a negotiation between management and staff and among different groups of staff which is open for different directions. Second, non-taylorist forms of work are revived or newly introduced among clerical work. This contradicts the main scenarios of industrial sociology which were predicting universal 'Taylorization'. Third, staff reactions of active involvement in new technology based on trust, high qualification and an efficiency outlook is not a 'false consciousness' but a yet poorly understood strategy of resistance to uphold the interest of staff in the labour process. They predict the 'clericalisation' of blue collar workers in contrast the marxist hypothesis of the proletarization of clerical staff in the technological process (Littek and Heisig, 1986, 257).

Impacts on decision making

Decision making deals with the problems of optimizing the choice among many options

for action according to certain criteria. March and Simon (1958) see decision making as the core activity of members in an organisation. Decisions are made in different hierarchical positions. On these different levels the decision making is qualitatively different with respect to the cognitive operations and the time horizon (Humphreys and Wishuda, 1987). In order to enhance the limited capacities of human beings to store and to process information the computer is enthusiastically welcomed as a decision tool. It is easy to appreciate the advantages of a library search data base, a police stolen care database, or a airline reservation system. Kling (1980) points to three unintended consequences of the implementation of computers as decision tools. Swollen databases are a troublesome tools. The data is not what users want and need. Data cannot be cross-referenced or only by very cumbersome procedures. Data is inaccurate or out-of-date. Often final decisions are made independent of a formal decision making tool. People are exploring the options using the formal procedure. However the actual decision is made by information which was gathered informally and may well be outside the CADM tool. That this has its logic is shown by Humphreys and McFadden (1980). They observed how formal decision making tools can be '**bootstrapping**' the decision maker in a '**small world**', which is built into the system. They develop CADM tools which are more flexible and allow the exploration of multiple perspectives on a decision problem. Such a tool is helpful for defining a decision problem, exploring alternatives in many different ways, that are controlled by the user rather than by the machine. The computer is not the decision maker, but the facilitator for making it. Computing with data base or CADM can have **symbolic value**. Computing is used to convince parties that decisions are made carefully and trustworthy. Irrespectively of how the decision is actually made, the computer provides the final decision with a patina of accuracy, authority and legitimacy (Kling, 1980, 82). The CADM turns into a **rationalizing tool** instead of being a tool to make rational decisions.

Impacts on management control

The idea of management control is to provide higher level management with fine grained, timely and accurate information about resources and man power: stock, location and performance. This information is used to redirect resources and human activities according to requirements. Activities in organisations are traced in budget-

control systems, man-power allocation systems, or management information systems (MIS), absenteeism, movements in buildings etc.. The supervision of human activity and performance has to face the **paradox of social control**: the allocation of resources requires adequate information about needs, the collection of this information is conditioning dysfunctional activities. Any control system selects, sees some activities and others not. Control systems to monitor activities are most skilfully 'gamed' by making numbers look good (Kling, 1980, 84). Nevertheless, control systems can cripple human creativity and, in the extreme, deny human dignity. Dysfunctional outcomes of a more prosaic nature are known from studies of industrial organisations and of bureaucracies described as **vicious circles**: People under supervision are surprisingly creative in finding ways to play the system, to uphold a degree of freedom, and to engage in 'undesirable' activities (Crozier and Friedberg, 1968). Undesirable activities are constraint by intensified control, which in turn facilitates more undesirable activities, which calls for more control, which in turn etc..... Such systems tend to evolve in costly cycles of periodic eruptions (Crozier, 1964).

2.3.2 Impacts of computing on the public and private sphere

The misuse of data and data protection, the intrusion of the private sphere and family life with sophisticated media, and the problem of remote work, which is reminiscent of preindustrial work situations with all its advantages and dangers, is the focus here.

The misuse of data and data protection

The intrusion of privacy and its prevention is an early issue of the social discussion on computing. Computing systems allow to store sensitive data about individuals, to network different data bases and to combine different kinds of information about individuals in an unprecedented way. The empirical question is what kind of data about individuals is collected and stored, who is using this data for what purposes, what kind of abuses may occur. Procedural safeguards are necessary to maintain and protect privacy and individual freedom: a) under confidentiality information is only used for

some purposes and not for others; b) the right to access the data and ensure their accuracy at request. Data protection laws specify such measures. The costs of information collection is a barrier for the use of sensitive information. The networking of different information is complicated and therefore costly. This may change in the future. Decentralisation of data bases prevents the kind of supervision that is highlighted in Orwell's novel '1984': 'big brother is watching'. No omnipresent monitoring system shall control the movements and thoughts of the citizens and make that data available to all kinds of agencies. The tightening of data protection laws is necessary as specialized businesses emerge. Address brokers collect and combine diverse data from publicly available data bases: official records, credit card tracks, bank credit information. They scan the whole country and sell the data to everyone interested. Such data is the basis of evermore fine-grained 'life style' taxonomies to advertise goods and services ever more effective by individualized telephone approach or junk mail[2]. The misuse of information happens. The security of information systems is a matter for legal developments. A legal taxonomy of computer frauds is needed. Computers are an opportunity for fraud. The computer is not only a problem solver, but a problem generator as well.

The intrusion of privacy and remote work

Another area which is touched by the computer is the **family and its privacy**. Since the massive reduction of prices during the 1980s the computers is evermore present in individual households. In 1985 19% of British household were using a computer (Dutton et.al., 1987, 147). The computer in the home is used as a toy for entertainment, to provide a learning environment, and as extension of work to the household. Controversies reminiscent to the debate on the impact of the television on family and personality arise. Empirical studies investigate the use of computers at home. Its influence on learning and education, leisure activities, household routines, family functioning, and work at home.

Computers can stimulate children's learning and their interest in schools. Computers reinforce an already unequal learning climate. Well educated families are

[2] An American system call 'pin point' has recently been excellently documented in a British Television production on junk mail: Equinox, Channel 4, October 1990)

more likely to have a computer at home. Concerns arise therefore about the unequal distribution of **computer literacy**. The home computer affects the pattern of family life. It requires space in a room, and it orients life and everyday activities towards home. The computer is a new source of family conflict, and may decrease the contact with other families and friends (Dutton et.al., 1989). The computer shifts individual leisure time away from television to the computer and video games, strait into a **computer culture** which has its own reading (computer magazines), and hence its own jargon. Outdoor activity is reduced, as well as interest in art and book reading, together with a general loosening of social interactions (Dutton et.al, 1987, 162). The home becomes an extension of the work place. To work at home is the primary reason for purchasing a computer for the home. The traditional separation of working and living is reversed into new forms of **distant work** (Roe, 1989). Tele-homework, satellite offices and other forms of distant work require a personal computer (PC) at home with a modem and a telephone line for the communication with the centre. New opportunities emerge for the physically handicapped to work at home. It can also mean new employment opportunities in remote areas like islands or mountain valleys. On the other hand, more worryingly, this may mean the return to pre-industrial forms of 'cottage work' without the legal protection and with all the risk of exploitation. The system of industrial relations may be gradually undermined. Hence these new forms of remote work are a concern for trade unions and labour legislation.

2.3.3 Resistance and social impacts of computing

Resistance to technology is not a prominent variable in social impact analysis. Resistance to change appears as **delay in the diffusion** of computing, or the **negative reactions of users** to computers. The refusal to use new equipment or technological strikes are rare incidences. Organized resistance to office computing and production automation is a marginal phenomenon with some exceptions. Some researchers are surprised and turn the question to why that is the case ? (TenHorn, 1989). This may also reflect internal 'filtering' mechanisms. Resistance is buffered by personal managers. Surveys take the information from senior managers, who are not aware of

incidents or are at the Public Relations side of a company. Resistance is 'marginal' because it ought to be, rather than because it is (Willman, 1986, 17). A function of resistance is implicit in the debate on the social acceptability of new technology. Technology is a matter of public affairs. It requires check and balance at all levels to draw attention to costs and their distribution. How far are certain trends necessary like the hacker personality, new computer related health risks, bureaucratization and centralization of control, citizen control and opportunities for data misuse etc. The idea of technology as an option reminds us constantly that no trend is necessary. There are many good reasons to be alert and to resist certain developments.

Organized labour generally does not oppose new technology, although for example in Great Britain resistance to new technology occurred in the printing industry, in the dock industry, in the textile industry, in the car industry, in the Post Office and in the Railways (Northcott and Rogers, 1984; Willman, 1986). However, according to Northcott and Rogers (1984), only 7% of British manufacturers reported opposition to new technology, mainly in establishments with more than 100 employees. Delays may also be the unintended consequence of complicated procedures, where everyone plays the game, and nobody can be blamed for that (Peccei and Guest, 1984).

Resistance to new technology seems to be confined to the 'loser group' of the change process. Those people, mostly elderly engineers or staff with non-specialist training show a **passive disagreement** with the implementation of new technology. They are not disposed to defend their interests and to compete with active staff. This group of technical staff risks their jobs (Littek and Heisig, 1986). The **resistance of top managers** to use new office equipment has been noticed in the early 1980s (Streicher, 1984). Was the resistant manager real or a myth? Alter (1985) gave evidence that resistance to the use of office automation was strong in low as well as top ranks of organisations, and weak the middle ranks. It can be argued that the resistance of top management to use office automation has focused the attention of computer suppliers and decision makers to the issues of user-friendliness of new technology in a historically unprecedented way. The resistance of decision makers is of different impact for the design of technology than the resistance of those for whom decision tend to be made.

2.4 Public opinion and attitudes to computer technology

The last notion of acceptance refers to public opinion and attitudes to computer technology as an indicators of 'temperature', 'climate' and 'potentials'. Public opinions, knowledge and experience of nuclear power, computing and information technology, biotechnology, and robotics, are surveyed: how do they affect everyday life, people's perception of costs and benefits, their positive/negative evaluations, and intentions to act against them. Attitudes are analyzed qualitatively and quantitatively. The qualitative analysis of attitudes to new technology has the potential of 'social representations' (Farr and Moscovici, 1986), as they describe the arrival of surprising and fear provoking objects in everyday life, in need for familiarization and anchoring in tradition. The quantitative analysis of attitudes describes the structure and changes in average responses of the public.

2.4.1 Qualitative studies of attitudes to new technology

Two British studies exemplify this approach in a fine way. The first one is an critique of British business culture, a contribution in the debate on the British secular decline. The second one is an early study on attitudes to the computer based on media analysis. Coleman and MacLoad (1986) reconstruct the origins of the **negative attitudes of the British business elites to new production methods** between 1800 and 1950. The thesis is: what is called the **'British decease' is fundamentally an entrepreneurial failure with too much continuity rather than decline.** Continuity of a system means relative decline when the environment is changing rapidly. Low investment and low productivity, a succession of long-term industrial failures in international competition (cotton, mining, machine engineering, shipbuilding, watch-making, printing, pottery, dye industry) are related to attitudes and behaviours or the British business elite. The list of vices is long. British business men were complacent, tolerant of incompetent management; favouring dynastic promotion, managerial inbreeding; displaying the conservatism of practical men, lack of planning, imagination and vision of future potential; neglect of work shop equipment; stuck to outdated practices and simple

minded empiricism; and avoided risks. British business men

> 'can be presented as sliding into incompetence, displaying the while an attitude to new techniques which combined ignorance, indifference, hostility, prejudice, and complacency in a dosage which ranged from the damaging to the lethal' (ibidem, 588).

These attitudes and behaviours represent the anachronistic survival of the spirit of the industrial revolution. That revolution was conducted by 'practical men' with a low level of intellectual investment from the privileged position of the dominant nation. Science and technology were seen as risky and unnecessary investments by self-styled businessmen as well as the financial elite, who took a pride in having no scientific education (ibid., 604). The ideal of classical education reinforces the disinterest in science and technology. Poor scientific and technical education, and the social disregard for engineering and technology are a cultural characteristic (ibid., 603). Technology was nothing but a labour saving device, to tame an undisciplined labour force, rather than an output increasing device. Such an exclusive use of technology is resisted by employees ever since the early 19th century, when machine breakers, spontaneously and organized, countered the threats livelihood and work practices (Thomis, 1970).

The second study analyses the attitudes to the computers in Britain before 1960 (Sheldrake, 1971). Sheldrake analyzes material from 17 quality newspapers and journals and a series of books about computing. Blue collar workers as well as clerks are seen as resisting the introduction of computing for fear of redundancy and of down grading of their work (ibidem, 40f). Three different attitudes are described: First the **'clay pigeon response'**: the belief that nothing can be done to alter one's fate but to wait and see; second the '**exclusion hypothesis**': computing will not happen to others, therefore I do not need to bother about it; and third the '**gravy train response**': computing is a bandwagon to jump on whatever the direction may be. The computer industry is observed with suspicion: a class-less industry, with a new bread of young, well paid, highly technical specialists, mobile and with no loyalty to a company, that are more and more detached from real problems, with an increasing distance between specialists and the man on the Clapham omnibus. Their products elicit public concerns about intrusion of privacy and security. Nightmare visions of the omnipresent supervision of everyday life appear (traffic control, personal information) by a 'Big brother' are appear. The **brain-computer-analogy** was a premature, but nonetheless disquieting image of

computers that take over human activities like problem solving and decision making. Standardization and reduction of humans to mere numbers were common concerns. A reference is made to a 'International Society for the Fight against Data Processing Machines' (ISFADPM), which was founded in 1963 (ibidem, 49). Two representations of the computer are typified: first, the **computer as a tool**: it is pragmatic and focuses on what the computer actually does, and how this can be commercially exploited; second a **technical perspective**: a utopian strand that is interested in the new technique per se, in widening its potential and reducing its limitations. These representations of computing were embodied in the two factions of the British Computer Society at the time. The early years of the Society were ridden by what one could call a conflict between pragmatists and mavericks, or between innovators and inventors (ibidem, 56). Sheldrake explains the social problems of computing by a failure of communication about what is basically an applied activity. A future is envisaged where the computer becomes a non-problem because it is part of everyday equipment like the telephone, the TV, or the automobile (ibid.,62). On the other hand the loss of jobs seems unavoidable and a concern for the future: 'Unlike previous technical developments, the computer is more likely to make man redundant rather than merely extend his capability' (ibid.,62). This study of the social representation of computing in Britain of the 1960s was written by a historian. Such analysis has not been replicated. It seems worthwhile to resume this line of research in social representations of computing.

2.4.2 Quantitative studies of attitudes to computers

The quantitative study of attitudes to computers deals with five problems: the design of reliable measures, the structure of computer attitudes, the attitudes of subgroups of society, the international comparison of attitudes to computers, and the patterns of attitude changes. I will discuss each them separately. McGuire (1986) defines an **attitude** as a response which locates objects of thought on one or more dimensions of judgement. Each judgement is a positive-negative statement. An attitude measure locates an individual relative to a social group on a scale or in a space of multiple dimensions. An attitude is a mediating construct which is expressed in indices of verbal utterances,

emotional expressions and actions. Their function is part of the human information processing: filtering of perceptual inputs, and selecting and directing of activities to or away form a certain object. Attitudes are acquired by social experience and are structured to variable degrees into non-contradictory systems.

The quantitative studies of attitudes to computers must be separated into two groups: opinion polling and scale based attitude research. Most opinion polls on computing have been conducted in the seventies and in the first half of the 1980s all over the industrialized world (Williams and Mills, 1986). Computing was the strategic technology at the time. Such surveys are conducted by private companies and cover a representative sample of the population of some sort mostly with a sample size 1000 or 2000. Results are based on single questions without sophisticated scaling methods. They are mostly published in newspapers and computer journals for fast consumption. The technically more sophisticated and more reliable scaling method to measure attitudes requires item analysis, multivariate analysis, reliability and validity studies. Such studies rather stress the quality of measurement than the representativeness of the sample and often assess only a subgroup of the population. In table 2.1 five studies on attitudes to computers that applied scaling methods are compared on five criteria: the year of the data collection, the sample size (N), the population studied, the number of items used, and the factor structure that was extracted. The four studies measured attitudes in three areas of the public: the general public (gen), professions (prof), and students (educ).

Table 2.1: studies of attitudes to computer using scales

Author	data year	N	population	items	factors
Lee	1963	3000	USA, gen	20	2
Morrison	1982	412	Aust, stud	20	4/5
Mueller-Boel.	1983	1145	Germ, gen	28	2
Gattiker et.al	1985	463	CD,US,prof	27	4
Bear et.al.	1985	550	USA, stud	26	1

Legend: gen=general public, stud=students, prof=professionals

The pioneering study of Lee (1970) is the pioneering survey of 3000 Americans over 18 years. Exploratory interviews and the analysis of computer cartoons yielded a 20

item questionnaire with a 2-factor structure: the computer viewed as the **beneficial tool** (e.g. 'they make it possible to speed up scientific progress and achievements'), and the **awesome thinking machine**, which expresses concern about human displacement. Computers are taking over vital human functions (e.g. they can think like a human being thinks', or 'someday in the future, these machines may be running our live for us'). The consistency of the two indices is good (Cronbach alpha= .77 and .79).

Morrison (1983) replicates the Lee study in an Australian student population (N=412). 68% of his students are external and have professional experience. He splits the sample in two and extracts two separate factor solutions with four and five factors. Each solution explains around 50% of the total variance. The factors refer to negative and positive outcomes, to the awesome machine (see Lee), and to the applications of computing. The 'negative outcome' is the best factor explaining 15% of the variance. Morrison shows a more complicated structure of computer attitudes. Lee's two factors, however, are preserved. Computer attitudes show the ambiguity of a 'beneficial tool' and 'awesome machine'. Unfortunately Morrison only reports the structure of attitudes but no correlates of the factors.

Another scale is provided by Muller-Boeling (1974, 1984): the ADV-Skala (Automatische Datenverarbeitungsskala). This carefully constructed 28 item Likert scale has a 2-factor structure (39.3% explained variance): **individual consequences** (e.g. 'computing alleviates the work of most employees') and **social consequences of computing** (e.g. 'computing deprives the employees from their tasks and jobs'). The total scale combines the two subsales with consistency .82. All three scales are standardized (m=100; s=20; German data set N=1145). The data is from 42 industrial and service companies and from students of Dortmund University. Norms for subgroups (students, men, women, age groups, computer experience in years, positions) are given. Muller-Boeling acknowledges the limits of validity of his scale. The scale is not representative for all possible computer issues, and no cross-validation with other computer attitude scales was done. In summary, this scale is well documented, short and easy to apply, and has good scalar quality. This scale will be used in the empirical case study (see chapter 12).

Gattiker and Nelligen (1988) present an instrument with 27 items and 4-factor structure that explains 52% of the total variance. The sample are 306 Canadian

professionals from large and medium-size companies, and 157 Americans from large and medium-size companies. It includes managerial and clerical staff. The four factors summarize four possible consequences of computing at work: **quality of work** (e.g. the use of this piece of equipment makes my work more enjoyable'; alpha=.90), **work effectiveness** (e.g.'using this equipment makes me more productive'; alpha=.80), **communication** (e.g.'this piece of equipment facilitates communication with people outside the organisation'; alpha=.71), **control** (e.g.'my productivity is controlled by this equipment'; alpha=.61).

A last example (Bear et.al., 1987) measures the positive attitude of pupils to computers. A positive attitude is expected to be the outcome of a computer literacy program. The scale is an evaluation criterion for computer courses. The 26 items Likert scale is consistent (Cronbach alpha= .94). The sample are 550 students in elementary and secondary education from Virgina, USA. The scale is validated on four criteria: Computer experience correlates mildly with a positive computer attitude (.34). Other things seem to interfere. Computer usage reflects parental and school pressure as well as an the students' attitude. Students with career plans in the area of computing, science, industry or business have a more positive attitude than those with other career plans. Lowest score students who want to go into art, public administration, mechanical skill and nature related areas. Computer science and science are the favourite subjects of high scorers, while vocational training, physical education are the subjects of low scorers. Elementary school students score higher than secondary school students. General school subject attitudes test (mathematics, reading, science) are predicted to correlate moderately on all subjects. Surprisingly the attitude to mathematics scores lowest. This is a handy, well-documented and validated scale to measure computer attitudes in primary schools.

2.4.3 'Cyberphobia' and 'computer addiction'

One assumes a normal distribution of attitudes to computers on a +/- continuum in a population. One cuts the two tails of the distribution and defines these extreme areas as quasi-pathological. This procedure is applied to computer attitudes. The negative end of the continuum defines 'cyberphobia' or 'computer phobia'. On positive end of the

continuum are the 'computer addicts' which have been described above.

Cyberphobia is an example of misuse of the concept of phobia. The **cyberphobia syndrome** includes avoiding the computer, panicking, having feelings of unreality, fears of losing control, sweating palms, pounding heart, tightness or pain in the chest, trembling and shaking, shortness of breath, dizziness or lightheadedness when facing a computer (Paton et.al., 1989). Epidemiological data is available for the cyberphobia. The same study claims that **14% of the US population** suffer from cyberphobia. 3% of american managers and industrial professionals suffer from strong cyberphobia, another 11% suffer 'technostress', a milder form of cyberphobia. The syndrome is most prevalent for women over 50 years, who are well organized and had a bad record in school mathematics (Tlustos, 1985). **One third of a total of 45 million of North American employees in the information sector** suffer cyberphobia according to another survey (Meier, 1985). One third of the people suffering from nausea, vertigo and stomach disorders attribute these physical disorder to effects of their computer interaction (Titus, 1983). With the definition of an attitude as 'phobic' it is implied to use behaviour modification to treat the problem of the individual. Therapeutic methods like progressive exposure to the computer and systematic desensitization are used to treat individuals who 'suffer' from cyberphobia. A more recent paper integrates the cyberphobia syndrome into the umbrella concept of 'technostress'. This allows to identify stressors, mediators and stress consequences in the process of technological change as well as intervention methods which centre either on the stressors (task and computer design) or the palliative interventions (relaxation, stress management, therapeutic care) providing care for the afflicted individual (Nelson and Kletke, 1990).

Three critical remarks on 'cyberphobia' are made: First, the use of this concept seems to be restricted to the US. Contrary to the concept of the 'computer addict' which seems to the primary pathological concern in Europe in relation to computers. In the US the negative attitude to computers tends to be seen pathological, while in Europe computer enthusiasm appears in a pathological light. It is a bold conjecture to argue that this reflects different underlying cultures. For the USA it might reflect a basic technological progressism and for Europe a basic technological conservatism in that stratum of the population which is preoccupied with studying social and psychological phenomena. Second, the concept of cyberphobia is used mostly by people

who work in medical institutions (Paton et.al, 1989, Titus, 1983). This seems to account for the application of a **medical model** to the problem: the problem is attributed to the individual and the treatment centres on the individual. Such an approach is incomplete because it loses sight of the interactive origin of the problem in insufficient task and computer design, i.e. bad hardware, bad software, and bad work organisation. The approach **fails to exploit the user resistance as a signal for the improvement of the technology** and the work environment. Third, the concept of cyberphobia is in danger to be misused. It may be useful to make a difference between resistance and cyberphobia. The latter refers to strong aversive emotional reactions in front of a computer. Psychotherapeutic intervention is helpful in such cases. On the other hand is it necessary to leave room conceptually for anxiety syndromes at work which are only indirectly related to the computer. Anxieties which have their source in stressful events like work overload, time pressure, close supervision at work etc.. For this kind of anxieties 'cyberphobia' is a misname. People's reactions to the computer more often reflect deficiencies of work design than anything else. Indeed hardware and software, or the way the computer system is implemented, can be at the origin of these deficiencies. The concept of cyberphobia attributes the problem to the individual an misses the deficit in the technology and the work design. I would call that the misuse of the concept cyberphobia.

The research on individual impacts of computing has focused for some time on an extreme behaviourial syndrome, a quasi-pathological phenomenon. Labels like **'hacker', 'computer wizards', 'computer addicts'**, or **'computer dependency', 'computer fetishists'** are used. Hackers are a concern for a least three reasons. First, they are agents of computer fraud and cause damage by intruding security systems, placing computer bugs, viruses or trojans (Peers and Ennis, 1989). They are prosecuted, although the legal process in lagging (Spafford, 1989). Hackers often enjoyed the status of **heroes of the computer age** when they managed to crack the security systems of a military or a police computer system. Instead of prosecuting companies used to hire successful hackers in order to close the loop holes in their security systems with the intruder's help. Recently more serious concerns have arisen as organized crime is deploying the techniques of hacking to enter the computer systems of financial institutions for purposes of blackmail. Second, hackers maintain a state of

mind and patterns of behaviour which has the potential of being socially dangerous, particularly as they are a technical elite. Their obsession with technical perfection correlates with a disregard for user requirements of technical systems. Their asocial life style, their social insensitivity, and their way of thinking (nothing-but-ness) in a magic and formalized universe, a motive for power and control together with political indifference predisposes them to be misused by undesirable political powers to further their objectives (Weizenbaum, 1976, chapter 4). Third, the hacker is the spearhead of **'computer culture'**. They life and propagate a human self-conception as a 'programmable information processing system' (Turkle, 1984, 319ff). Communication becomes more and more mediated in a dematerialized, desensualized and abstract work environment (Zuboff, 1982). That is in a world where a sense of time and slowness are lost (Mettler-Meibom, 1987). The machine character prevails: formalistic, shy, emotionally unstable, socially isolated, non sensual and without any social and political commitment (Schurz, R. and Pflueger, J., 1987). Weizenbaum, Turkle, Zuboff, Mettler-Meibom, Schurz and Pflueger assess the potential costs of that particular social change and warn us about of 'computer culture'. Three studies give a vivid, partly converging, partly diverging picture of that warning signal of computer culture.

Qualitative analysis shows the hacker as a person, mostly male, who spends excessive amounts of time in front a computer screen. Computer-interaction becomes compulsive. The hacker is in a permanent power struggle with the machine. His programming activity is devoid of any task orientation. It is an exaltation of means and technique, disconnected from any end, an end in-itself. The hacker is the expert ruler of a magical, self-created and virtual universe within the machine, and he uses his creation as a retreat from the difficult world, even taking on psychotic traits (Weizenbaum, 1976, 116ff).

Turkle (1984) studied the hacker groups at the MIT in Boston. For computer addicts computing is not a job but **a way of life**. They develop an intense relationship with their machines, maintain a desire for perfection and triumph over things. They tend to neglect their bodies and are non-sensual. Hackers perceive themselves as outsiders but special and as an elite. They form a community of loners which does not impose any of the normal rules of social behaviour. Hackers avoid complicated social situations, and play safe; they want to be in control; social relationships are for them

too risky a terrain. The machine becomes the substitute for an intimate personal relationship. The climactic experience for the hacker is the infiltration of a computer system, the cracking of a security system. It is the experience of finding the way through a large labyrinth driven by dark forces (Turkle, 1984, 201ff).

Shotton's study (1989) is based on a sample of 106 hackers whom she compares to 'normal' people in a matched design. Computer addicts tend to be male, unmarried or married without children, asocial and shy, and of higher education. They show characteristic patterns of behaviour on time budget, kinds of computer activity, leisure activity, attitudes, personality type. The origin of the syndrome may be a poor relationship with the father, and an unemotional or overprotective relationship with the mother, together with unhappy school years although academically successful. Addicts show a strong 'field-independence'. They are highly unlikely to change their views and attitudes under social influence. the 16Pf profile shows a tendency towards 'dissociation', i.e. the separation of emotional and intellectual life towards a schizoid character: introverted, militantly self-sufficient, sense for solitude, awkward in social situations, eccentric, inner-directed action, pursuit of abstractions etc. (Shotton, 1989, 163ff). The study established convincingly the phenomenon. We do not know, however, how wide spread it is. An **epidemiology of computer addition** still needs to be constructed. On the other hand, computer addiction may less a product of the computer than a new expression of an otherwise **deficient personality**. The computer improves employment prospects, provides satisfaction at work, provides a learning environment and the experience of control, self-esteem and self-confidence, all of which this type of people does not find easily otherwise. In balance the positive effects compensate for the negative ones like reduced social contacts and the strain on the marital relationship. Although diagnosing the deficient personality of the hacker Shotton does not regard it as a serious problem. In Shotton's view the behaviour pattern is unproblematic in the arms of a loving and understanding women. The notion of the 'hacker' is the social construction of intellectual resistance to modern technology. It expresses the irrational anxiety of cultural critics, anxieties which have accompanied most major technological innovations in the past (Shotton, 1989, 236ff).

A German study investigates the existence of a computer personality, that matches the requirements of an ever more widespread new technology (Schurz and

Pfluger, 1987). In a study of a sample of 15 years old, informatics students, and computer professionals they used questionnaires, psychometric inventories, experiments, physiological measures and behaviourial observations to identify what they labelled the **'mechanical thinker'**. The mechanical thinker strives for formalization, abhors ambiguity and irregularity, reacts nervously, stubbornly and non systematically to disturbances of their tasks. He lives a lifestyle where planning is omnipresent and where spontaneity banned. He is asocial, introverted and shy. He is sexually disinterested and has no political commitment. He admires the computer and see himself as an endangered species, whose capabilities are rather sooner than later been taken over by the machine. The mechanical thinker is the product of a socialization with a general lack of parental orientation. Schurz and Pfluger associate is to the disintegration of traditional familial authority in modern industrial society. Male or female dominance disappears. Any authority weakens. They project that the machine thinker will become the personality type in the trend. They cannot, however, give evidence for such a hypothesis. Their study, as Shotton's, leaves the question of causality open. It is still unclear to what extent the computer forms such personalities or just provides the new expression for a predisposed, albeit deficient personality type.

The two concepts 'computer addiction' and 'cyberphobia' are complementary in a wider context. Both concepts define the 'pathological' in terms of statistical extremes. Both are attempts to draw a line between the normal and the abnormal, but do that a) at the each other end of the underlying attitudinal continuum, and b) from different perspectives. Both concepts locate the problem in the individual. It is an example to illustrate the relativity of pathological distinctions. Cyberphobia is a boundary that is set from the point of view of the technology promoter or advocate. The line of distinction is on the negative extreme of the attitude continuum. Cyberphobia is pathological resistance in the process of computer diffusion. Computer addiction is a boundary that is set from the point of view of the technique sceptic, whose analysis of technological culture serves as a warning for the future. The line of distinction is set at the positive extreme. It would be an interesting piece of historical research to reconstruct the time, place and circumstances of the social construction of both of these concepts and their corresponding sector of reality.

2.4.4 Differences of computer attitudes in society

In the 1960s the psychological variable 'feeling of social alienation' was the major determinant of a negative view of the computer. Socio-demographic variables were not explaining the variance. In the middle of the 1980s socio-demographic variables explain attitudinal differences: **women, low earners, lower rank employees, and unionists** tend to be more sceptical about the computer than other people. Sceptical and negative attitudes measure the potential for resistance. Lee (1971) shows the contribution of differences in psychological traits to differences in computer attitudes in the USA. People that are receptive for the new and curious about mechanical things, that trust in people and social institutions, and that are familiar with the world of business take the 'beneficial tool' view of computers. The 'fearful science fiction' view is basically taken by people who feel alienated (partial correlation: r=.26), and have a low tolerance for ambiguity (partial correlation: p=-.19). An initially negative correlation with level of education (correlation: -.25) is partialled out by alienation and ambiguity tolerance (partial correlation: -.05). Differences in sex, age, education and race did not contribute to the variance in computer attitudes in the USA of the 1960s.

It has been repeatedly shown that men and women experience computers differently. Women find less improvement of their work related communication when they use PC's than men do. Women experience more external control in dealing with a mainframe computer than men do (Gattiker and Nelligen, 1988). Women are generally less optimistic about the computer (for Germany: Lange, 1984). They are particularly less optimistic about the prospects in task variety of computerized jobs than men. Women are more easily satisfied with their computing facility. Such differences reflect the differential positions of men and women in clerical work: women work more likely be in low technology offices. They bring in lesser computer credentials from education, and they use computers in a routine manner [illegible]: all that conditions a **lower level of aspiration of women towards the computer** (Gutek and Bikson, 1985). Muller-Boling (1984) confirms that women (ADV=97) have a less favourable attitude to computers than men (ADV=102) for Germany. Higher educated people have a more favourable attitude to the computer than less educated people, high earners more favourable than low earners, higher levels of the organizational hierarchy are more

favourable than lower levels, users are more favourable than non-users, people in private business more favourable than in public service, the production sector is more favourable than the service sector, passive union members are more favourable than active unionists (Muller-Boling, 1984, 17ff). Age and length of computer experience do not seem to make a big difference in the German case. These results are corroborated by polling data, where women and people with a lower standard of living tend to be more sceptical about the benefits of computing.

2.4.5 International differences of computer attitudes

Internationally comparable data that are based on sound attitude scales are rare. A comparison of American and Canadian office employees shows a gender effect. For Americans the quality of work makes the gender difference. For Canadians it is the effects on social communication and the control imposed by the machine that makes the difference for women and men (Gattiker and Nelligen, 1988). Opinion poll data is of less quality, but much more likely to be internationally comparable. A general conclusion can be drawn: computing with all its technical ramifications seem to encounter **no remarkable acceptance problems.** This is a marked contrast to other new technologies like nuclear power or biotechnology. The public concern about computing and its impact is on a considerably lower level than for nuclear power across all industrialised nations. If there is an acceptance problem, it is marginal and lacks a social basis. There is no social movement capable of mobilizing very different people like the anti-nuclear movement (Williams and Mills, 1986). Table 2.2 and 2.3 display data which is based on identical question. Asked to balance the total costs and benefits of computing we find around 25% of Swedish, Germans, Belgians and Swiss with a pessimistic opinion. For them the costs are higher than the benefits. The Belgians are the most optimistic (64%) followed by the Swedish (42%), German (34%) and the Swiss (24%). The Belgians make their opinions easily with only 8% respondents undecided. The Swiss, Germans and Swedish are more insecure and confused about the issue, which is reflected in a high percentage of neither-answers. The pessimists, i.e. people who see more costs than benefits from computers, are in all four countries

around 25% of respondents.

Table 2.2: balance of costs and benefits of computing

Country	year	optimists	pessimists	neither
Sweden(1)	1985	42	22	36
Germany(2)	1983	34	23	43
Belgium(3)	1984	64	28	8
Swiss(4)	1984	24	26	50

for optimists the benefits exceed the costs,
for pessimists the costs exceed the benefits;
in percentage of respondents;
(1) Forslin, 1986, 291 (2) Lange, 1984, 64, (n=2000)
(3) Eraly, 1986, 314 (4) GfS, 1984, 26, n=700

Table 2.3: 'most other people's attitude to the computer'

country	positive	negative	no opinion
Germany	27	36	37
France	48	30	22
Britain	54	26	20
Italy	74	8	18

in percentage of respondents
Lange (1984), data from IBM survey 1982, N=2000

Asking about 'what most people think' produces the pattern of results shown in table 2.3. The Italians (74%) and the British (54%) see a majority of positive attitudes to the computer, followed by France (48%). The Germans see more negative attitudes to the computer (36%) than positive ones (27%). This result leads Lange (1984a) to conclude that the computer may be a problem only for the Germans. Comparing the German data in table 2.2 and table 2.3 shows the bias in their self-observation: they see themselves more negatively (table 2.3: 36%) than they actually are (table 2.2: 23%). In summary, in the European context by the mid 1980s, about 25% of the adult population of Sweden, Belgium, Germany and Switzerland were pessimistic about the overall benefits

of the computer. Asked for self-observation the Germans see themselves more pessimistic than they actually poll. The most positive view of the computer and its impact is found in Italy, Belgium and Britain. Confusion and insecurity about the impact of computers is high. Up to 50% of respondents had no opinion about the issue.

2.4.6 Models of attitude change patterns

In order to structure the discussion on attitude change, I formulate five models of change patterns. Attitudes may polarize on a continuum either by a shift towards the negative (model 4) or the positive side (model 3). Polarization (model 1) may be followed by either normalization (model 2) or halt of the technological process (model 5). These models describe the characteristic patterns of attitude change to a new technology in general and computing in particular. They are descriptive and can become explanatory only in relation to other variables which account for the changes. Empirical evidence for all of these patterns of change relies on longitudinal and comparable data. In the case of attitudes to computers longitudinal data are rare. If available the time span they cover and/or the number of measurement points is very small. An incomplete time series can be evidence for one of the models without excluding another.

Model 1: 'polarization'

Attitudes to computing increasingly polarize to the negative and the positive pole. The undecided middle ground is squeezed out. Empirical evidence shows an increasingly equal distribution or bimodality of the distribution on an attitude scale. The neutral part of a population move towards the negative or the positive side. This pattern can be observed in several countries where nuclear power became a political issue. Polarization of opinions occurred in Belgium (Eraly, 1986, 310). Similar data that fits model 1 is given for Japan between 1978 and 1988 on 8 measurement points (Nagahama, 1990). An initial majority of undecided respondents polarizes towards accepting or rejecting nuclear power.

Model 2: 'normalization'

The underlying idea is, that any technological development polarizes public opinions in enthusiasts and sceptics for some time. Model 2 builds model 1. The initial polarization of attitudes decreases into a neutral middle ground where the majority of the population is neither positively nor negatively oriented. This polarization disappears with wide spread familiarity with the new technology. Once a technology is taken for granted in everyday life, extreme positions persist only in minority groups. The taken for granted is not an issue for explicit attitudes (e.g. Sheldrake, 1969; Pye et.al, 1986, 40). Empirical evidence is an increasing normality of the distribution of an attitude scale. The Swiss case of opinions about the computer gives evidence for model 2. More will be said about the Swiss case in chapter 2.

Model 3: 'negative-positive shift'

Model 3 describes a shift of the median of the distribution of attitudes on an underlying scale. The median of attitudes shifts from the negative to the positive side of the attitude continuum. Pye et.al. (1986, 41) hypothesise a 'natural' shift from negative to positive attitudes to computers for management and office clerks, however, without providing empirical evidence.

Model 4: 'positive-negative shift'

Model 4 is analogue to model 3, but describes a process into the opposite direction. The median of the attitude distribution shifts from the positive side to the negative side of the attitude continuum. Initial enthusiasm for computing is frustrated by bad experience, which turns many people into sceptics. Rye et.al. (1990, 41) hypothesise model 4 for the attitudes of computer users in office work, where high expectations after an early contact with the computer are followed by disappointment, however, without providing any empirical data. During the 1980s the public perception of the effects of computing shifted towards the negative pole in Japan, Sweden and Germany. 51% of German respondents to an opinion poll answered the question 'does the computer bring rather benefits or costs' positively in 1976 and only 35% in 1983 (Lange, 1984). The percentage of undecided answers increased in the same period from 14% to 25%, while the negative statements remained at 30%. A similar question asking about technology in general 'do you belief that technology is rather good than bad for humanity' was

positively answered by 72% in 1966 and only 30% in 1981. The undecided answers rose from 17% to 53% in the same period. This data fits model 4 (positive-negative shift), the attitudes of Germans shift to the negative, and it is at the same time evidence for model 1 (polarization), the negative poles of the distribution become accentuated, the positive and negative attitudes level out and opinions polarize. Mueller-Boeling (1984) confirms that trend for Germany. The aggregate ADV-attitude measure to computers decreases from an average of 111 in 1974 (n=433) to 100 in 1983 (n=1093). He concludes that the attitudes of German computer users have turned markedly more sceptical between 1974 and 1983. In the 1980s there was a considerable potential for resistance to computing. Swedish public opinions shifts with regards to the work safety effects of automation, degrees of participation, career prospects, workload, job satisfaction, and importance of trade unions provide. The data fits model 4. For all these issues of public opinion shifts towards the negative pole between 1974 and 1981 (Forslin, 1986, 296). Further evidence for model 4 comes from **Japan** (Nishira and Dore, 1986, 79). On the question about the impacts of computers and robots on life, a decreasing number of people tags the answer 'life becomes more convenient': 22% in 1968, 21% in 1981, and 12% in 1983.

Model 5: 'polarization-halt'

Model 5 describes the case of attitude change from a position of polarization. The halt of the technological process or parts of it may be second consequence of polarized opinions. Polarized attitudes suddenly shift massively towards the negative side of the attitude continuum. A politically significant majority will finally hold negative attitudes which leads to a stop or a moratorium of the technological development. In such a case the development of computing technology would be interrupted by political pressure on technological decision making. No evidence for such a pattern of attitude change to computing can be found. However, evidence for model 5 can be found in public opinions about nuclear power. In countries like Japan, Austria, Germany Switzerland, Sweden or Austria the attitude change in the 1970 and 1980s fits model 5: the polarization of attitudes tips towards the negative pole under the impression of technological accidents like Three Mile Island (March 1979) and Chernobyl (April 1986). The mass of negative attitudes is transformed into political decision making

against nuclear power. In some cases nuclear power stations are halted, or building programs of nuclear power stations brought to a halt (Williams and Mills, 1986). Table 2.4 summaries the available evidence for the five models of attitude change. All kinds of combinations of these basic patterns of attitude shift may occur over longer periods of observation. Model 1 and model 3 make model 2, model 1 and model 4 make model 5.

Table 2.4: patterns of attitude change to computing until mid 1980s

model	data points	nation	source
model 1: **'polarization'**			
	1966-1983(2)*	Germany	Lange (1984b)
	nuclear power:		
	1978-1988(8)	Japan	Nagahama (1990)
	1978-1983(2)	Belgium	Eraly (1986)
model 2: **'normalization'**			
	claimed, no data	Britain	Rye et.al. (1986)
	possible	Swiss	GfS (1985)
model 3: **'negative-positive shift'**			
	claimed, no data	Britain	Rye et.al. (1986)
model 4: **'positive-negative shift'**			
	1966-1983(2)	Germany	Muller-B (1984)
			Lange (1984b)
	1974-1981(2)	Sweden	Forslin (1986)
	1968-1983(3)	Japan	Nishira (1986)
	1964-1984(2)	USA	Paton (1989)
model 5: **'polarization-halt'**			
	no evidence for 'computing';		
	evidence for nuclear power in Austria, Sweden		

*In brackets the number of data points is given

For computer attitudes, evidence is found mainly for model 1 and 4: The attitudes to computers polarize to a certain degree and shift towards the negative pole during the 1970s and early 1980s. No evidence can be found for models 3 and 5 in the change of

attitude towards computing. This may reflect rather the lack of data, than the actual state of affairs. The combination of model 1 and 5 can clearly be demonstrated from data about public opinions on nuclear power stations in several industrial countries.

2.4.7 Critique of attitude research on computing

The attitude research of computing is deficient empirically as well as in principle. The international data basis on attitudes to computers is poor. Most attitude research on computers lacks adequate scaling methods. The empirical evidence on computer attitudes is mainly of the public opinion type data. Single questions about impacts and perceptions of computers, or intentions about the computer are evaluated. No effort is made to combine a number of questions into a reliable attitude scale of the Likert or Guttman type for repeated use. Attitude scales are constructed for educational purposes to assess 'computer literacy' in order to evaluate computer training courses. Data collected with such scales are restricted to young age groups, and they are not suitable for extended use because of the school related character of the items. To my knowledge only one standardized, general purpose attitude scale on computing (ADV-scale) is available, which has a good data basis at least for Germany (Mueller-Boeling, 1984). Very few studies use scalar attitude measures for cross-nation comparisons. Most of the cross-national studies are based on single questions of the public opinion type. Mostly a small number of two to four nations are involved. Different studies are using different question wordings. Although a number of studies on computer attitudes of this type have been conducted in the 1980s, these results are not directly comparable.

Trend pattern must be based on a time series of data from cross-sectional or longitudinal designs. Attitudes must be measured repeatedly over a period of time and must be assessed with the same method in order to be comparable in a trend analysis. Comparable repeated attitude measurements are rare. Some repeated measurements on computer attitudes are available, but they are based on two or three measurement points only, which does not allow to identify trends unambiguously. Repeated attitude screening across different countries does not exist.

On the whole the research on attitudes to computers seems to reflect a dilemma

of attitude research: good measures with a restricted data basis, or bad measures with a wide spread data basis. The poor state of the international data basis may be due to the fact, that attitudes are assessed by or for companies (user companies, computer companies, public opinion research companies) and not published. This is the case in my own case study which will be reported later. On the other hand data might be published, but scattered and difficult to access. No review exists which systematically gathers that data and makes it accessible. A systematic and international synopsis of data on attitudes to computers during the 1980s is a task for further study. Most studies on attitudes to and opinions about computers have been conducted in the 1980s. The peak of research activity seems to have been **between 1983 and 1987**. This allows us to call these years the 'years of concern for the public acceptance of computing'. Major technological developments come in waves, so seem to come the concern for public attitudes to each technology. The research of attitudes to nuclear power preceded the research of attitudes to computers. The research of attitudes to biotechnology is the present concern. A systematic comparison of attitude research in these three major technologies of the post-war period is a task for future research.

A fundamental point of critique concerns the relation of **attitudes and behaviour**. General attitude research shows that the attitude-behaviour association rarely exceeds correlation above r=0.30 or 10% of explained variance (McGuire, 1985, 252). Despite the weak attitude-behaviour relationship attitude measures are of intrinsic interest as indicators of social change. They serve as 'fuel' for political arguments, and are cheap indices of 'climate', albeit weak in predictive power. Better a weak index than none (Kelman, 1974). There is no evidence that computer attitudes and computer behaviours correlate better than expected. Behaviourial criteria used are computer use (Bear et.al, 1985) or actions to be taken against computers at the work place. In a Swiss survey the likelihood of resistance actions have been explicitly assessed in combination with attitudes measures (GfS, 1984). Resistance actions were: to prefer a job without computer in the company, to look for another job. As no relational data analysis is presented, and the raw data is not accessible the exact relation of computer attitudes and computer behaviour is unknown.

The structure of attitudes changes in at least three ways. First, it becomes **more differentiated**: the replication of Lee's study from the 1960s does not confirm the two-

dimensional structure of computer attitudes, but requires four or five factors to represent 50% of the variance (Lee, 1970; Morrison, 1983). Differentiation preserves old dimensions and introduces new ones. Second, the relative weight of structural dimensions changes. This can be expressed in the percentage of explained variance in factor analysis of attitude items. Paton et.al. (1989, 92) find a **accentuation** of the attitude structure to computer on negative issues. A third type of structural change is **specification.** Phenomenological evidence from my earlier study on resistance to change showed qualitative changes in attitudes during the implementation of the computer system: Unspecified and sceptical attitudes to the computer system transform into negative attitudes towards specific points of the computer system. Specific features of the hardware, the software or the organizational embedding of the system become attitude objects (Bauer, 1987 and 1991).

A last criticism points to a dilemma of change measurement: on the one side it has been shows that the structure of computer attitudes becomes more differentiated and accentuated and general attitude are gradually replaced by specific ones over time. On the other side, in order to assess attitudes longitudinally a reliable measure is required, i.e. the underlying attitude structure must be fixed over the period in question. This can hide an important trajectory of change. Attitudes not only shift their distribution on a certain scale, but their internal structure is altered. The attempts of scaling computer attitudes show that this is indeed the case. The dilemma can hardly be solved. Rather it is necessary to document the changes in attitudes on fixed dimensions as well as the shifts in the dimensionality.

2.4.8 Resistance and negative attitudes to computers

Coleman and McLoad (1986) present resistance to technical change in historical perspective, more implicitly than explicitly, as a **systemic problem of an old industrial culture.** A feedback loop links the behaviour of the entrepreneurial class with the behaviour of the labour force. They mutually restrain their interests in new technology until the system levels out on a low urge for innovations. For the entrepreneur new technology is a labour saving device. Labour unions resist the single use of new technology to cut

jobs. That in turn reinforces the indifference of the **British business elite** in trying to avoid troubles. A vicious circle is the result. This process is further reinforced by an elite educational system, i.e. public schools and Oxbridge universities, that marginalizes science and technology in the curriculum, and that considers art education as most appropriate qualification for higher management positions. The historical failures of the British businessmen according to Coleman and MacLoad have been: a) to misuse new technology only to save labour instead of increasing quality and quantity of output, and b) to neglect their proper job and aspiring for an aristocratic life style. The whole system is resistant. In the secular decline of British industrial power, this systemic resistance is clearly seen as dysfunctional to the development of technology. Future research, however, will have to differentiate that picture. Sheldrake (1971) locates resistance to computing **among blue collar workers and clerks**. He identifies the **alienation of computer professionals**, by jargon and mentality, from the public as a root of the problem. Being himself critical of the development of computing he presents resistance as a dysfunctional social event. He uses a deficit model of resistance. Resistance is explained by lack of information of people resistant and/or the failure of communication from the expert with the lay people.

The interest in measuring attitudes to computers is a way of avoiding the term resistance to change. The relation of attitudes and resistance takes two forms. First, negative attitudes to computers are taken as an **indicator of resistance** to computers: negative attitudes are resistance. Morrison (1983, 1053) sees the attitude structure, accentuated on negative features of computing as a 'barrier to the more widespread acceptance and application of computers' in Australia. The terms 'negative attitude', 'barrier' and 'low acceptance' are taken as synonymous. The measurement of attitude to computers is a way of operationalizing resistance. the extent of negative attitudes to computers in a population represent the level of resistance in that population. Second, negative attitudes to computers are taken as **indicators for potential of resistance** to computers (Mueller-Boeling, 1984). However the link between verbal expression of attitudes and behaviour is poorly explored. Studies which investigate how computer attitudes are related to behaviour towards the computer system are rare. Organisational case studies may be more fruitful by carefully demonstrating the path from attitudes to action in daily

organisational life. Such an attempt will be made in my case study where it will be shown how resistant attitudes to computing are variously enacted during the implementation of a computer system in a Swiss bank. Interpreting attitude research as indicator for potential to resistance one can say that by the mid 1980s **between 25% and 33% of the workforce** is prone to be somehow resistant to the development of computing. Most studies on attitudes to and opinions about computers have been conducted in the 1980s. The peak of research activity seems to have been **between 1983 and 1987**. This allows to call these years the 'years of concern for the public acceptance of computing'. The attitudes to computers **polarized by shifting towards the negative** during the 1970s and early 1980s. In the European context by the mid 1980s about **25% of the adult population** of Sweden, Belgium, Germany and Switzerland are pessimistic about the overall benefits of the computer. Asked for self-observation the Germans see themselves more pessimistic than they actually poll. The most positive view of the computer and its impact is found in Italy, Belgium and Britain. Confusion and insecurity about the impact of computers is high. Up to 50% of respondents have no opinion about the issue. In the 1960s the psychological variable **'feeling of social alienation'** was the major determinant of a negative view of the computer. Socio-demographic variables were irrelevant. In the middle of the 1980s socio-demographic variables explain attitudinal differences: **women, low earners, lower rank employees, and unionists** tend to be more sceptical about the computer than other people. Women are less optimistic about the prospects in task variety of computerized jobs than men. They are **more easily satisfied** with their computing facility. That reflects the differential positions of men and women in clerical work: women work more likely be in low technology offices. They bring in lesser computer credentials from education, and they use computers in a routine manner than men. Women tend to develop a **lower level of aspiration towards the computer.** The splitting up of general attitudes into specific attitude, i.e. specific effects of computers on work and private life, are a way of investigating the different objects of resistance. Differentiation, accentuation and specification of resistance is measurable within the attitude approach.

Using the problematic notion of 'cyberphobia' research concludes that a third of a total of 45 million of North American employees in the information sector suffer from. One third of the people suffering from nausea, vertigo and stomach disorders

attribute these physical disorder to effects of their computer interaction. The notion of cyberphobia is a deficit concept. The notion of the 'hacker' is a social construction of **intellectual resistance** to modern technology. It expresses the irrational anxiety of cultural critics, anxieties which have accompanied most major technological innovations in the past. With the concept of 'computer addiction' a boundary is set from the point of view of the technological sceptic, whose analysis of technological culture serves as a warning for the future. The line of pathology is drawn at the positive extreme of the attitude continuum.

2.5 Summary and critique of acceptance research

First I clarify the term 'acceptance'. It has been shown that 'acceptance' is used in different ways. Using an initial classification to present the literature I summarize the three usages of the term which need to be distinguished: 'acceptance I', 'acceptance II', and 'acceptability'. These usages are compared with five criteria in table 2.5. Each usage is characterized by its time dimension, its focus, the normative dimension, the aim of the approach, and the prevailing strategy. The criteria are defined in the following way:

Time dimension: in which time relation is the research to the technological development? Ex-post-facto research takes place after the technological construction is terminated. Accompanying research takes place during construction. Beforehand research is utilized at the stage of planning.

Focus: does an intervention adapt the user, the product or the design of technology, or the activity in relation to the technology?

Norm dimension: is the research feedback oriented (empirical-descriptive) or/and feedforward oriented (normative-prescriptive)?

Aim: research can be conducted to increase control over a process; to explore and mitigate problems in an early warning function; or to enhance a codex of human values.

Strategy: a palliative strategy is satisfied with the embellishment of the product and product image ('smooth talking'); a corrective or preventive strategy tries to avoid hazards and damage ('whistle blowing'); and the prospective strategy facilitates creativity, human growth and well-being by creating opportunities ('missionary').

Acceptance type I refers to diffusion and attitude research. Acceptance type II refers to social impact analyses and ergonomics. Acceptability research refers to attempts to reflect the structure and process of social acceptability and the tradition of socio-technical design of work and organisations. All types of acceptance research suggest a better social control of technology progress by **bringing the user in**. Much of it is an answer to the historically most recent 'acceptance crisis of technology' which has existed since the 1970s, and was first and most effectively voiced in the context of

nuclear power. Other terms such as 'technophobia' or 'cyberphobia' are used to mark the problem. Meanwhile the term 'acceptance' and 'acceptance management' is in the political vocabulary and is used in other contexts. The acceptance crisis reflects the growing awareness of engineers, politicians, producers, buyers and users that the mere newness of technology no longer guarantees psychological, social and economical desirability. New technology is open for debate about its costs and benefits. The problem is best expressed in the question: what use is the best technology if it is not used?

Table 2.5: synopsis of three types of acceptance research

	acceptance I	acceptance II	acceptability
	diffusion research attitude research	impact analysis ergonomics	work design social acceptability
Time	ex post facto	accompanying	beforehand
Focus	consumer, user product image	user product design	person, forms of activity job design organisational design
Norm	descriptive empirical	descriptive empirical speculative evaluative	evaluative normative constructive model organisations scenarios, trends
Aim	index for control	exploration early warning mitigation	human values guidelines
Strategy	palliative	corrective preventive	preventive prospective
	'smooth talker'	**'whistle blower'**	**'missionary'**

feedback	**feedforward**
'acceptance helpers'	critical of the process
technology=given, fixed	technology=variable, options
deficit model of user resistance;	user advocacy

Technologist and politicians call upon the social sciences. The advocacy of the user can

be done in many ways, which differ in methodology, theoretical and moral legitimation. This is reflected in the three uses of 'acceptance'. Acceptance research aims to serve the needs of social groups, experts or policy makers, the general public, and the potential user in general (Peter et al., 1986). This can be done as a smooth talker, a whistle blower or as a missionary, by providing feedback about what has already been achieved and by providing feedforward about where one would want to go from here. It can be shown that much of the criticism of acceptance research is within this triangle of types of research. Acceptability research opposes acceptance I and II research, acceptance research type I criticizes type II and the acceptability approach, and type II research criticizes type I and the acceptability approach. Acceptance types I and II define a series of tasks for the social sciences in general, and for psychology in particular, which fall short of their potential. Social scientists tend to be restricted to the role of acceptance-helpers' (Volpert, 1985, 165ff). They find themselves confined to increasing the sales figures of computing products and to speeding up the implementation of computer systems. The criticism centres on the ways in which the user feedback is collected and on how strongly that feedback is theoretically reflected and legitimated.

Diffusion research, attitude research, and impact analysis take the **technology as given**. Once a computer tool, hardware and software, has been developed for certain predefined function, the problem arises of ensuring its acceptance among the buyers and users. Social scientists, particularly psychologists, are called in to design intervention strategies which smooth the diffusion process. The mapping of potential users by sophisticated market research is part of the tool box. The theory and practice of mass communication, persuasion techniques, and other forms of rhetoric are available to advertise, construct and project an image of the new product in a way that the 'life style' of the target group is matched. This is the paradigm of the 'smooth talking' strategy. Organizational psychology in the social engineering tradition of Lewin offers participation, group discussion, quality circles, and task forces as instruments for changing attitudes and creating commitment. All these instruments may further the acceptance of computers in the context of the office automation or the on shop floors. Negative attitudes to computing are seen as 'irrational' and in some cases, by using the concept of 'cyberphobia', even as 'pathological'. The attitude approach aims at

changing the user by changing his attitudes through mass communication techniques, group techniques such as groups participation or quality circles, or personnel selection, and in some cases behaviour modification techniques are applied to 'cure' cyberphobia (e.g. Paton et al., 1989). What is achieved is not the adaptation of the computer to the user, but the adaptation of the image of the computer to the user. Diffusion, attitude research and often impact analysis, not taking the technology as a variable, imply a deficit model of resistance. The user is considered deficient, either in motivation or cognitively. He or she lacks information. Were all information about the new computer available, he or she would have a positive attitude and would use the product without hesitation. The problem lies on the side of the user and those resisting the new technology. The blame is externally attributed by the technologists (Mittelstrass, 1992).

Social impact analysis often takes the computer as a fixed and uncontrollable variable, as do diffusion and attitude research. It evaluates a computing system that already exists. In some cases, prototypes of a computer system may be subjected to user tests in field experiments, or different systems are analyzed comparatively. Ex-post facto analysis and accompanying research is able to detect undesirable outcomes. By extrapolating current trends it serves as an early warning system, and can direct the mitigation of undesirable effects as well as the prevention of hazards in the future. Social impact analysis may inform the design process, albeit only corrective and preventive. Comparative case studies provide useful information about functional equivalents in order to achieve and avoid certain effects in the future. Such evidence is presented in guidelines for the design and organisation of computer systems. Impact analysis can work by providing feedforward information. However, this intervention is limited most of the time by the constraints of an already existing computing system. Social impact analysis runs the risk of being used to legitimize a technological fix without significantly influencing it.

The ergonomics of hardware and software is design oriented research. Computer hardware (environmental features, VDU, keyboard design) and software (interface, dialogue design) is the variable. Different design versions are prototyped and studied for their effects on performance and well-being of general users. Such studies often result in norms and guidelines for design that feed forward into future constructions.

Ergonomics aims at the optimization of the human-machine interaction on the criteria of performance and well-being. Such norms are legitimized as industrial norms (British Standards Institution 'BIS' or Deutsche Industrienorm 'DIN') which constrain the design of computers in the future to better the performance and the well-being of users. The ergonomic definition of 'user-friendliness' is narrow and necessary, but not sufficient for the acceptable design of computer systems. While preventing potential health hazards, it falls short of providing all the criteria for an optimal design of computer technology. Ergonomics is not enough. Ergonomically up-to-date design does not guarantee that the computers will be used by the employees[1]. Such experiences point to other important factors of acceptance. The **narrow view of user-friendliness** reflects a narrow view of organizational behaviour. It is blind to the organizational context of computer use: the job design, the division of tasks between the computer and the work group, the division of labour among members of the work group which use the computer system. Well-designed work stations can still be deskilling, constraining creativity, and can afflict the well-being of user who is assigned a monotonous or over-demanding task at a computer work place under stressful organisational conditions.

Advocates of the acceptability approach (Ulich et al.; Hacker; Volpert; Bungard et al.; Peter et al.; Meyer-Abich) stress the necessity of a normative and empirical approach: a proactive and constructivist approach. Empirical research on computer technology is supposed to liberate, facilitate, and enhance the well-being of individuals and of social groups towards more freedom and autonomy. The explicit objective of most of European action psychology is to enhance the variety, autonomy and the development in work activity; technology is variable. Research is informed by a model of humans as biological, psychological, and social beings. Research results are made available at the point of planning of new technology, i.e. before the realization. This is necessary in order to be prospective rather than be only corrective after the event. Design of technology needs to be psychologically and socially informed and reflected, not only to prevent hazards, but also to create opportunities. Such normative requirements are rooted in values, which find historical expression in the spirit of Western Liberal Constitutions which target freedom and prosperity (Meyer-Abich,

[1] The experience of that kind of Lloyds Bank London has been described in The Independent, November 1990).

1979). The programme of social acceptability of new technology is competing for the narrow span of attention of science policy makers, educators of engineers, and the computer industry, but seems to have made considerable progress. User-friendliness has become a sales argument, although it is often more claim than reality. A normative approach has to tackle two main problems (Turoff, 1977): First, the normative orientation of technological development is based on today's values upon which we judge what a desirable future may be. Unreflected, this procedure does not envisage the possibilities of value changes and therefore changes in what we regard as desirable in the future. Changing social values close off and open up different futures at the same time. A dogmatic approach, and a normative approach may be of that kind, runs the risk of closing future trajectories by blocking present developments which may become desirable in the future. In that context Luhmann talks about the risk of morality (Luhmann, 1984). A normative approach has to allow for changes in social values which underlay its very argument. Secondly, the normative orientation of technological development has to confront competing value systems in a pluralistic society. The primacy of a particular value system about what is socially acceptable has a problem of legitimation. Normative orientations are only one input among others into the market place of political ideas. However, returning to the utopia of value-free knowledge is out of question, particularly in the area of technology. Any technical design is loaded by an agenda that implicitly prescribes what and how things should be done with it. There is a hidden agenda in every technical product. The danger lies in concealing that fact, and in falling for the naturalistic fallacy which claims that what 'is' also 'ought' to be. Turoff warns us of the consequences of that fallacy: 'If that were the case 'the [technical] system ends up regulating the society to conform to the ideas of the designer of the system' (Turoff, 1977, 123). Hence, a closer look is needed at how a hidden agenda gets locked into a computer design and who makes which contribution in what manner.

3. The acceptance of computing in Switzerland

In this chapter I present global evidence on the resistance to computing in Switzerland after 1955, focusing on the mid- and late 1980s. This gives a sense of the technological climate in Switzerland with regard to computers, and gives the background for my case study in a Swiss bank. Four indicators are used: diffusion of computing since 1961 (Luethi et al., 1991); content analysis of the Swiss publications (Haessig,1987); public opinion surveys (TAGI, 1988; GfS, 1985) on new technology in 1984, 1986, 1987, 1988 and 1990; and concepts of social acceptability (Ulich et al.).

3.1 The diffusion of computing since 1960

Figure 3.1 shows the diffusion of computing in Switzerland from 1960 to 1991([1]). The right scales shows the number of business units with computers, the left logarithmic scale shows the number of computer units. A computer unit means either a mainframe, terminal, microcomputer or a PC. In 1987 26.3% of Swiss business units use at least one computer unit, be it a mainframe or PC, external link and terminals. The diffusion of computing took off rapidly after 1980. This take off from around 6% 1980 to 26.3% in 1987, and to 41% in 1991 is most likely due to the arrival of the PC. The diffusion of computing in Switzerland comes in two waves, the one based on mainframe computing the other on the Personal Computer. An early boom can be identified in the 1960s. From 1965 to 1970 the number of computer units nearly tripled from 544 to 1560; from 1971 to 1980 only from 1767 to 2710, or by 53%. Between 1980 and 1987 the adoption of computers quadrupled again.

By 1982 Switzerland had the highest proportion of computers per head of the population in Europe, with 12 units per 1000 inhabitants, while lagging behind the US in basic computer education, integrated office automation and the use of robots in industry (Haessig, 1987, 25). This had already caused political alarm by the late 1970s. Concerns about losing competitive advantage triggered special efforts: the introduction

[1] The data for figure 3.1 is combined from Billeter-Frey (1980, in Haessig, 1987, 24) and Kuehn et al. (1988). Billeter-Frey counts computer units, while Kuehn counts 'business units with access to computers'. As the two data sets are based on different methods they are not directly comparable. A business unit may have several computer units.

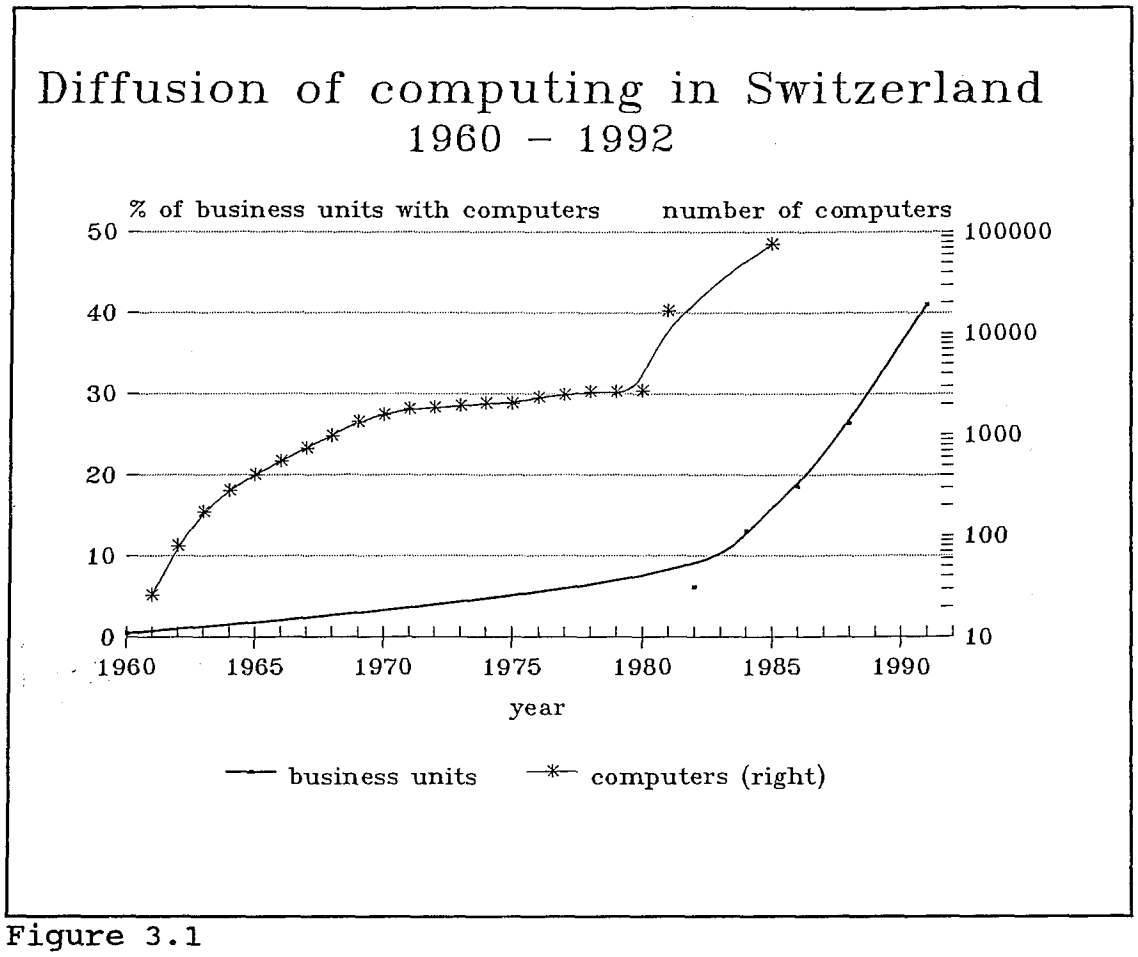

Figure 3.1

of computing in the curriculum of secondary education, the expansion of high-tech departments at University level in engineering schools, the foundation of an engineering school for microelectronics and robotics in Neuchatel, and two strategic National Research Initiatives in 1978 and 1982. Swiss industry and politicians was accused of 'complacency, sleepiness, decadency, and missing opportunities' in high technology development and applications (Haessig, 1987, 145 and 202ff). In the Zurich area, the main economic region of Switzerland, the use of PCs increased from 8% in 1984 to 21% of all companies in 1987, i.e. 2.3 PC per company and 2 PCs per 100 inhabitants by 1987. For small businesses, 97% of all businesses, the increase is from 7% to 19%, for larger businesses from 25% to 75%. The diffusion of PCs in large enterprises is much faster than in small businesses. The diffusion rate depends on business size (Tages Anzeiger, 1988, 8). The small business structure, 97% of Swiss business employs less than 50 people as compared to 82% in GB, partly explains the relative lag in diffusion.

3.2 The debate on computing 1955 to 1985

Haessig (1987) undertakes the content analysis of the print production (books, pamphlets, official reports, newspaper articles) on the social impacts of computing in Switzerland between 1955 and 1981. Because only a small number of people had direct contacts with computing from the very beginning, public opinion is necessarily mediated by representations of computer technology, of its capacity, of its uses and of its impacts. This process of representation is called the **dramatization** of computing in the public debate (Haessig, 1987, 34). It mobilizes the public and stimulates the critical, preventive and corrective reflection of the development (ibid., 215). Dramatization goes paralleled with the more silent process of **'banalization'**. Computers become a feature of every day life: at work, in entertainment and leisure activities. The computer becomes a banal object like the telephone or an automobile. The public debate of computing is preceded by the diffusion of knowledge about new developments. The debate first arises among technical specialists before it is taken up by the Social Sciences and Humanities, the media and the other professional bodies. Four social groups participate in the debate: business interests and employer organisations, organized labour, scientists and journalists, governmental bodies. The latter act as stimulator of the debate by commissioning research.

The bibliographic indicators show three phases in which the debate follows the international pattern with some delay. Three periods of high density can be observed: 1956 to 1959 on **'automation'** on job losses and devaluation of human work, 1964 to 1972 on **'computing'** as an instrument of bureaucratic control, and since 1977 on **'modern informatics'** combining and amplifying the concerns for individual freedom and the problem of changes in work and organisations (ibid., 40f). After the second world war the debate commenced in a climate of scepticism about the technical civilisation, its materialism, that is epitomized in the cult of the machinery, in Soviet Communism and mass culture. This critique was carries the values of the educated middle class. The cultural and technological shock of Nazism and Stalinism was traumatic. Later in that debate no particular social group emerged, that principally rejected computer technology. 49% of publications represent a positive attitude to computing, pressing its diffusion and stressing its capacity for problem solving. 39%

is neutral and balances the evidence (wait and see attitude). 12% is predominantly negative and warning. The negative attitudes cluster from 1961 to 1966, from 1971 to 1973, with a **peak in 1977** with over 50% of publications. Since 1977 the negative evaluations increased relatively and absolute. The debate is carried by social scientists (46%), business interests (29%), humanities (29%), technologist (22%), labour organisations (10%), and the media (4%). The media, business interests and technologist mostly represent positive attitudes (more than 50%). Labour organisations, the humanities and the social sciences carry the bulk of the negative attitudes. The neutral attitudes are mostly represented by the humanities, technologists and the social sciences (ibid., 120ff). Haessig analyzed the debate in three dimensions: First the individual and the computer. This centres around questions like: Is computer is substituting human creativity by machinery? Is the computer a thinking machine and can human activity be modelled in that metaphor ? Is the computer enslaving or liberating human capacities ? Is the computer reducing the degrees of freedom at work, in creasing control, a hazard to the health of the active population, increasing de-socializing and hazardous shift work, reducing work hours and increasing leisure ? Does the central position of work shift in people's lives ? Does the computer decrease the social and political participation of the citizens ? The second dimension deals with the societal scenarios and the economy. The computer represents the 'third industrial revolution' and marks the advent of 'information society' or 'post-industrial society' and with increased speed of social changes: Where does civilization go to? Is technocracy taking over? Is it no longer a question to be asked about the kind of future to go for? How is the security and the protection of data guaranteed? Are we on the road to a totalitarian state collecting data and monitoring minutely the activity of its citizens? Can the Swiss economy survive in the run for new technology or is the future of mass unemployment the outcome? The third dimension of the debate centres around the state and its role in the development. The questions are: Does the security of the state need an integrated information system for the police ? A proposal for a central police force was aborted through a referendum in 1985. The concerns for the future of federalism toppled the central information office. Does the state have a stake and role in the development of new technology or should that be solely left to the private economy ? How can the security of private and military information systems be

maintained against the destructive intrusion from outside ? Do information system generally increase the vulnerability of institutions ? In the early 1950s an outright rejection of computing was still thinkable, it is no longer a real option in the 1980s. Machine breaking is definitely past. The present debate assumes computers in principle while debating its directions. Content analysis of print matter and public opinion research show how the debate was nourished by widespread alarm among the Swiss. The peak of negative representations of computing was in 1977. Public opinion followed with a delay of about 7 of 8 years. By mid 1980s about 50% of Swiss expressed negative attitudes towards the developments of computer technology.

3.3 Public opinion on computers in Switzerland 1984-1988

Between 1984 and 1990 several surveys were conducted about computers and technological developments in general[2]. I am referring to the GfS surveys of 1984, 86, 87, and 1988; and the surveys of the TagesAnzeiger, a major Zurich daily paper, in 1984 and 1987. Some of these questions were replicated, and are therefore comparable for a trend analysis (see appendix 1). The GfS surveys give a picture of the Swiss experience with computing, the perception of costs and benefits, problem perceptions, pro and contra statements, the scope of feasible counter actions, technical interests, perception of technical progress, risk acceptance and the consent to the technical imperative for the future[3].

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[2] The Swiss Society for Practical Social Research (GfS) runs regular the UNIVOX survey on four areas of public concern: living in Switzerland, government, economy, and independence, with a repertoire of around 400 questions. A quota sample of 700 German and French Swiss are interviewed (GfS, 1985).

The PC market study was conducted by the Tages Anzeiger in 1984 and replicated in 1987 (Tages Anzeiger, 1988). A stratified random sample of 221 companies in the area of greater Zurich are visited and interviewed. This sample represents 53371 companies in the Zurich area. Business owner and decision making managers were asked about their experiences with PC use and their future investments; the exact wordings of the questions are in the appendix 3.

[3] In the following surveys questions are referred as listed in appendix 3.

3.3.1 The intensity of resistance

In a business survey of 1983 78.5% of all businesses were without a computer, 3.3% voice explicit resistance to computer for human or social reasons (Hassig, 1987, 25). A general survey in 1988 (Q9) found 29% of the Swiss used a computer at work, be it a terminal, a PC or a computer controlled machine. In 1984 a similar question showed 16% (1984: Q13). Computer experience is more likely for men (36%), people under 40 years (32%), office clerks (35%), people living in urban areas (32%) and for the French Swiss (32%). In 1984 (Q6) 36% of Swiss admit to be against the use of computing. Negative attitudes are particularly wide spread among women, middle aged people, and in rural areas. 48% (Q7) prefer a work place without computers, 26% (Q8) would rather look for another job, than working with a computer, if computers were introduced. Being without perspectives is widespread as most people (Q8; 63%) take things as they come not given any choice. Most people (53%) are disoriented and do not see any room of counter actions in order to prevent the negative effects of computing (Q9, Q10). A majority of Swiss does not believe that resistance is possible (Q11,Q12), but **14.8% see resistance as an option** in 1984; e.g. stopping the diffusion, not using the computer, seek data protection, seek more personal protection (GfS, 1984, 30ff).

3.3.2 Trends in resistance 1984-1987

The questions about the balance of costs and benefits of computing allow a trend analysis. Table 3.1 shows the perception of the balance of costs and benefits between 1984 and 1987. Optimists are getting stronger. More and more Swiss see the benefits of computing overriding its costs, 24% in 1984, 35% in 1987. Pessimists are loosing ground. For less and less people the costs override the benefits of computing, 26% in 1984, 15% in 1987. For 38% costs and benefits keep the balance. Gender, age, standard of living, employment status, political affiliation, and rural living areas make a difference in the perception of the computer. Women see the computer less beneficial (1987: 27% vs. 42%) and more costly (1987: 17% vs. 12%) than men. The older, the

lower the living standard, and the more left the respondents votes, the less favourable is the view of the computer. Blue collar workers see the computer less positive than clerks in salaried status.

Table 3.1: The computer brings more benefits than costs? (N=700)

answers	1984	1986	1987
more benefits	24	26	35
more costs	26	14	15
cost=benefits	38	28	38
no answer	12	38	12

figures are in % of respondents, rounded
questions are: 1984 (Q5), 1986 (Q2), 1987 (Q3)
Source: GfS 1985, unpublished data[4]
margin of error at 5%: +/- 3.7%

A gap exists between the language communities. The Romands are more favourable to the computer. Markedly less Romands (8%) see computing as a costly as the Swiss German do (17%). Yet another contribution to the 'Roesti' gap, as differences between the French and German speaking areas are called in Switzerland with reference to the favourite Swiss German dish. An interesting feature of this trend is the increase in non responses to the question about benefits and costs from 12% in 1984 to 38% in 1986. Women, rural areas, and the Romands contribute most to that shift from 1984 to 1986. The non responses are interpreted as an expression of uncertainty, which is very strong in 1986. Two interpretations are possible: In the aftermath of Chernobyl (26 April 1986) doubts about security of nuclear power stations are very high. There is a short term effect tainting the general confidence in technology beyond nuclear power. The drop in the percentage of people, who believe that costs and benefits of computing are balanced, from 38% in 1984 to 28% in 1986 might account for that. However, the decrease of pessimists from 26% to 14% weakens that interpretation. A Chernobyl

[4] I should like to thank Dr Fredi Zulauf, Sociological Institute, University of Berne, for kindly giving me access to the data.

effect would suggest an increase in pessimists. Another, more plausible interpretation is that the mid 1980s is the period of cautious transition of attitudes to computing. Pessimists do not convert strait into optimists. Rather, they become uncertain in their pessimistic evaluation of computing and give no answer. The same might be true for those who think costs and benefits keep the balance. They become insecure before they become optimists. The marked decrease of pessimistic and balanced answers from 1984 to 1986 might support this interpretation, pessimists from 26% to 14%, balanced answered from 38% to 28%. The level of uncertainty slumps from 32% in 1986 to 12% in 1987, optimists gaining strongly 10% up to 35% of respondents. Pessimists remain stable at 15% of respondents.

We have here a model 2 and model 3 situation: attitudes turn from polarization to normalization by shifting from the negative end to the positive end of the attitudinal continuum (see chapter 2.4.6 on attitude change). This transition is due to shifts in rural areas and in the French part of Switzerland. The transition of computer attitudes in the mid 1980s marks the assimilation of rural and urban areas, and an increasingly more favourable perception of computers by the Swiss Romands. In rural and areas of the Swiss Romand much uncertainty turns into a favourable view of computers. In 1987 the perception of computing in rural areas is basically the same as in urban areas, while before there were marked differences. The level of uncertainty in rural areas and in the Swiss Romands rises from 15% in 1984 to 40% in 1986. 1987 marked increases in beneficial perception for both groups can be noticed. The differences among subgroups of the population become smaller. The one exception is the gender gap. The gap is stable at around 14% for optimistic answers, around 5% for pessimistic answers. Women remain less optimistic and more pessimistic than men. The cautious transition from a strongly ambivalent view to a favourable view of computing takes place in the mid 1980s through a period of high uncertainty. In 1987 15% of Swiss take an unfavourable view of the computer. The Swiss press represents that issue in headlines like 'Swiss are sceptical towards new technology (Tages Anzeiger, 6 August, 1985, 7) or 'conservative attitudes of the Swiss towards economy and technology' (Neue Zurcher Zeitung, 31 July, 1985, 41). This ambivalence towards computers must be seen in the context of general attitudes to technology. In 1987 (Q1) and 1988 (Q1) 30% of Swiss expect more damage and losses than help and benefits from technological progress. The

particular attitude to computing is with 15% pessimists relatively favourable. The Swiss are more pessimistic about other technologies than they are about computing.

3.3.3 The contents of resistance

In 1988 the specific concerns about the computer have been investigated with prompted questions. 21.2% of Swiss reject the idea of a computer imperative, according to which one cannot cope with the future without the computer (1988: Q3).
41.7% (Q4) expect daily life to become more complicated with computer. 60.8% (Q5) expect less opportunities for self enhancement, and 84.5% (Q6) expect more social isolation, and 44.8% (Q7) expect less interesting work with the computer. 42% of Swiss want to drop a technological development when even small risks for humans emerge (1988: Q2).In open responses about the social costs of computing (1986: Q4) the Swiss refer to job losses (23%), dehumanization of work (11%), costly failures in developments (4%) as shown in table 3.2.For all these concerns the mentioned pattern of differences holds: these concerns are higher among women, the elder, people with a lower standard of living, workers, the German speaking Swiss, and left voters.The data from table 3.2 shows the increased level of uncertainty in the Swiss public in the percentage of no answers for costs and benefits of computing. The concrete worry about loss of jobs, however, decreases from 54% in 1984 to 23% in 1986. The percentage of unspecified other costs increases from 1% to 15% by 1986. The worries about job losses are replaced by uncertainty and worries about other, unspecified impacts of computing.

Another source of data is the PC market study conducted by the TagesAnzeiger. The respondents are asked to list benefits and problems which arise by the use of PCs in their company. 42% in 1984 respectively 43% in 1987 of companies report problems with the implementation of their PCs (Q1, Q2). In 1987 companies report operating problems (23%), inadequate software (18%), resistance of employees (17%), delays (11%), unfriendly user manuals (11%), technical deficiency (11%), problems with compatibility (10%), insufficient introduction (8%), insufficient information by supplier (8%), inadequate hardware (6%), insufficient support by supplier (6%), overload of

personnel (2%). Most of these problems are stable between 1984 and 1987, although some shifts have occurred: the user-friendliness of the user manuals and the information by the supplier have improved.

Table 3.2: benefits and social costs of computing in CH

GfS surveys 1884-1987 general Swiss public			Tages Anzeiger 1884/87 companies: managers, owners in the region of Zurich		
	1984	86		1984	87
- benefits:					
speed of operation	35	29	efficient processing	68	68
less monotony	16	8	time for other tasks	70	57
rationalizations	13	8	reduction of costs	44	33
transparency	13	5	better work organisation	33	30
for big business	3	1	less stress at work	22	23
only for science	4	4	higher moral at work	23	20
no answers	29	45	reduction of jobs	13	16
			others	13	10
costs:					
loss of jobs	54	23	problems with operation	16	23
dehumanization	15	11	inadequate software	18	18
costly failures	6	4	resistances of employees	12	17
misuse of data	6	1	delays	9	11
others	1	15	unfriendly user manuals	18	11
no answers	21	46	technical deficiencies	9	11
			lack of compatibility	3	10
			insufficient introduction	8	8
			insufficient information	11	8
			inadequate hardware	5	6
			insufficient services	1	5
			overload of personnel	-	2
	% of respondents			% of companies	
error margin:	3.7%			6.7%	
source:	GfS			TAGI	
criterion:	first mentioned			multiple response	

Operating problems and insufficient support by supplier are more frequent. 17% of companies reported resistance in the region of Zurich in 1987 with an rising trend. The

report of incidents of employee resistance increased from 12% in 1984 to 17% in 1987. A partly lower and partly similar rate of incidents of resistance was reported for British manufacturing industry with 13% for the shop floor and 16% for top management, and 4% from other groups (Northcott and Rogers, 1984, 110). As one can assume that companies tend to hide their problems from the public to appear in a better light, these rates of resistance must be regarded as a conservative estimates.

3.4 Defining the social acceptability of computer solutions

For a short review I select studies on work and organizational design in the context of computing. They provided parts of the conceptual basis for my active interventions in a case study that will be presented later. The Institute of Work Psychology (IAP: Institute fuer Arbeitspsychologie) at the Federal Institute of Technology in Zurich (ETH) studies the impacts of new technology on work and organizations in Switzerland (Ulich etal., 1985). In these studies attempts are made to operationalize the **social acceptability of computing**. Their concepts are used for training of engineers, particularly production and electronic engineers, at the Federal Institute of Technology. They are linked to the computer science department. They conduct basic research and applied research particularly in Switzerland and Germany. The dissemination of results is done by practical guidelines for the design of hardware, software and work organisation and organizational change (Spinas et.al., 1983; Ulich et al., 1985; Baitsch et al., 1989).

Human work design

A definition of the 'human work design' is used to evaluate and to alter existing work system and to develop design options on the level of hardware, software and organizational design. The IAP definition of human work organization was adopted by the Swiss National Research Initiative no 15 on the 'work environment and new technology' in 1983:

> 'an occupation can be designated as humane when it is not **damaging to the psycho-physical health** of the worker, does not - or must only temporarily - impair his **psycho-social well-being**, when it **corresponds to his needs and qualifications**, makes possible individual and/or collective influences on the conditions and systems of work, and when it contributes to the **development of his personality** in the sense of broadening his potentials and increasing his competence' (Ulich et.al. 1985; enhancement by the author).

The philosophy of the IAP can be summarised in four notions: technology as an option; the elaborated concept of user-friendliness; the socio-technical analysis of work and organizational design; three strategies of work design: corrective, preventive, and prospective; three characteristics of work design: flexible, differential, and dynamic.

Technology as an option

The notion of technology as an option is concretized in several studies. Different forms of work and organisational design are studied comparatively. Word processing in secretarial work does not determine the work organization per se. Concrete secretarial work is a particular mix of three types of activity: typing, general secretarial work, task-specialist work. A major conclusion for future work design is that the adequate mix of work activities is crucial to promote work satisfaction and personal development in secretarial work. The ambivalent character of word processing is shown: while fatigue, performance pressure, job strain and work pace increase, work challenge and reduction of monotony are experienced positively. Computer assisted word processing increases the demands on training and skills. The most remarkable change concerns the behaviour authors of texts. The care given to the production of drafts decreases (Ruch, 1985, 15ff).

User-friendliness

Another comparative study investigates the user-friendliness of dialogue systems which are already in use. An elaborate concept of user-friendliness is developed. The concepts of 'flexibility' and 'feedback' are operationalized. Flexibility of the dialogue means that the user is able to move forwards, backwards and sidewards from any position. Feedback in a dialogue means that the user is getting sufficient information on his or her position in the system, its activity while he is waiting, error information

and correction references. Flexibility and feedback are ordinally scaled. Flexibility correlates with a positive subjective evaluation of the dialogue system by users (r=.70). A definition of 'user-friendliness' is proposed that contrasts the notion of 'fool-proof'. The user is neither a fool nor does he or she need strict guidance. A user-friendly dialogue system must reflect the characteristics of self-active users. 'User-friendliness in this sense means that software has been adapted to the perception, memory, thinking and social behaviour of man' (Spinas, 1985, 7ff). This notion of user-friendliness of a dialogue system has seven criteria: transparency, consistency, tolerance, compatibility, support, flexibility, and participation.

This set of criteria will be used to evaluate the software that was developed by the bank in the case study. These criteria conform to the basic characteristics of work design: flexible, differential and dynamic design. A technical solution needs to be flexible in order to allow the individual to alter procedures. A technical solution needs to be differential to accommodate the inter-individual differences of users. There must be simultaneous options to chose between different work systems. At the same time it needs to be dynamic in order to accommodate the intra-individual differences of user over time. The level of difficulty of a work systems must be changeable according to the developing skills and competence of the people. There should always be something to learn on the job. Users learn or lose skills, gain and lose qualifications during their work. The technical design has to take that into account (Ulich, 1978; 1983 and 1991). The postulate is no longer to design only technical system but to design work systems in a way that is guided by psychological and social constraints in order to avoid the waste of individual and therefore social resources (Ulich, 1991, 3). Another case study has shown how the lack of design options and the faits accomplis of political decisions lead to a suboptimal work organisation although criteria for adequate work design on the individual level are met in the form of job enrichment. Work and organizational design cannot be separated in reaching optimal outcomes. New technology opens up and requires socio-technical reorganization (groups tasks, semi-autonomous work units) if optimal effects are to be achieved (Baitsch, 1985, 27ff).

Strategies to obtain socially acceptable technologies

The IAP follows three strategies of work design in their attempt to realize socially

acceptable technology. It is **corrective** in the sense that bad working conditions are corrected after they have been established. It is **preventive** in the sense that work systems are designed according to the rich body of knowledge which allows a) to prevent physical and psychological hazards to employees, and b) at the same time to be productive. It is **prospective** in the sense that it is designed for the further development of job skills and a competent citizenship in and out of work. The attempts of the IAP at the Federal Institute of Technology at defining the social acceptability of computers in the office and in the production seem to be well received. No data about the extent of diffusion of these concept is available yet. Experiences from impact studies, where these concept are realized, show the problem, that management resists out of entrenched preconceptions and myths about the planning and implementing of new technology. An assessment of resistance to new organisational designs in international comparison is task for further research (Blackler, 1984).

3.5 Summary: Resistance to computing in Switzerland

The data from diffusion research, media analysis, attitude surveys and impact studies allow us to assess the extent of resistance to computing in Switzerland in the second half of the 1980s. Diffusion data suggests that computing came in two waves, in the 1960 and in the 1980s. Although the number of computers in Switzerland did not lag behind other Western countries, the provision of infrastructure like training and research lagged in the late 1970s and early 1980s. The take-off period for the diffusion of computers was the early years of the 1980s. The Swiss public is alert to negative impacts of computing. Analysis of the computer debate since 1955 shows that 12% of printed matter on computers represents negative attitudes. In the late 1970s this proportion increased to peak in 1977. Nevertheless, machine breaking is not practised. After 1955 no social constituency can be identified with resistance against computers. Negative attitudes are mainly but not exclusively expressed by labour organisations, the humanities and the social sciences. The opinion surveys confirm the media analysis with a delay of about 7 to 8 years. At a peak in 1984, 35% of Swiss were against the widespread use of computers. 15% saw resistance as an option, contemplating actions

such as preferring a computer free job, or changing the job. The mid-1980s was the period of cautious transition from highly ambivalent to more optimistic attitudes. 1986 was the year of greatest insecurity about the costs and benefits of computing. From 1987 onwards the optimists gained ground, and the differences among different groups of the population decreased. The pattern of attitudes assimilated across rural and urban regions. A gap between men and women remains, as well as a gap between the Romands and the German Swiss. Women and German Swiss are resistant to the development. By 1987 15% of the Swiss population were pessimists. Women, German Swiss, the middle aged and elderly and left wing voters are more pessimistic. The pattern of opinion change fits the normalization model with a shift from negative to positive attitudes. In 1983 3.3% of business voice principle resistance against computing for social or human reasons. 17% of companies in the region of Zurich report incidents of employee resistance by 1987, an increase from 12% since 1984. Due to self-serving bias this must be seen as a conservative estimate. One would further expect the rate of resistance to be higher in less industrialized regions, in correlation with the attitude data. Taking negative opinion as a indicator for the potential of resistance I estimate that **15% of the Swiss are resisting computing in about 20% to 25% of Swiss companies by 1987.** The concerns of the public about the costs of computing shift from concerns about job losses to other, unspecified issues. Swiss Computing attitudes normalize during the 1980s as described in model 2 (see page 64).

4. Resistance to change in the organizational literature

The analysis in the previous chapters of the research on attitudes, acceptance and impacts of information technology and computing has shown that people may resist the introduction of computing in organisations with good reason, to prevent manifold undesirable developments. From the societal level I descend to the organisational level of analysis in a review of how the organisational literature has dealt with the phenomenon of 'resistance to change' in the past: what concepts are used, what are the practical implications of a particular concept are, assuming that differences in thinking make a difference for action. Firstly, I will show that resistance is mainly seen in negative terms, as a deficit concept of some kind, and as a dependent variable. Looking at it exclusively as a dependent variable reflects the dominant research interest of controlling and managing resistance in organisational change. Secondly, the Lewinian concepts will be the main object of my criticism. Kurt Lewin's field theory remains influential for the analysis of planned social change, or so called 'American democratic social engineering' (v.Elteren, 1990); and, as my analysis tries to show, in many respects rightly so. I will present the strengths and weaknesses of the field theory and acknowledge my own point of departure. Field theory provides a framework from and against which conceptual development can grow dialectically. Some field theoretical studies on resistance to change will be analyzed to show their problematic assumptions and shortcomings. For some time the problem has been the choice of analogy: are psychological phenomena better modelled as closed, physical and entropic systems or as open, biological and neg-entropic systems? Recent paradigm changes promise to overcome that dilemma by a unified view of systemic development (Jantsch, 1979; Prigogine and Stengers, 1984). My critique of the organisational and psychological literature on resistance to change can be summarized in five theses:

H4.1: Most analyses value resistance negatively: it is a nuisance to be overcome.
H4.2: Resistance is mostly presented as a 'deficit phenomenon'.
H4.3: Resistance is mostly a dependent variable.
H4.4: 'Feeding the reluctant eater' is the paradigm of the Lewinian analysis of resistance to change.
H4.5: Careful phenomenology of resistance has been replaced by pragmatic analyses from the point of view of the change advocate.

Evidence for these thesis is drawn from publications over the last 50 years. A plausibility argument is developed according to which the literature treats 'resistance' in the hypothesized manner[1]. The selection of materials reflects the persistent scanning of USA and European (British, French, German, Dutch, Scandinavian) material over the last seven years (Bauer, 1986). Selection criterion for the material is the explicit use of the term 'resistance to change'.

4.1 Resistance as dependent variable

To classify the evidence I follow a simple logical model: Resistance is a relation with five arguments: R (actor, object, conditions, manifestation, perspective). Resistance is an individual or collective act. The actor resists certain events, the objects of resistance. Resistance is conditioned, that defines social or individual characteristics which are associated with an increased likelihood of resistance; classifications of conditions (independent variables) are often used to explain statistically the occurrence of resistance (dependent variable). Resistance comes in various forms of behaviour, experience and mind states. Any analysis of resistance implies a positioned observer who uses a 'theory' of resistance; such theory is a cognitive tool that is used to distinguish and identify certain organisational events as either conditions or manifestations of resistance. Concepts of resistance allow the ordering of events in the figure-ground distinction always from a certain perspective. The common feature of such of analysis is: resistance is the dependent variable. Resistance may itself be a dynamic process with a single or several characteristic patterns of development over time, i.e. a process gestalt.

[1] A rigorous test would need a quantitative analysis of bibliographical sources, which is not intended here. For example the University Microfilm International ABI/INFORM database on DC-ROM gives 108 references in English language for the term 'resistance to change' between May 1987 and November 1991, only.

4.1.1 Resistance, a matter of perspective

Resistance is an attribution from the perspective the interested observer. Somebody called 'resistant' by an observer, and many things may be implied by that. This attribution of resistance to behaviour in an organisation can take a) the form of 'observing the other' or b) the form of 'self-observation'. As resistance in an organisational context has negative connotations, the term is rarely used for self-observation. It mostly refers to others. Kahn reminds us that 'resistance' or 'commitment' may refer to the same kind of events depending on whether the 'observed others' goes along with the observer or not:

> 'When we want change, we speak of those who do not as presenting obstacles and resistance. When we want stability, we speak of perseverance and commitment among those who share our view' (Kahn, 1984; 416).

For Willcocks and Mason (1987) resistance is an attribution from a **position of power and agenda setting**. For Lorsch (1976) writing about resistance is attractive because it has **'news value' as bad news** about the business scene. Resistance to change is the universal scape goat for the failures of organisational change (Guest, 1984). The argument, indeed, is problematic not least because it is circular: the change project fails because of resistance. Resistance is the case, when the project fails. An account of resistance independent of failure is necessary. Hobsbawm (1952) comments that historical machine braking was the analysis of popular unrest by 19th century economic analysts with a middle class outlook therefore introducing a particular bias in the analysis. In the British context these were the Fabians, Liberals and industrialists. Their interests inflates otherwise marginal events. Their view point of 'progress' allows the negative qualification of the events as 'pointless, frenzied, ... endemic rioting ... the overflow of excitement and high sprits' (ibidem). I conclude, that any analysis of resistance to change has to reflect its own point of view to explicate and identify the inherent bias.

4.1.2 Actors of resistance

An analysis of resistance identifies the actors. Within the organizational context the question arises: which level of the hierarchy is most prone to resist changes? A level of hierarchy is an aggregate of individuals. The literature shows a shift of evidence with respect to this question. Older literature (Coch and French, 1947; Lawrence, 1954; Johns, 1973; Greif, 1983) locates the agency of resistance in the **lower levels of the organisational hierarchy**. It is the shop floor or the clerical office which ~~resistant~~ resists changes. In the last 20 years a more diffuse picture emerges. Particularly the introduction of information technology has altered that picture. Some authors identify the main agency in the middle strata of an organisation. They identify supervisors and the lower and middle management with resistance to change (Bargmann, 1984; Klein, 1984, Carlopio, 1988). Others identify the least resistance in these middle strata of the organisation, on the contrary middle management is the most likely the agents of change, which is resisted from both the lower position and the higher positions in the hierarchy (Alter, 1985; Streicher, 1984). This seems to reflect alterations in organisational change. Organisational change is no longer a process which affects only the lower stratum of an organisation but involves periodically all levels of the hierarchy. Resistance to change is equally probable at all levels of the organisational hierarchy. At present the problem of **resistance has to be identified and analyzed at all levels** depending on the people that are affected by the projects of the agenda setters. These agendas affect different people at different times, while nobody is excluded (Lawrence, 1969; Johnston etal. 1969; Ulich, 1984; Kahn, 1984). Hage specifies the omnipresence of resistance:

> 'Elites resist because it upsets the balance of power, lower participants resist because it is too stressful. All members resist if the innovation maximizes quality and yet the work flow is relatively routinized or the reverse. Professions resist any attempt to increase the quantity of work..' (Hage, 1980, 236)

A **trade union** is an organized social actor that was sometimes resistant to technical change. Organized labour traditionally advocates social change in society. The record with regards to technical change is however mixed. Organized labour seems to have taken a critical view throughout history not against new technology per se, but against

certain trajectories of development. Splinter groups at times opted for 'machine braking'. At present, trade union policies are not against new technology, but aim at preventing undesirable outcomes for their members with the help of negotiated technology agreements (Willman, 1986, 11ff). Contrary to earlier evidence, recent evidence on actors shows that resistance to technical change can be found on all levels of the organisational hierarchy, and is by no means a main issue lower levels or of trade union politics.

4.1.3 Resistance to what ?

Principally any initiative in an organisation can be target of resistance to change. It is nevertheless useful to introduce some typology of events that are frequently the target of resistance.

Technological resistance or social consequences

The most common distinction is that between resistance to new technology or to its social consequences. Many authors conclude from their analysis of events that people do not resist the new technology per se, but the social consequences which arise out of its implementation (Lawrence, 1954, 49; Johnston etal. 1969; Ulich, 1984; Carloppio, 1988). Underlying this distinction is the assumption that technology per se is neutral. It is the uses it is taken to, which make the difference. People have been using technological tools all the time. Resisted are the dissolution of social groups, changes in the task structure, threats to the social positions, job losses, changes and devaluation of skills, increased job demands etc. Historical studies of machine braking foster this distinction. Machine braking was not an end in itself, but a means of bargaining. In the early 19th century the Nottinghamshire Luddites, machine breaker in Lyon and Zurich broke machinery to keep the prices for their products, to protect their skills and crafts, and to prevent the implementation of labour-saving new machinery, to protect the unity of home and work place, and to take political positions (Hobsbawm, 1952; Thomis, 1970; Bucher, 1982). However the analysis shows that the resistance to technology per se may be part of the phenomenon of luddism particularly in Yorkshire and Lancashire (Thomis, 1970). Technological resistance emerges when it fuses social unrest with

romantic-conservative ideals about pre-industrial society (Sieferle, 1984; Tucker, 1990).

Change per se or trajectories of change

Some authors put forward **change per se**, irrespective of content or interests, that is the object of resistance. They postulate motives and dispositions like 'natural conservatism', 'innate inertia', 'limited capacity for stimulation' 'built in resistances' of people which make them prefer the familiar status quo to anything new and changing, and to react against any change of the status quo (Davis, 1962; Toffler, 1970; Watson, 1971; Hirschheim and Newman, 1988). Homeostasis is the model that is evoked in that context. Although homeostatic systems might accurately characterize some forms of human motivation like thirst and hunger, which are based on internal standards and states of deficiency, and regulated by deviation or dissatisfaction, More characteristic human motives are not based on fixed standards but tend towards learning and growth, i.e. structural change (Maslow, 1943). The idea of an 'innate conservatism' is based on two errors of reasoning: a) from the permanent and ubiquitous presence of resistance its 'natural kind' is inferred. Resistance is not an individual characteristic which is determined by someone's genes, but it is a potentiality of human action in relation to a situation. It characterizes a situated person. That means that the situated person is crucial not the person per se; b) change per se cannot be resisted, as it happens all the time: people are doing things all the time and therefore alter the relation of things in space and time; they also grow older literally changing their skin. The apparent stability is relative to the frame of reference of space and time span. Microscopic analysis shows changes where macroscopic analysis sees only stability; macro level stability masks micro level fluctuations, micro stability disguises long term changes. If change is omnipresent, and stability a matter of perception, it is not change that is resisted, but certain trajectories of change. The crucial question arises: what kind of change is resisted ?

Goals, means, kinds of interactions, mind frames

The analysis of resistance in psychotherapy research distinguishes various objects of resistance which one can consider by analogy for the present purpose. Resistance being defined as contributions of the client which threaten the continuation of the change

process (Caspar and Grawe, 1981, 352). Resistance may be against certain goals of the change process. The change agent suggests certain objectives for change which is not compatible with the goals and values of the client. This often reflects rudimentary understanding of the client system on the part of the change agent. Resistance may be against the means the change agent is deploying for the implementation of change. A client system might not be prepared to engage in exercises of training which the change agent suggests. Resistance may be against the kind of interaction the change agent is offering. The very style in which the change agent is interacting with the clients is rejected. The relationship that the change agent is offering frustrates the expectations or supersedes the capabilities of the clients. The latter two points are stressed in the organisational literature. Resistance expresses disagreement with the style of change management, e.g. the language used by technical people, the information policy, the degree of participation (Coch and French, 1947; Lawrence, 1954; Fischer, 1971; Boehnisch, 1979). Resistance is a management problem. Lastly the resistance of a client may be against the mind frame or model of human functioning which guides the intervention of the change agent. Behaviouristic or mechanistic assumptions may be rejected. Such conceptions make the change agent deny the relevance of ideas, beliefs and feelings, and make him arrange for simple reinforcement or incentive systems.

Social control and the restriction of freedom

It is postulated that resistance is a reaction against the restriction of freedom. Any change process which is perceived to constrain the present degree of freedom, i.e. to increase the other's degree of control, is responded with resistance. A particular type of motivation is postulated for such case: reactance (Brehm, 1972; Gniech and Grabitz, 1978). Reactance assumes that people have choices, value having choices high in some particular context, and perceive the restrictions on these choices aversively. The resulting reactions aim at restoring or extending the degrees of freedom. This is done either by mental restructuring or by acting onto the source of constraint. The organizational literature has a tradition of analyzing people's collective strategies of resisting the control of management as informal structures. Informal structures arise complementary to formal organisational structures. Formality can restrain the freedom of participants, informality may open up spaces of freedom. Crozier (1963) calls it the vicious circle

of bureaucracies: They tend to restrict freedom of participant, to which participants react with strategies and structures of resistance, to which the management tends to respond with further restrictions, to which the participants tend to .. etc.. Resistance to change in organisations is often the response to the tightening of managerial control (Crozier and Friedberg, 1977, Laurent, 1989).

4.1.4 Conditions of resistance

Conditions refer to factors that explain the likelihood of resistance as a dependent variables. Three levels of situational conditions of resistance to change can be distinguished: interactional, organisational, and cultural conditions. On each level two issues may be relevant: the legitimization of resistance and the problem of power and resistance.

4.1.4.1 Interactional conditions

Interactional conditions summarize the factors that are localized in the individuals. They constitute what is critically called 'an argument of psychologism', that explains social and cultural conditions away with individualistic psychological variables.

The implicit psychological contract

The assumption is that the employees's participation in organisations is based on a individual cost-benefit analysis (Lorsch, 1976; Hage, 1980). An implicit agreement about the contributions (costs), expected gains (benefits), and their positive balance defines the terms of the contract of participation. This contract is not formally written down, rather implicit in people's mutual understanding. Changing the organisation may alter the conditions of that contract as career opportunities may fade away, power positions shift and compensation schemes be changed. Change creates uncertainties about the past, the present and the future. This may result in perceiving that the implicit contract is broken, and resistance is the result: 'if the change he or she is asked to make violates that contract, the individual is apt to drag his or her feet in altering behaviour' (Lorsch, 1976, 670). The 'implicit contract' concept puts resistance into a positive light.

The legal analogy of a broken contract legitimizes resistance to change. Hypothesis H4.1 is falsified. The 'broken contract' is a deficit state of affairs, albeit not of an individual but of the relationship between individuals. Hypothesis H4.2 is confirmed.

Inoculation against persuasion

McGuire (1964) uses the medical analogy of 'inoculation' to analyze the conditions under which individuals are likely to resist persuasive communication, the goal of which is to change their beliefs and attitudes, and ultimately their behaviour. Such resistance to change is often the outcome of prior training. Inoculation is created by behaviourial commitments which arise from private decisions, public announcements of them, active participation, external attributions of such commitment; by linking beliefs to other believes and values, or to reference groups. Such measures increase the likelihood of failure of persuasion. Inoculation is the effect of prior training: the defense of believes can be practised by challenging experimentally mock beliefs. The better the inoculation, the stronger will be the resistance to persuasion. The analogy of inoculation puts resistance as a desirable state of affairs. It is a resource to withstand persuasion that gained in prior training. Hypothesis H4.1 and H4.2 are not confirmed.

Psychological traits and demographic data

Psychometric traits like neuroticism, anxiety, rigidity, closed mindedness, ambiguity tolerance, conservatism, dislike of learning, and demographic data like level of education, age, class and sex are studied in relation to resistance to change. Statistically education, age, class and sex seems to be most predictive for resistance to change. Not much can be generalized beyond the statement that different people are resistant to different things at different times (Graham, 1956 with regards to social class and divers innovations). A negative correlation between age, level of education and generalized resistance to change seems to be the only generalization possible. Older people and people with less education are more likely to resist changes in their life (Johns, 1973; Dexter, 1977). An individualistic explanation of resistance has at least two problems: First psychological concepts like rigidity, closed mindedness, conservatism, dislike of learning, ambiguity tolerance are defined by avoidance of change and cannot be used to explain resistance without being tautological. Second such

concepts are negatively loaded and carry a bias for change. Nobody likes to be 'anxious, neurotic, closed minded, ambiguity intolerant, psychologically conservative'. The use of such terms blames the individuals for not behaving socially desirable. Resistance then is problematic, may even be pathological. Explaining resistance by psychological characteristics is a good examples for explaining resistance along hypothesis H4.1 to H4.3: resistance is undesirably negative, a deficit state of affairs, and a dependant variable.

4.1.4.2 Organisational conditions

Organisational conditions are emergent network characteristics when people cooperate for various purposes. To explain resistance to change variables like vested interests, formal structures, bureaucracy, informal structures, costs of innovations, and absence of alternatives are used.

Vested interests and formal structures

Hage defines resistance as 'an unwillingness to cooperate with change' or 'passive non-cooperation'. Resistance is lethal for change efforts (Hage, 1980, 223), explaining failures of change efforts. Hage's hypotheses link the occurrence of resistance to vested interests of dominant groups and formal structures of organisations. The more centralized, the deeper stratified, the smaller the crisis faced, and the less prevalent norms of equality are, the more resistant dominant groups will be in organisations. Conditions under which organisational members are less likely to resist changes are prior experience with role changes, experience of various schools of thought, experience of different cultures, and a slow rate of change. It is assumed that all these relations are linear.

Bureaucracy

Centralization, stratification and equality point to the problem of bureaucracy. Bureaucracies are formalized, highly centralized, highly stratified organisations, and are based on inequality. Hage is concerned with increasing the rate of innovations in an

organisation as this is conducive to long term survival. Petit in a review paper characterizes resistance as the dysfunctional outcome of the application of classical theories sensu Taylor, Foyol and Weber (Petit, 1987, 320). If this is the case, non-bureaucratic organizational practices would make resistance disappear as an organisational event (TenHorn, 1990). Hence resistance is a negative event, which has to be overcome, and it is the outcome of deficient state of affairs. Resistance is the dependent variable. Hypotheses H4.1 to H4.3 hold: resistance is presented as the negative outcome of deficient organisational structures.

Informal structures

Bureaucracies give rise to parallel informal structures. Many studies have shown how informal structures of communication and behaviour emerge in response to tight management and supervisory control. Such structures provide social support and security. They include social pressure, define ingenious behaviours to avoid the controlling eye of supervision, and secure space of unpredictability within formal settings (Crozier and Friedberg, 1977). Resistance from informal structures is a management problem. The change agent tends to ignore this informal structures in the planning of change and jeopardizes the success of the project (Lawrence, 1954). The valuation of resistance by informal structures is ambiguous. Informal structures are on the one hand a resource, insurance and expression of human freedom (positive), and on the other hand the very structure that has to be crashed to overcome resistance (negative). Hypothesis H4.1 may be falsified. Hypothesis H4.2 is falsified. Informal structures are not inherently deficient structures.

Costs of innovation and absence of alternatives

March and Simon (1958) discuss resistance under the problem of altering an existing or adopting a new program of organisational action. An action procedure that is satisfying according to some criterion does not call for change. Program continuity and behaviour persistence are the terms used for resistance to change. Sunk costs of old equipment and know-how tend to produce program continuity. In addition inaction does absorb less resources, than action does. On the other side persistence is attributed to the absence of any search for alternatives. Persistence is explained by 'the absence of a

vigorous search for alternatives under circumstances where existing program is regarded as satisfactory' (ibidem, 174). An organisation is faced with two kinds of choice situation: choice between options, and choice between persistence or program alteration. In the first kind of choice information processing will shift the relative attractiveness of the options. In the second choice situation information processing will suggest alternatives by coming up with new programs or by altering old programs. Resistance to change is a problem situation of the second kind and expresses a twofold deficit: lack of search activity and lack of initiative. Given March and Simon's major interest in 'steady state' processes (ibidem, 172), persistence or resistance to change is not a generally negative phenomenon. H4.1 cannot is not supported. However, under the problem of innovation and development under environmental uncertainty, resistance expresses deficiencies of the information process. Hence, H4.2 is supported.

4.1.4.3 Cultural conditions

The highest level of explanation of resistance to change is the cultural. Concepts like the 'British Disease', local communities, traditional society, industrial relations systems, and thee will to resist' are offered to explain resistance.

The 'British Disease' as an example

Cultural conditions may be variables external to the organisation, which give organisations particular features in that particular cultural context (Smircich, 1983). Organisations are more or less resistant to change depending on this wider cultural context. An good example of a cultural explanation is the 'British Disease' of which conflicting descriptions exist. Huczyinski and Buchanan give the following definition:

> 'The British disease is a general sense of strain and conflict at the place of work, and the withholding of effort of workers from managers to whom they are inherently opposed by differences of class' (1991, 534).

Steele argues that the British business world is particularly resistant to the expertise of 'organizational development'. Cultural factors explain resistance: a gentlemanly emphasis on style instead of effectiveness; a tradition of respecting taboos, i.e. avoiding unpleasant topics; the high value of the past and of heritage; rational argumentation

bends towards empiricism, i.e. the value of the new has to be proven by facts before it is adopted; the value of privacy and the home and a correlated mistrust against professional advise in affairs of daily life (Steele, 1977). Resistance is valued negatively and the outcome of a deficient state of affairs.

Embedding of organisations into local communities

Johns draws attention to the embedding of productive organisations into local communities. Organisations may differ in that respect in different countries. The stronger the sense of community beyond the organisation, i.e. the more the working life is merged into non-working life, the higher will be resistance to technical change. The wider the gap between old and new norms, that are implied in the implementation of new technology, the stronger resistance will be (Johns,1973,57f).

Traditional societies

Strong barriers to upward mobility, large family structures and fatalism about social positions correlate with the static self-concept of traditional societies. Technical and industrial innovations face strong resistance as norms of novelty and efficiency contradict the traditional norms of societies. Indifference to experience and to skill training are manifestations of resistance in such contexts (Beals, 1977, 587).

Industrial relations systems

Industrial relation systems influence the likelihood of resistance to change. Attitudes of bosses and workers are mutually reinforcing (Coleman and McLeod, 1986). Culture of 'low trust' between unions and employers show more and different kinds of resistance to technical innovations than cultures with 'high trust' cultures (Littek and Heisig, 1986).

The 'Will to Resist'

In military sociology, one finds the concept of a cultural resource called 'the will to resist'. It describes the combined motivation of a population to prepare the defense of national independence by all means, even when no threat is immanent. The will to resist depends on ability and value: the perceived capabilities of defense and on the question

whether the situation is worthy to be defended. The perceived threat influences anxieties, the perception of capabilities and the perceived worthiness of defense. Rhetorics about a situation unworthy to defend undermines the perception of resistance capabilities (Haltiner, 1986).

4.1.4.4 Legitimization of resistance

Legitimizing is any argumentation that intends to explore the moral right to resist certain political or technological developments. It traditionally is a legal argument that turns around the 'Right to Resist' to the power of the state. Such arguments can be a source of ideas to think about resistance in the present context.

The Right to resist

Political and legal philosophy reflects from time to time on the 'right to resist' the power of the state. The discussion on the right to resist deals with past and present actions like murdering the tyrant, illegal demonstrations, squatting, demonstrative damaging of property, occupations of territories, refusal to pay taxes, hiding of illegal immigrants etc. The moral problem is, whether formally illegal activities are ethically legitimate, and under what conditions that may be the case.

Risky behaviour: participation outside the norms

Political resistance is a form of conflict defined as political participation beyond the legality, i.e. participation outside the established political institutions of the time. Resistance is therefore risky behaviour. By contrast political opposition works within the political institutions and does not subject the participants to the risks of incrimination (Ryska, 1985; Rhinow, 1985). The legitimation of resistance draws upon a framework wider than the positive legal system. Such thoughts can be traced back to early constitutional history and reflects attempts to bind power within the law: the law before power. Resistance is justified under six conditions: if a) the present system does not possible to reform, if b) the system is morally illegitimate and unjust, if c) the attempt to resist the activity of the state is based on the highest values, if d) such

actions are highly risky (Ryska, 1985), if e) the democratic reform process is deficient or decaying (Rhinow, 1985), if f) the system of justice is deficient. Saner argues that no state system is perfect, therefore the case for deficient institutions can always be made. Hence resistance is justified most of the time (Saner, 1988). My initial hypothesis H4.1 (negative value of resistance) has to be qualified. The philosophical discussion takes for granted that resistance is problematic and negative. The problem is exactly to define the conditions of and to justify the positive and legitimate resistance. Hypothesis H4.2 (deficiency concept), does not holds in that context. Resistance is justified under a morally deficient state of affairs, but the agent is not deficient at all. Resistance expresses a deficient context of action which legitimizes it.

4.1.4.5 Resistance and power

The relationship of resistance and power is an crucial one. Conceptually the problem has been solved in various ways: resistance limits the exercise of power; resistance is a substitute to older forms of power control; resistance is a way of exercising power for the powerless; or power is a measure to describe resistance relative to other forces.

Limiting the exercise of power

This leads to a discussion of the relationship between power and resistance. Power is a relation between two non-symmetrical relations. A has power over b, if the power of a over b is greater than the power of b over a. The basic problem is whether resistance is a form of power or something else (Barbalet, 1985). Barbalet concludes that power and resistance are different things. This comes out of an exegetic discussion of the translation of Max Weber's initial definition of power as 'Einfluss.., auch gegen Widerstreben'. Resistance is not reducible to power. The opposite of power is powerlessness, the opposite of resistance is initiative or striving for something. Resistance not necessarily means conflict, but can be silent, passive, non-intentional as well as indifferent. It is rather a contribution of the powerless to limit the exercise of power. Scott (1987) provides ample evidence for this in his analysis of the peasants' strategies of tax evasion in pre-revolutionary France and present-day Malaysia.

Resistance and the moral control of power

The limits of power at any given time are the outcome of past politics and structuring. Resistance is accentuating and defending the negotiated order of the past. Morality defends the rules of the game of the past. Crozier predicts the decline in generalized moral and ethical control of power, which going to be progressively replaced by open negotiations between power groups (Crozier, 1973). Within that trend resistance may have to play an important role to replace morality and ethics as control of power by voicing the specific concerns of the powerless.

Resistance in power and resistance out of power

It makes a difference whether resistance comes from a position of power or from a position out of power. Both forms are manifested differently. Considering the two faces of power (Bachrach etal., 1962), resistance, mobilizes the bias, defines the set of options, defines the rules of the game, and defines the structure within which conflicts are negotiated. Decisions are ultimately taken from within a given scope of alternatives.

Resistance is always stronger

In his reflections on war, Clausewitz characterizes resistance as the continuous to and fro between waiting, retreat and reaction. He formulates that, given equal means, resistance is always stronger because it has the capacity of surprise and the knowledge of the territory. It is able to mobilize actions at various places. It can rely on preparations and on local support, and has the moral advantage of defending homeland (Clausewitz, 1832, 363ff). Waiting/retreat and reaction express the two principles of resistance: by waiting and retreating, i.e. temporary surrender of 'territory', the intervention of the change agent becomes an obstacle to itself and depletes its resources without reaching the goal. Sporadic 'guerilla' actions weaken the forces of intervention even further (ibid., 393). Temporary surrender and sporadic reactions on selected targets are the key to successful resistance to change. Contrary to the organizational context the concept of resistance has a positive connotation in the military context. My hypotheses H4.1 to H4.3 do not hold for military reasoning. Resistance is neither negative nor the outcome of deficient conditions, nor is it the dependent variable of the analysis. Clausewitz's Gestalt theory of war (Metzger, 1943) is rather a possible source

for a positive analogy and a functional concept of resistance.

4.1.5 Forms of resistance to organisational change

Most discussions of resistance to change stress its variable manifestation. 'Resistance' is a concept which covers many different patterns of behaviour or states of mind. Table 4.1 gives a complied list of events which have been identified as resistance in different organizational contexts. In table 4.1 the two dichotomies **individual/collective** and **active/passive** are used for the classification. Other dichotomies are postulated for the classification of resistance to change: **violent/non-violent, planned/spontaneous,** and **self-conscious/unconscious**. The active/passive distinction marks the boundary between resistance that involves taking initiative in contrast to resistance that is non-action like being indifferent and mere waiting. The isolated/collective distinction marks resistance which is enacted by a single, isolated individual or by a number of people simultaneously. Collective resistance does not imply organized resistance. The violent/non-violent distinction marks whether hurting people and damaging property is part of the resistance actions. The planned/spontaneous distinction marks the boundary between resistance which is planned beforehand, determined, persistent when in difficulty, or improvised and sporadic eruptions of certain patterns of actions. The self-conscious/non-conscious distinction marks the boundary between actors who conceive themselves as resisting or between actors who have no such self-concept. The combination of these five dichotomies produces $2^5=32$ different kinds of resistance. This gives an idea of the theoretical variety of resistance to change. I will not provide examples for each type of resistance. One would expect that different conditions lead to the prevalence of different forms of resistance. A violent miliary intervention may give rise to the whole spectrum of resistance. In the context of the introduction of information technology one can say that violent and conscious resistance is rare, as is planned and collective resistance. Most resistance in that context seems to be spontaneous and non-violent, active as well as passive.

Table 4.1: Manifestations of Resistance to organisational change

Collective-active	
	high fluctuations of staff
	absenteeism and increased morbidity
	reduced output in quantity and quality
	work to rule
	technological strikes
	destruction of means of production
	occupations of factories
	forming of groups
Collective-passive	
	negative attitudes, low acceptance
	slow diffusion rates
	women refuse to use the 'male toy'
	sticking to old ways of doing
Individual-active	
	reduced performance levels
	criticism of management
	memoranda to management
	sabotage
	aggressions
	refusal of additional work load
Individual-passive	
	rationalizing refusals
	apparent acceptance, later return to old ways
	wishful thinking
	refusal to use new facilities
	laughter, irony, pleasure about system failures
	anger, nervousness
	critical comparison with other systems
	sticking to old ways of doing
	indifference and waiting

The list is adapted from an earlier analysis of the literature and an empirical study (Hermann, 1984; Bauer, 1986 and 1991)

4.2 Resistance and Psychological Field Theory

Psychological Field Theory is the most influential framework for the analysis of 'resistance to change' in the social and organisational psychology. 'Field theory' defines the research program of Kurt Lewin and his collaborators in Berlin in the 1920s and later in the USA. It advocates a psychological theory in contrast to associationism and behaviourism (Lewin, 1931 and 1949). The development of field theory goes in two phases: In a first phase, until about 1939, field theory is about the behaviour of individuals. It is an attempt to represent the life space including the person and the environment. The guiding maxim is pragmatistic: 'real is what has effects'. The life space is the reality of the individual person with all the possible and the actual influences on behaviour. That reality is not coextensive with perception and consciousness (Lewin, 1936, 28f). Novelists like Dostoevsky and Proust together with Freud are invoked to witness the richness of the psychological life space in its determination of behaviour and experience. The life space is not identical with what an observer can see. The diagram representations of the person's life space are pragmatic tools of the observer to penetrate the individual's world and to predict his or her behaviour from there (Lewin, 1936, 13). The analysis of resistance is a 'barrier to locomotion' within that situation. In the second phase, after 1939, Lewin extends field theory to the analysis of social entities like groups or organisations. A project of integrating structural explanation and the dynamics of structures was planned, but later abandoned (van Elteren, 1990). Not least his early death has left Lewin's influential research program unfinished (Coser, 1984). The historical evaluation of Lewin's program needs still to be done. Signs of reappreciation can be seen (Graumann, 1986; Henle, 1978; White, 1978). I characterize field theory in seven programmatic points being, however, aware of the historical discontinuities. Lewin of the 1920s is not Lewin of 1940s as van Elteren has clearly shown (v.Elteren, 1990).

Phenotype and genotype

Lewin postulates the need to go beyond observable and to introduce non-observable structures, the 'constructive-genetic concepts'. Similar surface observations may reflect different underlying structures, and vice-versa. What looks as the same, at first sight,

may not be the same at a closer look. This is a notion which has become an axiom of action psychology: the same behaviour patterns may rely on different cognitive processes. The same behaviour may be part of different actions, and the same action is observed in different behaviour. Action is meaningful behaviour.

Mathematical tools

Non-observable concepts are described in two kinds of mathematical language; **topology**, to represent the possible, and **vector geometry** to represent the actual within the possible (Lewin, 1936 and 1938). Psychological space is not identical with physical space. The mathematical langauge allows to be brief and to map a variety of different psychological observations into a unified framework.

Historical and structural explanation

Systematic explanations predict behaviour of a person or a social group in terms of the present situation only, the 'force field' or 'life space' at the time. The force field comprises all influences at time t. Behaviour is a function of the total situation present: $B = f(S)$. In contrast, a historical explanation is concerned with the origin the present situation: $S(t)=f[S(t-1)]$. Structural explanation and the explanation of the origins of structures are the two separate problems, both equally important.

Behaviour of the single case

The single case is not deviance from a statistical mean. Single cases are explained by general psychological laws and boundary conditions. Lewin assumes structural determinism of behaviour. Variability reflects unknown structures. Variance does not reflect error, rather qualitative, structural differences in the life space. The 'laws of gestalt' are examples for how dynamic constructs and their lawful relationships can be applied in dealing with divers phenomena of perception, insight, actions, processes of will and psychological needs (Lewin, 1931, 255; Bischof, 1981).

Unifying metatheory

Field theory unifies various fields of psychological studies in a single metatheory. Partial phenomena require partial theories. The strategy is to analogize psychological

phenomena with concepts like 'differentiation', 'tension' and 'directed forces'. Field theory integrates problems of perception, emotion, motivation, action, learning and psychopathology. The objective is pragmatical in the sense that good theory is eminently practical for research and applications.

Intentionality

Field theoretical analysis implies that psychological phenomena are 'directed towards'... A goal is not a characteristic of the individual, but relates the organism to the environment. The unit of analysis are situations[1]. Reaching the goal is reaching a state of equilibrium or tension-reduction by the person in his or her environment. The organism is an open system, while the person-environment is a closed system. Intentionality is a state of tension. A goal achieved is the 'good gestalt' of Gestalt psychology (Koehler, 1938; Lewin, 1938, 17; Metzger, 1943, 236ff)[2].

Physics as the model

Lewin reflects the history of science and assimilates the progress of psychology to the historical progress of physics. However, he is not advocating physicalist reductionism (Lewin, 1931, 234). Psychology deals with a distinct subject matter and is not reducible to physical events. Psychology is the 'younger sister science': similar endowment, but a different problem. According to Lewin sciences follow a course of progress from classification and substance to questions of function and dynamics, from historically located, statistical regularities to systematic laws[3].

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[1] This allows Lewin to criticize a) concepts like 'intelligence' and 'abilities' as measured by tests, and b) the nature-nurture debate that attribute behaviourial tendencies to the person relatively independent of the concrete environment (Lewin, 1931, 248 or 265-271).

[2] Whether this state of equilibrium is equivalent to the one proposed by v.Bertalanffy for biological processes is explicitly left open. Lewin's formulation rather suggests a negative answer to the question (Lewin, 1931; 259).

[3] The accuracy of such a historical analysis must be left open. Lewin's analogy of psychology and physics ignores the problem, that the development of the 'later born' may follow a different path than the earlier born. An earlier attempt to locate psychology with biology was lost in Lewin's later work (Bischof, 1981). Lewin's idea of scientific progress is particularly doubtful for Social Psychology, where the claim of universal laws is ideologically masking the historical context of its validity (Gergen, 1973).

During the World War II years Lewin and his collaborators shifted interests from the individual situation to the analysis of the 'social field'. The historical context of this shift was marked by three events: a) The long standing intellectual contact to the German sociologist and marxist philosopher Karl Korsch served as a catalyst. A joint research project to integrate the structural and the historical analysis of social events failed in 1939. The reasons for the failure lay partly in difficult situation as immigrants in the USA as analyzed by van Elteren (1990). b) The Harwood textile company became a field for experimental problem solving, out of which a number of studies arose. c) Lewin conducted study of changing food habits during the war years. Lewin formulated the 'theory of the social field' in two papers in 1947 titled 'frontiers in group dynamics' (Lewin 1947, a and b). These papers combine the conceptual developments, results from a number of empirical studies, and a strategy of 'social management' or 'social engineering' called 'action research'.

Social field theory culminated in the establishment of the MIT Research Centre for Group Dynamics, Lewin's involvement in the New York Commission on Community Interrelations just after the war, and his enthusiastic participation in the Macy conferences on Cybernetics (Heims, 1991). Lewin's early death in 1947 from a heart attack left that work basically unfinished. The objectives of a social field theory are three: integrating social sciences; moving from description of social bodies to the dynamic problem of changing social life; developing new instruments and techniques for social research (Lewin, 1947a, 5). Lewin argues that although **social engineering** is a long standing preoccupation of political elites, it lacks an accumulated body of knowledge and is basically left with vague, intuitive and intangible terms. Contrary to physics where the status of the atomic parts was an issue of debates, in the social sciences it is the status of the whole which was and is debated. Social events depend on a force field as a dynamic whole rather than isolated factors. As such social phenomena cannot be understood by classification and 'looking at' only, but rather by intervention or 'doing something with' them. In order to understand the social dynamics one has to try to change it (ibid., 9). I describe the analytic tools in some detail which are used for the analysis of resistance to change in that context.

4.2.1 Basic concepts of analysis

Lewin's program uses mathematical language namely topology and a vector geometry. The psychological or 'hodological' space is non-euclidian and finitely partitioned (Lewin, 1836; 1938). A mathematically incomplete and rather poor imitation of physics as that may have been at the time (London, 1944), it reflects Lewin's systematic **and** pragmatic treatment of matters: the mathematical language is justified by fruitful research, and, if necessary, the mathematical concepts have to be adapted to the psychological reality, and not the psychological reality to the mathematical concepts. For the non-euclidian, hodologial space no mathematical treatment existed at the time. It needed to be developed, and Lewin started to do exactly that (Lewin, 1938, 23ff). Topology represents the constraints on locomotion. Vector geometry represents the forces of locomotion. Both tools give a hypothetical picture of the dynamic of behaviour within constraints. The concepts used for the analysis of resistance to change are summarized in table 4.2.

Table 4.2: Lewin's topological and vectorial concepts

- **topology:** representing possibilities: life space, hull, region, neighbourhood, boundary, person, goal region, barrier, differentiation, fluidity, elasticity, plasticity; - **vectors**: representing actualities: force, strength and direction of forces, force field, valence, distance, overlapping force fields, potencies.

This may suffice to analyze the way Lewin is analyzing the problem of resistance to change at the individual and at the social level. Resistance to change indeed emerges as the central problem of that research program and clearly shows its 'bias for change' from the point of view of the socially **interested observer** and action researcher:

> 'This technical analysis renders it possible to formulate more clearly the problems of planned social change and resistance to change. .. It is suitable for the analysis of a variety of processes like the production level of a factory, of a work team or of an individual, the change of abilities of an individual or the resources of a nation, for group norms with or without reference to cultural

values, for group activity and for interactions between groups, between individuals and between individuals and groups' (Lewin, 1949, 363).

Lewin's analysis of resistance to change is twofold in accordance with the two phases of the research program: Firstly, resistance as the barrier of locomotion for individual behaviour, and secondly, resistance as the counterforces to change for social entities. I will deal with both of them separately.

4.2.2 Resistance and the 'barriers of locomotion'

The life space is structured into regions. These regions are the media of locomotion. An action is represented by a point, the person, moving to the goal region. Regions are connected by boundary zones. A barrier is defined as a boundary zone, which offers resistance to locomotion. Resistance is the measure of strength of the barrier and varies between zero and infinity (Lewin, 1936, 123ff). Resistance varies between total block, locomotion is impossible, and friction, movement is difficult, but possible, and varies in **degree and quality** which depends on five factors. a) Resistance is different for different kinds of locomotion. Resistance is a relational concept. It is not characteristic of the barrier, rather a characteristic of the locomotion and the barrier. Different kinds of locomotion encounter different resistance at the same barrier. b) Resistance is different for different directions of locomotion. The strength of a barrier may be higher for a locomotion from one side than from the other side. c) Resistance is different at different points of the barrier (Lewin, 1936, 217). Barriers are homogenous or differentiated. A homogenous barrier is equally resistant at each point of attack, while a differentiated barrier offers variable resistance at different points of attack. d) Resistance varies with the strength of the forces for change. Lewin invokes the physical principle of action=reaction. The stronger the forces for change, the stronger are the restraining forces. e) Resistance is highest at an impassable barrier. An impassable region is an 'unmapped' and unqualified region. That region between the person and the goal region is unknown and cannot be used as a medium of locomotion (ibidem, 130ff). An impassable barrier only takes a restraining force if there is an active force for change.

A barrier offers different **qualities of resistance** depending on the fluidity and elasticity of the whole structure of the life space (Lewin, 1936, 159ff), on its character as a thing or medium, and on the level of the balance of forces. Low fluidity of a structure corresponds to high resistance, high elasticity of a region corresponds to high resistance. Low plasticity of the structure corresponds to high resistance to change. Two types of resistance can be identified within these dimensions. Firstly, **High fluidity, high elasticity resistance**: Change can easily be induced, but it does not persist in time. The elastic structure swops back to the status quo ante. The fluidity of a situation varies with the present state of the person. For example fatigue produces a fluid person-environment situation. Situations are also very fluid in statu nascendi with high uncertainty and no routines available. Playful situations and dream worlds are more fluid than serious realism (Lewin, 1936, 160). Times of high inflation and revolutionary times are highly fluid situations for the individual. Secondly, **low fluidity, low elasticity resistance**: Change cannot easily be induced because the structure is rigid. It rather breaks down, than yields to the forces of change. Drill, strict regimes of obedience, and routines create person-environment situations with low fluidity.

The quality of resistance depends on the region as **thing or medium** (Heider, 1927). As a thing the region is either a goal region or a barrier. As a barrier it is a source of resistance. The same region perceived as a medium does not offer resistance, but is a medium for locomotion. This points to the importance of perception for resistance. Transforming a thing into a medium is a way of dealing with resistance. Lastly, the quality of resistance depends on the level of the balance of forces. Strong forces for change are countered by equally strong restraining forces at a barrier. Weak forces make a force field of low tension, strong forces make a force field of high tension. The differences in tensions make a different kind of resistance.

Lewin and his colleagues applied this analysis initially to mother-child interaction in a feeding situation: a child supposed to eat spinach. A paradigm of thinking arose from that which is implicitly still present in later studies. The **'feeding of the reluctant eater'** paradigm of resistance to change has three characteristics: Firstly, the goal of change is fixed at the start; secondly, the goal is introduced top-down; thirdly, the changes are regarded as good for the others without their consent.

4.2.2.1 Mother-child interactions

Making a child eat is the original model situation for the field theoretical analysis of resistance to change. It can be shown that the model situation of the 'reluctant eater' was gradually generalized from the mother-child-interaction to wider social issues by Lewin and his colleagues. Lewin's two monographs on field theory (1936 and 1938) contain many examples of psychological situations. The first example is a woman at the factory loom, who is annoyed about her own performance. The example illustrates how the woman's being annoyed cannot be understood from the immediate work situation, but has to be seen in the wider context of her present family situation (Lewin,1936;22). Another example, taken from a German novel (Hans Fallada's novel 'Kleiner Mann, was nun?'), shows how financial constraints and dependencies place barriers and shrink the life space of a person (ibid., 46). The minute differentiation of that small and shrinking world is a means of psychological compensation for the constraints. However, 9 out of 18 examples used in the 'topological psychology' are observations of child behaviour. The choice of examples reflects Lewin's affiliation to the Iowa Child Welfare Research Station. The mother-child interaction, when the child is reluctant to be fed, is the model situation of Lewin's analysis of resistance. Lewin takes the example from a motion picture recoding: (Lewin 1936, 47, 96ff; 1938, 127, 203ff). The mother wants to feed spinach to the small child after having taken him away from the play. The child's life space is dominated by two forces, 'toward play' and 'away from eating'. The mother puts her arm around the child. Mother's interference sets a barrier in the life space of the child, separating the region of play and the region of eating. As the child starts playing on the mother's lap she restricts the movement of the child even further. Thereupon the child begins to struggle and to widen its range of free movement (Lewin, 1936, 47). Later we are told how the mother succeeded in feeding the child by building up, patiently, step by step the 'eating situation': putting the hands on the table, taking the spoon, putting food on the spoon, bringing the spoon halfway to the mouth, bringing it to the mouth, taking the food into the mouth, making him chew and swallow (ibid., 97). Lewin characterizes such situations as quasi-dictatorial, however acknowledging that it is done in service of the needs of child. In Lewin's own formulation:

> 'It seems to me characteristic of this relationship that the mother picks the child up, lays him down, washes him, etc., without asking him. She uses direct bodily force in a dictatorial manner. Thus, the mother controls the infant by her will in a way which is only slightly different from the way in which she controls her own body' (ibid., 179)

The wider social and political significance of such a strategy is expressed by Lewin quite clearly:

> 'One of the most important goals of domestic and foreign politics is to change the space of movement of a single person or of a group. At the same time it is one of the essential means of reaching a political goal. Political struggles as well as struggles between individuals are nearly always struggles over the boundary of the space of free movement' (Lewin,1936; 47)

The 'manipulative' mother-child feeding situation becomes the model for the analysis of resistance and possible strategies to overcome it. Later we find the same situation eating situation exemplifying another strategy: overcome resistance by distraction. The play situation and the eating situation are two overlapping force fields with relative potency. As long as the child tends to play instead of eating the play situation is the more potent one. The mother will now try to increase the potency of the eating situation in order to make the child eating. She does that by involving the child in a conversation. The conversation distracts the child from his tendency towards play, and brings him towards eating. The mother manages to build up a second overlapping force field. In distracting the child the mother alters the situation by reducing the potency of the eating situation, and the relevance of her being a inhibiting force for the playing situation. In consequence the relationship among the inhibiting force 'mother', the positive force toward play, the negative away from eating, and the positive towards conversation shifts, so that the resultant force is directed toward eating (Lewin, 1938; 205). By inducing a new force field the potency of the target field, the inhibiting forces in the target field are reduced and the driving forces toward the goal are relatively strengthened.

Maintaining the high potency of the eating situation can be achieved by power demonstration. It leads to the perception that resistance is hopeless and resistance will then be abandoned (ibid., 206). The capability of maintaining the potency of a force field or the capability of inducing a new force field expresses the Lewin's concept of

power. Power in that sense is a relation between two agents expressed by the different of mutual potential influence: 'a has power over b', means 'a has more power over b, than b has over a'. Power is a potentiality and a matter of mutual perception, and a characteristic of the interaction not of an individual. The 'powerful' person has different power in interaction with other persons. The balance of power is not a power free situation (Graumann, 1986, 86f).

By that time Lewin had described three strategies to overcome resistance to change: restriction the degrees of freedom, distraction and power demonstration. Lewin's analysis however still remains within the mother-child-interaction of feeding the reluctant spinach eater. My elaboration of thesis H4.4 is: The 'feeding the reluctant eater' paradigm can be recognized in many empirical studies that Lewin and his collaborators have conducted. The strategy for overcoming resistance is a) the **gradual restriction of the range of free movement** by building up barriers (physically or morally), b) the building up of an alternative force field by **distraction**, and c) the **demonstration of power** to maintain the relative potency of the target force field.

4.2.2.2 Resistance to forced eating of 'unsalted crackers'

J D Frank, a colleague of Lewin, conducted an intriguing experiment to study ways of producing and overcoming individual resistance in 1934/35, which for some reason were published years later. Frank saw the relevance of this study in representing daily activities of leaders, salespeople, interviewers and child trainers, as need to overcome resistance of other people to their activities as an integral part of their daily jobs (Frank, 1944, 23). However, creating resistance experimentally proved to be difficult. Initial trials with impossible, boring or interrupted tasks proved useless, because the experimental situation engaged participants into an 'implicit contract' to follow the instructions of the experimenter. Only rarely did subjects refuse to finish the tasks until the end of the experiments (ibidem, 23ff). 'Feeding reluctant eater' proved more useful.

49 Cornell college students were asked to eat 12 unsalted soda crackers one at the time, which were laid out in three rows of 12 in a tray. These crackers were similar in form to a common type of crackers, but had an unpleasant taste. Three experimental

conditions were created. In situation I (control group) subjects were informed that the experiment requires eating the crackers. In situation II (challenge at start) subjects were frankly told right at the beginning that they will be made eating 12 crackers by all means. In situation III (challenge after start) subjects were informed as in II but only after they had started to eat crackers together with the experimenter. Resistance was defined as 'refusal to comply with a request, either verbally or behaviourially' (ibid., 23). During the sixth or seventh cracker the instruction was reinforced by adding another 12 crackers into the tray. Resistance was quantified as well as qualified. Conversation and behaviour was recorded by observers, resistance was rated, the time for eating each cracker and the time interval between each cracker was recorded. 'Minimal resistance' was measured by the number of crackers eaten until first refusal. 'Maximal resistance' was measured by the number of crackers eaten until total refusal to go on eating. The challenge immediately at start was most powerful in creating resistance: total refusal was reached by 76% for II and 45% for III, first refusal occurred after an average of 2.5 crackers for II and 6 for III. Only 10% of the control group stopped. The reaction in situation III and situation I was less strong in that order. Women reacted more strongly than men. Average eating time was much longer in II and III than in the control group. French concluded that resistance is easily created in a situation which 'involves submitting to an arbitrary personal demand of someone else, [that] is thereby equivalent to a personal defeat' (ibid., 40).

Eight intervention strategies aimed at creating increased pressures were deployed to make subjects continue eating in case they became reluctant to do so. The strategies included nonverbal and verbal intervention from friendly looking to forcing of cracker into the mouth of subjects. These strategies were classified as 'differentiated' and 'undifferentiated' and were graded in 'persuasion' and 'force'. The differentiated strategy involved the gradual approach of subject by the experimenter and with instructions of action steps from 'take to cracker' to 'please, finish the cracker'. Persuasion consisted of looking and verbal instructions to gain the cooperation of subjects. Persuasion was most effective to make subjects to continue, the differentiated strategy was second, followed by the undifferentiated and force strategy. The effect of persuasion lasted longer than that of force, as 89% of subjects could be persuaded to take more than one additional bite compared to 48% by force. **Force was most**

effective to overcome resistance, when the lower degree of pressure failed, and before total refusal. French summarizes the results in three points: a) higher pressure can induce eating when lower pressure failed, lower pressure after high pressure is ineffective; b) Persuasion is more effective than force. The latter implies defeat and loss of self-respect; c) Persuasion is accomplished best by a stepwise approach, i.e. a differentiated strategy. Under pressure, compliance may become the lesser of two evils, the greater evil being the embarrassment in eye of the experimenter. The loss of self-respect can be prevented by an appeal to favour and cooperation, and by lowering standards half-way through the task.

The qualitative analysis of resistance is most informative. Indications of resistance are verbal refusals, increasing distance from crackers, dawdling, physical fighting, creating a alternative social situation by engaging the experimenter in conversation, negotiating a deal, self-assertions by insisting on marginal issue, being passive and let experimenter feed. Three types of resistance are found: Firstly, '**strong-willed**' resistance is strong and steady from the start and no signs of yielding are shown. Secondly, '**vacillating**' resistance comes and goes, emotional tension is obvious: embarrassment and confusion are shown indicating the conflict between the two tendencies of resisting and yielding. Thirdly, '**disorganized**' resistance shown no understanding of the situation, refusal is weak at times, strong at others, pressure is effective, subject tries to negotiate for water or a cigarette, makes a fuss, overcomplies in the end, denies having been under pressure.

French makes some interesting observations about the internal dynamics of resistance over time. 82% of subjects indicate resistance. **Resistance changes its character over time.** Resistance gains strength when pressures applied by the experimenter are increased. The onset of resistance shifts from between activities to during activities with increasing intensity. First resistance, often rather weak, arises after instructions and in between activity. Later stronger resistance arises during the activity. This is explained by a restructuring of the perceptive field. 'Eating a cracker' is no longer a unit of perception, but is differentiated in many regions. Resistance also shows a tendency to escalate from refusal of mere eating to more preparatory phases of the actions. Initial refusal of eating spreads to total refusal of any suggestion of the experimenter. French explains this phenomenon by the restructured field of the

individual. The subject being angry tensions build up, and the individual learns that whatever the experimenter asks or says, it will always end up in eating (Frank, 1944, 57ff). To summarize the significance of that study of the 'reluctant eater' one can say: Resistance is best overcome by persuasive appeal for cooperation or a favour. The effect of persuasion persists longer than the effect of force. A differentiated strategy is most effective, where the target activity is approached stepwise, so that changes remain always below a threshold of resistance. The resistance is dynamic. It changes its strength in relation to pressure, shifts its point of onset in relation to the activity, and involves a restructuring of the perceptual field according to need states, tensions and learning which can lead to the escalation from partial to total refusal of expectations.

4.2.3 Resistance and the 'counterforces to change'

Social affairs like a group atmosphere, group performance, norms, leadership, discrimination, food habits, social hostility etc. are introduced as '**quasi-stationary equilibria**' of a social force field. Such social events are represented in a 'phase space', which shows these events as a fluctuating process on a stable level. The equilibrium is the results from a balance of forces, the forces of change, which are neutralized by the counterforces to change, the forces of resistance. The phase space shows neighbourhood regions around the equilibrium. Within the neighbourhood region all forces point towards the equilibrium, beyond that region forces point away from it. A **gradient** describes the forces in function of a) the distance from the level of equilibrium and b) of the individual variance among the person of the social field: The greater the distance and the smaller the individual variance the steeper is the gradient of forces. Any attempt to shift the equilibrium meets increasing counterforces until the edge of the neighbour hood region is reached. Beyond that edge the force field shifts onto a new level of equilibrium (ibid., 13ff). This conceptual analysis has a number of consequences: a) The stable social phenomena are as a matter of fact a state of permanent social conflict, the simultaneity of forces for change and of resistance to change. b) Two problems are analytically separated: the forces for change and the forces of resistance. c) It is feasible to identify these forces separately and in their mutual relation: what are these forces and

how long do they neutralize each other? d) For social engineering the basic questions are: how can the counter forces be reduced, the forces for change be strengthened, or both simultaneously, in order to shift the balance of forces in the intended direction to a new level of equilibrium. e) The same level of equilibrium can be the result of two qualitatively different conditions: a balance of weak or strong forces, or social tensions.

The phase space is the method to monitor a social processes with regards to the objectives of the intervention by the social engineer. As any shift of equilibrium generates tension, takes time and more or less persists, all three criteria can be used to evaluate the efficiency and effectiveness of intervention strategies by the change agent. Efficiency refers to the effort per time unit needed for the shift, effectiveness refers to the level of tension after the shift and the persistence of the shift. Lewin uses the cybernetic notion of self-regulating systems for the analysis of social affairs. Social affairs are like **floating ships** (Lewin,1947b, 147; Heims, 1991). The equilibrium in a social system is maintained by negative feedback. Deviations are sensed by sense organs, and forces are mobilized to action organs to reestablish the standard trajectory. Fluctuations are kept within a viable range. Levin does not go into the problems of a smooth or oscillating trajectory of action. The social change activity itself is analyzed as a **goal-seeking system** which steers the 'moving ship' like an external feedback channel. The change agent is oriented towards a goal, initially vague, more clear at a later stage. Plans are made, how to go about to change the client system. In order to be effective, the plans need to be flexible. Only for the first step the decision is final. Planned social change rests on 'sense organs' and 'action organs'. Feedback processes link the goal of change with the 'sense organs' and the 'action organs'. Sense organs stands for methods of fact finding, action organs stands for change activities. Social systems tend to move on a suboptimal level, because the feedback system is based on internal information only. Top down, internal control processes have to be complemented by outside-in processes. Fact finding has to provide information about the outside effects of actions. Such fact finding has to rely on basic social research, including conceptual and mathematical tools (ibidem, 151). Action steps, fact finding (feedback), alterations of plans and decision have to go in several loops, until a sufficient outcome is reached (ibid., 150). This analytic framework is a powerful source for guiding actions. The consequences which arise for social engineering in the sense

of action research are the pragmatics of field theory.

4.2.3.1 Changing food habits

Another of Lewin's studies was concerned with collective food habits and the possibilities of change during the War years (Lewin, 1943)[4] . The studies investigated how, with more efficiency, to make people eat offal such as kidneys, beef heart, sweetbreads, and drink more fresh milk, cod liver oil and orange juice. People in the Iowa Mid-west tended to respond to offal with deep-seated aversions. The commissioning of that study reflects the broader political concern to bring US food habits in line with the constraints of war. The food process is analyzed as a region in a social force field with many conflicting forces: positive like cheap, tasteful, easy to prepare, knowledge that the family likes it; negative like expensive, disagreement about preparation, tasteless, dislike etc. New concepts are introduced such as **food channels** and **gate keepers**. Food travels from the production to the family table through many channels. These channels are characterized by 'gates', points at which the gate keeper decides to buy certain food or not. The gate keeper is the important person in the food channel. Decisions are based on perceptions of 'good' or 'bad' and other believes in considering many different things. The problem of changing food habits of different social groups is reformulated to a) identify the channels of food transformation, b) within these channels to identify the gate keepers, and c) how to change their minds and behaviour most effectively.

In Lewin's study the gate keepers were women laying the family table. In the field experiment the relative effect of the lecturing and group discussions was compared. The economic and health advantages of altered food habits were explained in lectures. Recipes for the preparation of offal were presented. The aim was to arouse the interest of the attending public for 'new delicious dishes'. Group discussions were set up in order to induce housewives to participate in the program. After discussions a group decision was made by raising hands. The follow up of the experiment showed

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[4] These studies were conducted in collaboration with Margaret Mead, the famous anthropologist.

that group discussions among housewives are more effective than persuasive lectures for changing food habits of the family: 3% change for the lectures, and 32% for the group discussion. The ordering of preferences between different dishes remains the same before and after change, and the effect declines with time. Lewin accounts for these differential changes by several forces for change which are induced by the group dynamic: a) group discussions increase the involvement of attendants; b) decisions are closer to action than mere consideration and raise of interest; c) group decisions constitute a standards of behaviour, and the individual is not inclined to deviate; d) social expectations: the group members were informed that at a later stage an inquiry into the food habit will take place to see whether anything has changed or not. This might have induced a norm, that people are supposed to change, once they have attended the program (social desirability effect); and e) Having the technically incompetent moderator seems to be an advantage. Groups had an incompetent moderator with regards to cooking and food matters, while the lecturing audience was confronted by experts (Lewin, 1947c). In this famous study Lewin introduces several new strategies to overcome resistance to change by inducing forces for change: to **identify the channels of communication**; to **identify the gate keepers** and decision makers; to involve these gate keepers in **group discussions** and **group decision making** in order to create involvement for the issue and to create a group standard; to **set expectations for changes** that will be assessed at a later stage, and to have **group discussion moderated by non-experts.**

4.2.3.2 Resistance to new production methods

Another example of studying and overcoming resistance to change are the Harwood studies (Lewin, 1947a, Coch and French, 1948)[5]. Changes in work practices based on time and motion studies and job transfers were frequent. Job attitudes were negative and

[5] The Harwood manufacturing Corporation was a textile firm with 600 employees working at piece rate, 84% women of an average age of 23, in rural Virginia. A.J. Marrow, a student of Lewin, was director at the time. In these studies Lewin takes up his early interest in working life while shifting his focus from improving of the 'consumption value of work' to increasing the 'production value of work' (Lewin, 1920; John, 1989). Van Elteren sees this as a discontinuity of Lewin's outlook under the influence of the American experience (v. Elteren, 1990).

the learning curve after production changes tended to rise slowly. Pre-change standards were often not reached. Productivity was low and the company produced losses at the time. Various different wage systems had not improved the situation by the time (Marrow, 1977, 165). Production output rates fluctuate around a level of equilibrium within a band width, the so called neighbourhood region. By shifting the balance of the forces towards change, it will be possible to shift the level of production higher. A change process goes in three steps: to **unfreeze** the equilibrium, to **move** the level of equilibrium, to **refreeze** it. Lewin contemplates two strategies for moving: either **increasing the forces** for change or **decreasing the resistance forces.** The former results in a high tension in the system, which is not desirable. In the context of work groups this may lead to aggression, emotionality and non-constructive criticism, ultimately to industrial action. Lewin argues that reducing the counterforces is the way forward. This is done by means of group discussion and group decision (Lewin, 1947a and 1947c) The question arises: how is that done most effectively ?

Coch and French (1948) conducted an often cited experiment illustrating the force field analysis. The procedure includes: to identify the target variables in a phase space, to identify the forces for change and the forces of resistance, testing the most efficient way of reducing the forces of resistance. The target variable are group production rates. The driving forces of group productivity are: standard level of aspiration given by management[6], group cohesion and group pressure towards that level, inter-group competition, and positive attitudes towards management. The forces of resistance are: job difficulty, frustration because the group target is not reached and people do not reach the level of pay as expected, restrictive group standards enforced by group pressure, negative attitudes to management, scape goating of those deviating from the group standard. As consequences of high tension between the forces, high turnover, absenteeism and aggression toward management are observed. The study tested the relation between resistance to change, defined by the rate of recovery after the changes, and the degree of worker participation. The four group experimental design varied the 'degree of democratic procedures' (ibid., 520) as shown in table 4.3.

[6] The level of aspiration is set initially by the management. This target is assumed to be accepted by the group because low pay is not desirable, low status and failure to reach the target tended to be avoided because of group competition, and job insecurity might arise from not reaching the target.

The control group was informed by the time study man about the necessary changes and a new target was set by management (control group). Group I was informed about the necessary changes, an initial group meeting was held to discuss problems which the group could not solve, management was then suggesting a plan for change, no formal decision was made, special operators were delegated for special training in meetings (participation by delegation). Group II and III were smaller than group I, they were informed as the others, group meetings were held to discuss matters, all members received special training a plan was presented and many suggestions for altering the work procedures were recorded from these groups. No formal decision was reached (full participation). Daily records of individual performance was kept and the ranking of production groups was publicly displayed.

Table 4.3: ordinal degrees of participation

control no participation	group I representation	group II and III 'full participation'
n=18	n=13	n=8 n=7
Info	info	info
Target set	target set	target set
Group meeting	group discuss meetings	group discussions all group meetings
	delegation	all operators in training
		many suggestions recorded
		'intimate atmosphere'
Go decision	no decision	no formal decision

The effect of these different group situation are shown in the differential recovery rate of the learning curve after the introduction of the changes. The production rate of all groups fell immediately after the changes were introduced. The performance of the control group never recovered to the level before the changes. The performance of group I recovered slowly (14 days) and went beyond the initial level. The performance of groups II and III recovered rapidly (3 days) and remained fairly stable on a higher level (after 12 days). After the experiment the control group was treated in the same way as groups II and III. They reached a higher level than before within 7 days. The

variance of all groups decreased after the changes; an effect of group cohesion under competition. The turnover in the experimental groups was lower than in the control group. These results established the **functional relation between participation and resistance**: the higher the degree of participation, the lower is resistance to change. They concluded that participation is an effective management method to overcome resistance. Participation reduces and modifies the forces of resistance, and a the same time reduces costly turnover. The participation strategy includes group meetings to inform about impending changes, to stimulate suggestions in group discussion for implementing changes, and to up an incentive system for the new target.

Later attempts to replicate restrict the context under which the results are valid. It was shown that in the Norwegian and US context situational and personal factors influence the outcome of participation: perception of right or wrong to participate in decisions (legitimacy), management credibility, importance of area of decision making, relevance of effects (French et al. 1960), psychological independence and tolerance for ambiguity (Vroom, 1960). For independent people and people with high tolerance for ambiguity, participation tends to have stronger effects in the expected direction. Juralewicz (1974) has shown that in the Puerto Rican context the relation between resistance to change and participation takes an inverted-U relation, medium degree being most favourable for performance. Comparing with other results he concludes that the relation of participation and resistance is mediated by the **cultural context**. Similarly TenHorn (1989) reports 10 Dutch case studies on office automation, where participation is not enacted or resistance is not reported[7]. He accounts for the absence of resistance by an organisational culture in Holland that has significantly changed. Flat hierarchies, flexible structures, and the absence of job threats are widespread in the service sector. Changes in work procedures are a feature of daily life. He concludes, that the linear and inverted relation between participation and resistance is contingent to a rigid and bureaucratic culture. Taylorist organisations of the manufacturing industry are of that kind. In that sense the Coch and French results are still valid, although in specific organisational contexts. Methodological criticism of the study of Coch and

[7] This might also reflect a measurement problem.TenHorn assumes that the sensitivity of the resistance measure was equal in all 10 cases. However, he acknowledges that the definition of the concept of resistance was 'operationalized rather generally'. Minor cases of resistance were not reported in the publications of the case studies (ten Horn, 1989, 9/ and personal communication, April, 1989)

French has been voiced. The single case study provides no basis for generalization because no sampling procedure and inferential statistics was used. The field experiment is bound to be inconclusive. The variance in production rates cannot be attributed to participation only because uncontrolled variables may explain the differences between the experimental groups: different group size, kinds of information, group competition, type of activities involved, kinds of training received, industrial conflict. A more rigorous analysis of variance is necessary (Gardner, 1977; Bartlem and Locke, 1981). The Coch and French study and its later criticism show one of the limitations of field theory. Being a metatheory it provides a way of structuring the discussion of a problem, i.e. resistance to change. The identification of the relevant forces in the force field, however, has to rely on some additional theory. The kind of forces invoked by Coch and French are arbitrary or are based on earlier studies. As such they reflect the early stage of the Lewin's program in describing the social force field. In the light of later interpretations they seem rather incomplete. As such the study can be seen a an early attempt to map the field applying method of gradual approximation to the actual situation (Lewin, 1931, 265). The stimulating effect, which this study had, does justice to the Lewinian approach.

4.2.4 Summary: ways of overcoming resistance to change

What are the lessons for the change agent which Lewin and his colleagues draw from his analysis ? Various strategies to overcome resistance to change can be identified within the three Lewinian steps of **unfreeze, move and refreeze**. The persistent goal is to overcome the 'reluctant eater', be it an individual person or a social group from the point of view of the interested observer. Phenomenologically resistance itself is dynamic. It changes its strength in relation to counterpressure, shifts its point of onset in relation to the activity, and involves a restructuring of the perceptual field according to need states, tensions and learning which can lead to the escalation from partial to total refusal of expectations. Lewin summarizes his lesson in overcoming resistance in three steps: unfreezing, moving and refreezing as shown in table 4.4.

Table 4.4: Lewin's strategies to overcome resistance

Unfreezing: make the situation fluid
1. Identify the channels of communication;
2. Identify the gate-keepers and decision makers.
3. Involve these gate-keepers in group discussions.
4. Confuse the situation: Induce fatigue, dreaming; arrange for a playful situation; induce cognitive uncertainty.
5. Transform a 'thing' into a 'medium' for locomotion: instrumentalizing the unknown barrier region by exploring and mapping it.
6. Gradual restriction of options by building up barriers (physically or morally)
Moving: shift to a new standard
7. Move by increasing the forces for change, until the barrier brakes down: create need for change; a persuasive appeal for cooperation or a favour. The effect of persuasion persists longer than the effect of force.
8. Move by reducing the resistance forces by distraction, i.e. building up a second force field with high potency. This will reduce the relative strength of the restraining forces is the first field, and locomotion becomes easier.
9. The demonstration of power to maintain the relative potency of the target force field.
10. Moderation of the group discussion by non-experts.
11. Group discussions and other forms of participation to create involvement and commitment.
12. Group decision making in order to create commitment to a new group standard.
13. A differentiated strategy is most effective, where the target activity is approached stepwise, so that changes remain always below a threshold of resistance.
Refreezing: stabilizing the new level of equilibrium
14. to set expectations: announce that the changes will be assessed in a follow-up.

4.2.5 Recent echoes of field theory

Lewin's analysis of resistance to change in forces for and against change is present in many, even very recent, texts in organisational psychology; often more implicit than explicit. Watson (1971) interprets the 'institutional lag' in the context of accelerating

technological change in industrialized countries. He groups the forces of resistance in personality and systemic forces. On the level of personality he identifies complacency, habits, the effect of primary experiences, selective perception and retention, dependence on authorities, illusory impotence, norms and superegos, deprivation and anxiety. On the social level he identifies conformity to norms, cultural cohesion, areas of the sacrosanct, rejection of outsiders, affluence and leeway, restricted communication as forces of resistance. Such forces are part of a homeostatic system which tends to mitigate changes into temporary disturbances.

Staw (1982) shows how commitment to a task or an idea can be strengthened under conditions of failure. That dynamic is a major counter force to change in organisations. Behaviour patterns or a course of action persist, even intensify as a result of negative outcomes. The need to justify previous decisions, the norm of consistency, and the expectation of valuable outcomes in the future fosters the individual and collective commitment. This can lead to escalations in a misleading cycle of action. Staw recommends outsider advice, decreased accountability, and rotation of staff as measures to overcome resistance.

Greif (1983, 211 and 267) locates resistance mainly on the lower levels of the organisational hierarchy. Resistance can be individual and collective. Individual resistance is a function of social support and negative occupational attitudes. Collective resistance to change is a function of many variables: segmenting of the labour market, low social status, relative deprivation, collective activation, negative occupational attitude, social support, group norms.

Bate and Child (1987) echo field theory in their analysis of organisations in transition, although no reference is given. Under the heading of 'pressures for change' and 'resistance to change' they compare the dynamics of organizational change, the agents, their rational and the methods on an international basis. Resistances can be rooted in structures, ideologies, attitudes and behaviour patterns.

Force field analysis is recommended by Willcocks and Mason (1987, 38) to deal with the problems of implementing computing at work. They grade the forces for change and of resistance in high, medium and low. In their example the forces for change are support for IT initiative, rising number of clients, data protection legislation, publicity of system failures, approved budget, job guarantee. Restraining forces are

volatile political coalitions in the organisation, uncertainty about senior and middle management, suspicious trade unions, lack of experience with IT.

Smither (1988, 263f) describes five forces which constitute barriers to organizational change: disruption of personal relationships, perceived threats to status, preference for status quo, threat of job losses, problems with change agents.

4.2.6 A critique of Field theory

Resistance is seen primarily as a **motivation problem**. By showing that a group situation can be manipulated, resistance becomes a **management problem**. Resistance can be handled (Coch and French, 1948, 516). Resistance is analyzed on two levels: on the level of resistant forces and on the level of outcome in terms of the group performance. The latter is the outcome of a balance of forces. Resistance is operationalized by the slope of the learning curve after the introduction of changes in work procedures. The steeper the slopes, i.e. the greater the change per time unit, the lower the resistance. The learning curve is interpreted as an expression of the motivation of workers in the work situation. The characteristics of **'feeding the reluctant eater'** clearly shows in the study of Coch and French: The goal of change is fixed at start and introduced top-down; the changes are regarded as good for the others without their consent. The management is setting the production targets and the timing of the changes. The contribution from bottom-up is restricted to making a number of suggestions about details of the changes within a preset frame in terms of 'what' and 'when' of changes. This leads to political criticism of the whole approach as being 'manipulative' and a form 'social engineering' in a bad sense. The label 'democratic' is just an euphemism, which may reflect naive intentions, but actually disguises management interest and undermines workers interests. The important ethical and political idea of participation is reduced to an instrument of management (Graebner, 1986; Rose, 1988, 175f; vanElteren, 1990). Whatever one's stance in that political debate may be, the critique draws attention to the dangers involved in Lewin's approach. Lewin can be defended by his intention to describe 'value free' the social situation and the techniques available for change. His psychological contribution to

social science has to be judged in that context. The way it is put to use is a matter of ethics (Lewin, 1920). The **tool character of field theory** has to be judged by its use, its deficiencies and by its fruitfulness. Its fruitfulness is historically well proven. Its deficiency lies in its methodological underestimation of human freedom, the person is lawfully determined by the situation, that is the present retention of his or her past.

Within the context of a theory of social planning by feedback control, field theory gains the character of a tool in the hand of the change agent. The change agent is an observer of the social field. Field theory becomes a way of construing the other person life situation and the social group, so that the intervention according to some goal of social planning can be accomplished successfully. The open landscape of the social situation becomes an ordered field under the eyes of the observer/actor, whose conceptual tools and methods of data collection impose that order for pragmatic reasons. Field theory is a **form of discourse of the interested change agency**. The legitimacy of their interest is a moral and ethical matter. Lewin's position was clear: a social scientist has to improve the working of democracy by 'efficient forms of democratic social management .. without his becoming a servant of vested interests', this includes awareness of power and courage defined as 'wisdom in the face of danger' (ibid., 153).

Field theory is inadequate for the treatment of resistance to change in several respects. Firstly, Field theoretical analysis is built on a physical analogy, 'the field of forces', and it alludes to the military 'battle field' as root metaphor of social analysis. Individual and social conflict are omnipresent, represented in the balance of forces. The solution of conflicts seem to be a null-sum game. The territory the one side wins, the other loses. The creative significance and function of conflicts for the social system cannot be described in that framework. Secondly, the model of the 'reluctant eater' is 'matronizing' and morally unacceptable in most social situations. Thirdly, resistance is not necessarily a force that needs to be overcome by the change agent, the more efficiently the better. An information processing analysis of resistance can show its functional content for the whole process of change. Fourthly, the initial phenomenological impetus of field theory (Lewin, 1936; Frank, 1944) got lost in the analysis of the social field. The phenomenological complexity of resistance is reduced by operationalizing resistance in a single variables, the rate of change (Lewin, 1947b; Coch and French, 1948). Thesis H4.5 is supported. Fifthly, the functional relationship

between participation and resistance is problematic. Participation does not necessarily reduce resistance, and no resistance does not indicate a form participatory organisation. Participation can be the very condition of resistance. Participation and resistance are more independent process characteristics than assumed (TenHorn, 1989).

4.3 Summary on resistance in the organisational literature

Five theses on the treatment of 'resistance to change' in the organisational literature have been discussed. Mostly resistance is studied as a dependent variables (H4.3). Types of actors, perspectives of the change agency, objects of resistance, conditions and various manifestations of resistance are analyzed. An outcome of resistance that is mentioned, but more often merely assumed, is the failure of organisational change. Resistance seems to explain failures. Resistance has news value as bad news about projects (H4.1). From the perspective of the change agent, resistance is mostly a danger, a threat, and on the whole **a negative event** (H4.1). However, the same pattern of behaviour is called resistance in the light of projected changes; in the light of continuity it is called perseverance and commitment. Most of the time resistance has been associated with lower levels of the organisational hierarchy. The emergence of IT seems to have changed that. Resistance has become an issues on all levels. Technology per se or social consequences; change per se or particular trajectories of change; goals, means, frames of mind and interactions of the change agency, social control and restrictions of freedom have been discussed as possible objects of resistance. Conditions of resistance often refer to deficient characteristics of the actor system, although not always (H4.2 qualified). Psychological traits such as neuroticism, anxiety, rigidity, and organisational conditions such as vested interests, bureaucratic structures, and the 'British disease' allude to a deficiency in the resistant system. The notions of a broken psychological contract, inoculation against persuasion, and informal structures, and 'will to resist' do not refer to deficit characteristics. Deficit and non-deficit concepts can be found. H4.2 has to be qualified.

The legal discussion on the 'right of resistance' demarcates resistance from opposition. Resistance is counteraction outside the legal boundaries. It is risky

behaviour. It is justifiable because existing institutions are never perfect with regard to higher values. Most of the time there are reasons for legitimate resistance. Resistance can come from a position of power or from a position without power. Resistance is not a form of power, but an action which defines the boundaries of power and of what is possible, without determining the details of the game. The military discussion of resistance shows its fundamental strength. With equal means for attack and resistance, waiting, retreat and small counteractions are always stronger because of the familiarity with the territory. The change agent is an obstacle for himself depleting his resources before the target is reached.

Lewinian field theory was chosen for exemplary analysis. Field theory is still very influential in social and organisational psychology. Field theory is an unfinished research program that progresses from the analysis of individual situations (field-at-a-given-time) to social situations (quasi-stable-equilibrium). Structural and historical explanations are differentiated. 'Structural' means the totality of simultaneous facts; 'historical' refers to the origin of structures. Behaviour and experience are dynamic towards a state of equilibrium, a concepts that is assimilated to the notion of the 'good gestalt'. Tension and conflict are states of affairs that give direction. Resistance is analyzed as 'barriers to locomotion' for individual situations or 'counterforces to change' for social situations. The quality and intensity of resistance depends on (a) the barrier, (b) the location of the forces for change, (c) the elasticity and fluidity of the whole field, and d) the strength of the forces for change. Resistance is a systemic characteristic. Field theory provides a framework from and against which conceptual development can grow dialectically. Good theory is practical as far as it goes beyond common sense. It can be shown that the notion of 'dynamic equilibrium' links field theory to cybernetics and open systems theory conceptually as well as historically (Heims, 1991, 201ff). Systems thinking forms the basis of my own concept of resistance as a self-monitoring subsystem of technical and organisational progress, which will be developed in part III.

Studies of mother-child interaction have been the model for the analysis of resistance in what I call the paradigm of 'feeding the reluctant eater' (H4.4). This Lewinian type of benevolent social engineering is well intended, but unacceptable in many respects: the changes are regarded as 'good' for the system without consultation;

the goal of locomotion is fixed beforehand; the goal of change is given top-down rather than by negotiation; the procedure is flexible, but its goal is determined. We find this paradigm implicit in all Lewinian studies: feeding the child, Frank's experiments on forced eating, changing food habits, and the Harwood industrial experiments. Resistance is a motivational problem that needs adequate management to handle it. Although resistance is not necessarily deficient (H4.2 needs qualification), it is negative from the point of view of the change agent (H4.1) and needs to be overcome, and resistance is a dependent variable (H4.3). Lewinian strategies to overcome resistance first increase the 'fluidity of the whole situation', and secondly weaken the forces of resistance with a mix of tactics: identifying the channels and gatekeepers of communication, inducing group discussions, confusing the situation, transforming 'things' into 'media', gradually restricting options, appealing for co-operation and favours, distracting from the central issues, demonstrations of power, group moderation by non-experts, creating commitment by group discussions, setting expectations for concrete changes. Field theory is a tool in the hand and a form of discourse of the interested change agency. The system is observed by an observer. The reluctant eater paradigm, albeit well intended, is **'matronizing'** and inadequate in many situations. A cognitive and informational analysis of resistance will show its creative and functional value for the change process. An important aspect which is lost in the motivational approach. Resistance is not a nuisance in every case. Studying resistance only as dependent variable will divert us from asking the right questions. The study of effects of resistance must be an empirical question and not a conceptually closed issue. An alternative concept is needed that focuses more on phenomenology and the consequences of resistance to organisational change. The phenomenological impetus of early field theory got lost in later years. Resistance is reduced to a single effect: the time delay of changes (H4.5).

From earlier, pre-war studies of resistance we gain important insights into the phenomenon: **resistance itself is dynamic**. Such process structures have been described by Frank: strong-willed, vacillating, disorganized and escalating resistance. These are process structures worth further study. Forms of resistance have been distinguished as a quality of the force field. Under conditions of high fluidity/high elasticity, change can easily be induced, but is not persistent. Under low fluidity/low elasticity change is hard

to induce and the system is likely to break down rather than to change. Other forms of classification of resistance are built on **simple dichotomies** such as individual/collective, active/passive, violent/peaceful, planned/spontaneous, self-conscious/non-conscious. From these five dichotomies 32 theoretical forms of resistance arise by simple combination.

In summary, all five theses are supported by the evidence. (H4.1) Resistance is mostly seen as negative in causal association with delays and failures of organisational change. An exception is the legal discussion of the 'right of resistance' and military theory on strategies of defence. (H4.3) Resistance is nearly always the dependent variable. The relation to organisational failure is an assumption rather than a empirical fact. (H4.4) 'Feeding the reluctant eater' is the persistent paradigm of Lewinian analysis of resistance. (H4.5) The phenomenology of resistance is historically more and more neglected in a progressively pragmatic context. Thesis H4.2 on the deficit concept has to be qualified. The deficit concept of resistance seem to be as prominent as non-deficit concepts. However, the relative salience of deficit concepts among change agents is an empirical question. Part II explores empirically the semantics of resistance among management trainees and future change agents and is a step in that direction.

Part II

A Preliminary Semantic Study

5. The Semantics of 'Resistance to Change'

Rather than looking up the term 'resistance' in various lexica and thesauri, I undertook a small empirical study on the semantics of 'resistance to change' among a specific group of people, which is of relevance to the present study. Semantic differential data and free association data was collected among 388 management trainees in Switzerland, the UK, and the USA[1]. The data allows us to test the hypothesis of the negative connotation of 'resistance' among change agents, and to contrast differences between the language communities within that framework.

5.1. The Relevance of a Study of Semantics

Social science vocabulary, drawing upon common language is inevitably value loaded (Gould, 1963). 'Resistance to change' is the key term of this thesis. In using that term I am confronted with the common sense meaning of the term. The semantic analysis explores the various connotations of 'resistance'. When a technical term is defined for a specific context, its meaning, compared to the common-sense definition, is at the same time both restricted and extended. Definitions are explicating, by turning vague terms into unambiguous terms, i.e. turning unspecified differences into specified ones (Lachenmeyer, 1971). Explicating involves three steps: (a) surveying of the use of the term in literature and common usage and showing the implicit assumptions which underlie different usages; (b) specifying the semantic context in which terms can be used; and (c) providing empirical data to which the term refers. In a given context of time and space the meaning of a term (T) is made up of two subsets of connotations: items that are shared in common and technical language (D), and the residuals (R) which belong to one or the other area only. The meaning of a technical term is context specific. Its common sense meaning comprises several contexts. The meaning of a term arises from its context of use: in this case I am interested in the meaning of 'resistance

[1] I should like to thank for giving me the opportunity to collect the data and for giving me their assistance: Rolf Wunderer, Rene Dubacher (HSG St Gallen), Daniel Waeber (IAP ETH Zurich), Frank Land (LBS, London), David Guest and Ricardo Peccei (LSE), Frieda Ammann Bauer (St Gallen), and Charlene Dykman (Houston Baptist University).

to change' in the context of organisational change. Other contexts might be psychotherapy, physics, politics or the military. The transfer of a term from one context to another constitutes metaphorical use, i.e. a method of gaining new insights by presenting the unfamiliar in terms of the familiar. In order to avoid misunderstandings and to demarcate the technical from the common usage, it is instrumental to know more about the common sense meaning of 'resistance to change'. Common sense often assimilates 'to be conservative' and 'to be resistant to change'. The similarity and dissimilarity of these two terms is used to contrast the meaning of 'resistance to change' explicitly. I use these semantic differential technique and a free association among a group of organisational change agents[2]. The study is explorative and compares data from Switzerland, Great Britain and North America, as cultural differences may significantly influence the meaning of resistance to change.

5.2. The methods of comparison

The data was collected by a self-completion questionnaires in a German and English version. It included a free association, and two semantic differentials, one for 'resistance to change' and one for 'to be conservative', and questions about nationality, sex, age, and professional status (see appendix). The completion of the questionnaire took about 15 minutes. Before completing the questionnaire respondents were informed briefly about the study (see appendix 5 for the questionnaire).

The semantic differential

The meaning of the term 'resistance' can be differentiated in its denotation and its connotation. The denotation is that culturally defined unit of the stream of events to which the term refers: 'resistance' refers to whatever event a certain language can assigns to it. Units can be the same in different contexts although they are identified by

[2] A **change agent** is defined as a person, who is professionally responsible for initiation, steering and/or controlling of change processes in organisations, most likely being in managerial position. He or she may be actually on the job or in specialist training for such a job. The change agent community includes all people of the managerial world as well as the institutions which provide the training for it, e.g. business schools.

different terms: 'Widerstand' in German, 'resistenza' in Italian, 'resistance' in French may refer to the same event. By connotation every term is associated with a chain of other terms. Every cultural unit refers to other cultural units which in turn refer to other units .. ad infinitum. Different languages are likely to produce different chains of connotations to historically similar term. Connotations qualify the denotation of a term. They form systems which can be analyzed as implicit ideologies about 'resistance'. Such a system of meaning is open and in permanent flux. The analysis freezes the state of affairs for a practical reasons, only. Any analysis is just another contribution to that open process of meaning. The denotation is a function of the connotations. The connotations constrain what the term can stand for, and which qualities of the signified event are highlighted, perceived and will be acted upon (Eco, 1977, 182). Osgood and his colleagues developed the technique of the semantic differential in the 1950s (Osgood, Suci and Tannenbaum, 1957; Osgood, 1971). Eco (1972, 110) defines the SD as the 'degree of institutionalised emotional connotation' of a term. By using group averages the meaning is assessed for an average hypothetical group member. The SD does measure neither the total meaning of 'resistance' nor the meaning for an individual. It assesses only one kind of connotations, and does that in an aggregate manner and for a generalized situation. The SD characterizes the stabilized emotional connotations in form of a group aggregate. In the SD respondents are presented with nouns or noun construction-that refer to concrete or abstract things or events. The respondents are asked to rate the truth value of propositions like 'A is x, not y' using a polar scale for gradual answers. X and Y are possible connotations. X and Y are qualifiers of the term. Respondents quantify the qualifiers to a term. They do that according to their experience with the event or object in question. The emotional connotation of a term is represented either a) in semantic profile or b) as a point in the semantic space in a certain distance from another concept. This technique allows to identify different meanings of the same term (emotional homonyms), or different terms with similar emotional connotations (emotional synonyms).

The Osgood research program (1969 and 1971) postulates a universal space of emotional meaning with three dimensions: evaluation (E), activity (A), potency (P). Any term can be represented as an endpoint of a vector in three-dimensional space. This componential model of meaning is based on factor analysis. The universality of

the dimensions claims empirical and theoretical evidence. Osgood follows Wundt according to whom emotions vary in three dimensions: pleasure-tension-excitement. Similar threefold classifications of meaning have been proposed by others and seem to map on each other as shown in table 5.1. Caroll (1959) identifies the three dimensions of behaviour in general: direction of behaviour (approach-avoidance), the behaviourial strength, and its frequency rate. Etkin (1979) reviews the evidence from the point of view of activity theory and identifies the dimensions as 'Evaluation', 'Space' (potency), and 'dynamic, time' (activity). All that points to the importance of emotions in every day life, as well as the relation of meaning to future and ongoing activity.

Table 5.1: The Osgood space of emotional meaning

	factor 1	factor 2	factor 3
Osgood et al.(1957)	Evaluation	Potency	Activity
Wundt (1910)	pleasure	tension	excitement
Caroll (1959)	approach-avoid	strength	rate
Etkin (1979)	evaluation	space	time

Empirical evidence is given in Osgood's (1971) cross-cultural studies. The evaluation dimension is not sensitive to cultural differences. Different cultures, however, make a difference in the dimensions 'activity' and 'potency' of many concepts. Hoermann summarizes the Osgood research program after weighting the evidence: 'E, P and A are those dimensions of meaning that have more ground than any other to be regarded as universals of language.....' (Hoermann, 1981, 55).

In designing a SD a number of option arise: to chose the concepts, to use a standard or specific set of polarities, the number of scales, different formats for the polarities. Two concepts have been chosen to contrast and to test the some hypothesis: 'resistance to change' ('Widerstand gegen Veraenderung' in German) and 'to be conservative' ('konservativ sein' in German). A specific set of polarities was developed. Five randomly chosen people at the LSE, Department of Social Psychology, chose 25

relevant polar attributes out of 75 that are listed by Snyder and Osgood (1959). Those 25 polarities which were mentioned more than once were then chosen for the SD profile. The 7-point rating scales were randomly orientated and in ordered, and were anchored at the endpoints (see appendix 5). For the data analysis the profiles of medians are plotted and the Osgood distance measure was calculated. Factor analysis, t-tests and analysis of variance are used to test for groups differences. Standard factor scores are the dependent variables for each stimulus.

Free associations

Each respondent was asked to write down a minimum of 5 associations to the term 'resistance to change'. These associations are categorized according to the valuation which they convey. The valuation is either implicit and judged by the rater, or explicit. In that case the rater considers linguistic markers like prefixes as 'un-' 'dis-' 'mis-' or 'lack of ....' etc. Four categories of valuation are used: positive, neutral, negative, deficiency. The inter-coder reliability is R=.68[3]. The distinction between negative and deficient is made to test the hypotheses, that 'resistance' is a deficit concept. The German and English distribution of free associations are compared by using the Chi-square statistics.

The sample and the variables

The target population are organisational change agents (see footnote 1). The change agents reached in this unsystematic sample are people in post-graduate business and organisational training. Five training institutions in GB (2), the US (1) and Switzerland (2) were reached between June 1988 and January 1990 (see appendix 5 for details). The sample includes people with professional practice. Assuming that teaching and training at these institutions is based on accumulated experience and reflected practice, the results might well reflect people who are confronted with state of the art knowledge on resistance to change. The size of the sample is n = 388. The average age was 25 years, ranging from 19 to 55 years; 66% male, 34% female. Respondents filled in either a

[3] The inter-coder reliability is measured as agreement between two coders. The reliability index is CR=2xCA/n1+n2 (Holsti, 1969, 140). The recoding was done on first sight coding without any training. I thank Angela Stathopoulou for the help.

English (65%) or a German (35%) questionnaire. This defines the dummy variable 'language'. The sample is a mixture of nationalities. The variable 'nation' identifies respondents as either British (30%), Swiss (32%), North American (15%) or others (23%). In order to test the effect of the experience of change agency on the connotation of 'resistance to change' An extreme group comparison was conducted. Implementers or non-implementers define the dichotomous variable 'change agency'. 'Non-implementers' (n=53; 13.7%) are less likely to enact and to reflect upon organisational change than do 'implementers' (n=95; 24.1%).

Table 5.2: The independent, dependent and mediator variables

stimulus	mediators	dependent variable
resistance to change to be conservative	nation language change agency	SD standard scores
resistance to change	language	free association

The three variables language, nation and change agency are the independent variables to account for variance the dependent variable: the standard factor scores, a mean m = 0 and standard deviation s = 1, for the SD connotations of 'resistance to change' and 'to be conservative' and free associations as shown in table 5.2.

5.3 Hypotheses

In the organisational literature a deficit concept of 'resistance to change' prevails, that is often based on a Lewinian framework as has been shown in chapter 4. A deficit concept of resistance correlates with a negative attributes and is expressed in qualifiers like 'a lack of...','wrong, poor, bad or negative'. Change agents endorse a deficit concept of resistance with which they are confronted in their training. In their practice they make sense of it in the light of that very training. One can assume a self-

reinforcing cycle of conceptualization and selective perception. Thus a negative valuation of 'resistance' is likely to be found among trained change agents. The first four hypotheses are as follows:

H5.1a: 'Resistance to change' connotes mainly negatively.

H5.1b: 'Resistance to change' is a deficit concept.

H5.2a: The negative connotation of 'resistance to change' is consensual.

H5.2b: 'Resistance to change' is a deficit concept in German as well as in English.

Petzold (1981, 36) alludes to the collective experience of the second world war which is reflected in the meaning of the term 'resistance'. The mobilization of resistance against Fascism during the 1930s and 1940s was different across countries. Its relevance for the post-war national identity is different as well. The stronger the Resistance movement during the war, and the more salient that movement is for the post-war national identity, the more positive is the connotation of the term 'resistance' in post-war common language. I propose the following ranking: In Switzerland, surrounded by enemies, the spirit of resistance was probably stronger than in Britain, protected by insular geography and very local warfare from the air (Bogdanor, 1988). In Britain the spirit was probably stronger than in North America, because of the immediate territorial threat. Based on that one would expect an ordered series of negative connotations across these nations. This leads to the third and fourth hypotheses, H5.3 and H5.4:

H5.3: Swiss German connotes 'resistance' less negatively than English.

H5.4: 'Resistance' connotes less negatively for the Swiss than it does for the British, for the British less negatively than it does for the North Americans.

In the 1980s social change has been introduced by capital-C-Conservative governments in Britain (Thatcherism) and the USA (Reaganism), while in Switzerland the same centre-right coalition has governed since 1959 without introducing major changes (Bogdanor, 1988). 'To be conservative' is more likely correlated with pushing for social change. 'To be conservative' is less similar to 'resistance to change' in the Anglo-Saxon World (GB and North America) than in Switzerland. In the Anglo-Saxon world of the 1980s 'to be conservative' connotes social change, while for Switzerland it means 'no change'.

This leads to the fifth hypothesis, H5.5:

> **H5.5**: 'Resistance to change' and 'to be conservative' connote more similarly for the Swiss than they connote for the British and the North Americans.

As change agents have a bias for change, the connotation of 'to be conservative' must be different in countries with and without that 'conservative revolution' of the 1970s. This lead to the sixth hypothesis, H5.6:

> **H5.6**: 'To be conservative' connotes differently in the Anglo-Saxon context and in the Swiss context.

5.4 Results

The results are presented separately for the semantic profiles, the standards scores of the semantic differentials, and the free associations to 'resistance to change'.

The analysis of semantic profiles

The SD profiles as shown in figures 5.1 allows to test hypothesis H1a. The two profiles for 'resistance to change' and 'to be conservative' show the median of respondents' ratings. 13 of the 25 polarities give a commonsensical positive-negative evaluation. Connotations are either strong (median $<=2$ or median $>=6$) or weak (median $<=3$ or median $>=5$). Six polarities did not deviate from the neutral middle point of the scale. In Figure 5.1 the label given corresponds to the scale value of 1, the opposite is value 7. Hypothesis H5.1a cannot be falsified: 'Resistance to change' connotes mainly negatively. Both concepts connoted strongly negative: 'resistance to change' connotes 13 of 25 polarities, seven of them negative ones, 2 out of 3 strong connotations: (strong) sceptical, **regressive, defensive** and (weak) **unsuccessful, egotistic**, cautious, **constraint,** tenacious, **pessimistic**, intentional, usual, **negative**, inherent. 'To be conservative' connotes 18 of 25 polarities, 9 of them negative ones, 2 out of 3 strong connotations: (strong) cautious, **constraint, regressive** and (weak) **egotistic, insensitive, passive**, sceptical, tenacious, **boring, pessimistic**, intentional, stable, rational, defensive, usual, **negative**, inherent, **bad**. Both concepts share the six negative connotations regressive, constraint, defensive, egotistic, pessimistic, and negative. Regressive is a strong common and negative connotation. A contrast between the two

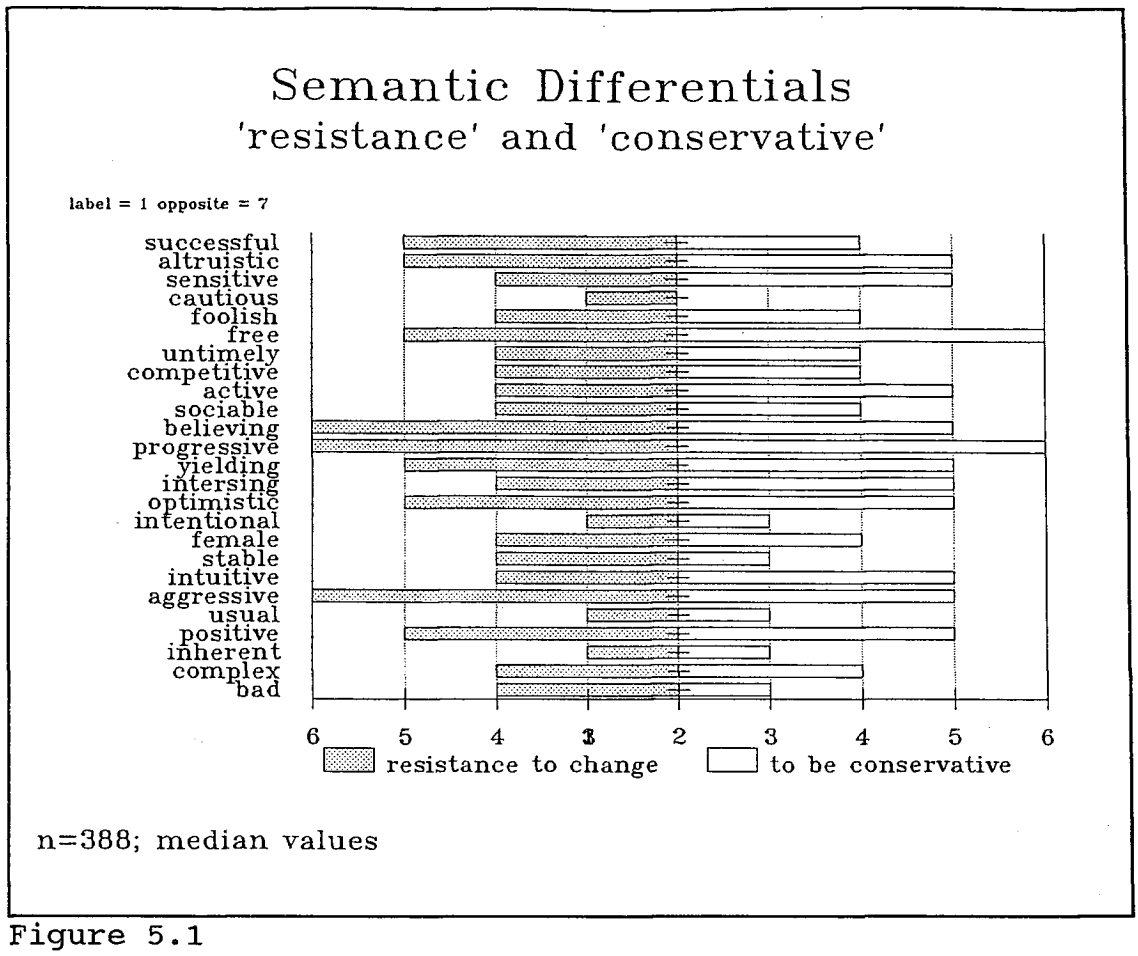


Figure 5.1

concepts is made by 11 attributes. 'To be conservative' is more cautious, constraint, defensive, insensitive, passive, boring, stable, rational, and worse, and less unsuccessful and sceptical than 'resistance to change'. 'Sceptical' and 'cautious' as attributes of resistance shows the ambiguity of the term. This points to the interestingly positive, albeit residual meaning of 'resistance to change'. A functional, positive view of resistance seems to have some ground among of change agents.

Results from the Semantic Differential

A factor analysis[4] produces interpretable 3-factor solutions for each concept. 61% of the total variance of 'resistance' and for 52% for 'to be conservative' are accounted for. The factors are identified by those variables which have factor loadings > .50 as shown in table 5.3.

Table 5.3: The 3-factor solutions

name	Osgood's label	identification
'Resistance to change'		
Resist 1	Evaluation	foolish, **negative, bad,** regressive, untimely, uninteresting, pessimistic
Resist 2	Activity	cautious, defensive, **passive**
Resist 3	?	tenacious, sceptical
'To be conservative'		
Cons 1	Evaluation	**negative, bad,** regressive, foolish, uninteresting, insensitive, egotistic, pessimistic
Cons 2	Activity	**passive,** cooperative, defensive, unsuccessful
Cons 3	Potency	unstable, **unusual,** rash

[4] A Principle Component Analysis was conducted on SPSS/PC for both concepts. Variables with a communality <.30 were not included as they do not covary with other variables and are therefore only noise in the solution. The criterion for the number of factors was 'eigenvalue >1' in both cases. Kaiser-Meyer-Olkin for sampling adequacy is .85 and more, which is a 'meritorious' factorisation (Kaiser, 1974). For 'resistance to change' an **equamax** rotation was chosen, for 'to be conservative' an **oblique** solution. This was done to facilitate the interpretation of the solution. A number of solutions were explored with different extraction, rotation, number of variables in order to optimize among the following criteria: correlations of the factors scores with the predictor variables 'language, change agency, nation', equal grouping of the variables among the factors, Kaiser-Meyer-Olkin index of simplicity, and total explained variance.

Enhanced are those attributes which identify the Osgood dimensions of the semantic space. A high score in Resist1 or Cons1 means that respondents connote the concepts negatively. The comparison with Osgood's semantic space (1971, 33) shows that Resist1 and Cons1 can be identified with the 'Evaluation', Resist2 and Cons2 with 'Activity', but only Cons3 with potency, the status of Resist3 is unclear. I have used a different set of polarities from that used by Osgood in his analysis. Even the more surprising, however, is the degree of coincidence of a three dimensional solution with that Osgood's universal model. Based on that evidence I will henceforth call the factors evaluation, activity and potency of 'resistance' or 'to be conservative' for keeping in mind the reservation for Resist3, which cannot clearly be mapped into Osgood's space. The 3-factor model provides a frame of reference to compare the subgroups of the data sample according to the hypotheses. The second hypothesis **H5.2a** about the consensus among subgroups is tested with a oneway analysis of variance and t-tests of the three factors of 'resistance to change' (resist1 to resist3) across change agency, language and nations. There is no significant difference across nations and change agency. Language makes a difference as shown in figures 5.2. For German speakers 'resistance' is more active and more potent than for English speakers. (more foolish and tenacious, less wise and yielding: resist2/Engl = .12 versus resist2/Germ = -.22/ t = 3.14; p=.002; less cautious and defensive, more rash and aggressive: resist3/Engl = -.11; resist3/Germ = .21 / t = -3.03 ;p=.003[5]). Hypothesis H2a is partly falsified across nation and change agency. Language makes a difference.Hypothesis **H5.3** is falsified with t-tests by language. In Swiss German 'resistance to change' does not connote more negatively than in English usage; i.e. the evaluation factor 'resist1' is not significantly different for German than for English as shown in figure 5.2. Hypothesis **H5.4** is falsified with oneway analysis by nations. The resistance scores do not significantly differ across nations. Respondents see resistance consensually negative. This is supporting evidence for hypothesis **H5.1a:** 'resistance to change' connotes mainly negative. Hypothesis **H5.5** is falsified.

[5] Due to the orientation of the scale a negative factor score represents a more positive evaluation, a more active, and a less potent connotation of the concept. A positive score represents a less positive evaluation, a less active, and a more potent connotation of the concept.

Figure 5.2

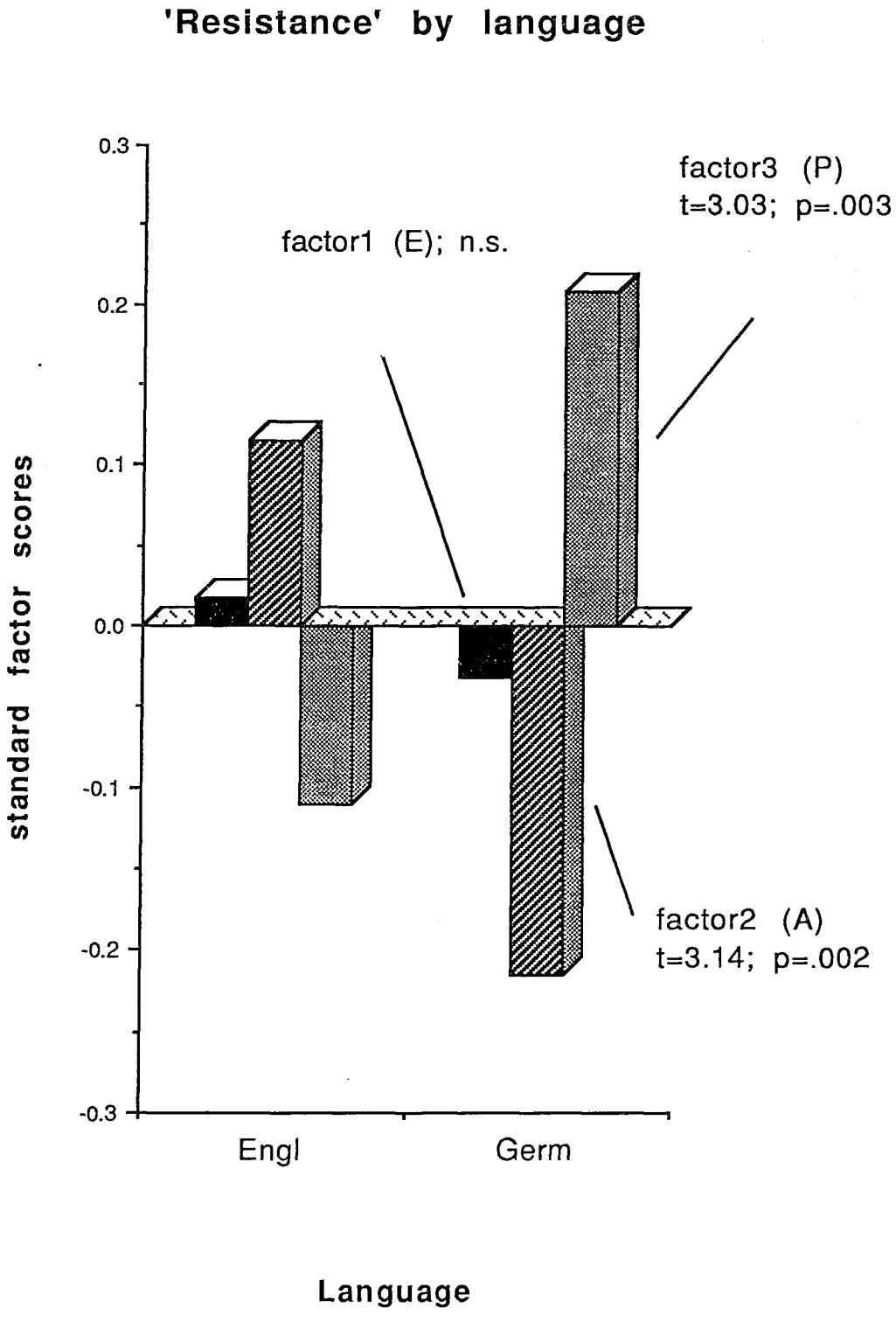

'Resistance' by language
factor3 (P)
t=3.03; p=.003
factor1 (E); n.s.
factor2 (A)
t=3.14; p=.002
standard factor scores
0.3
0.2
0.1
0.0
-0.1
-0.2
-0.3
Engl
Germ
Language

Figure 5.3

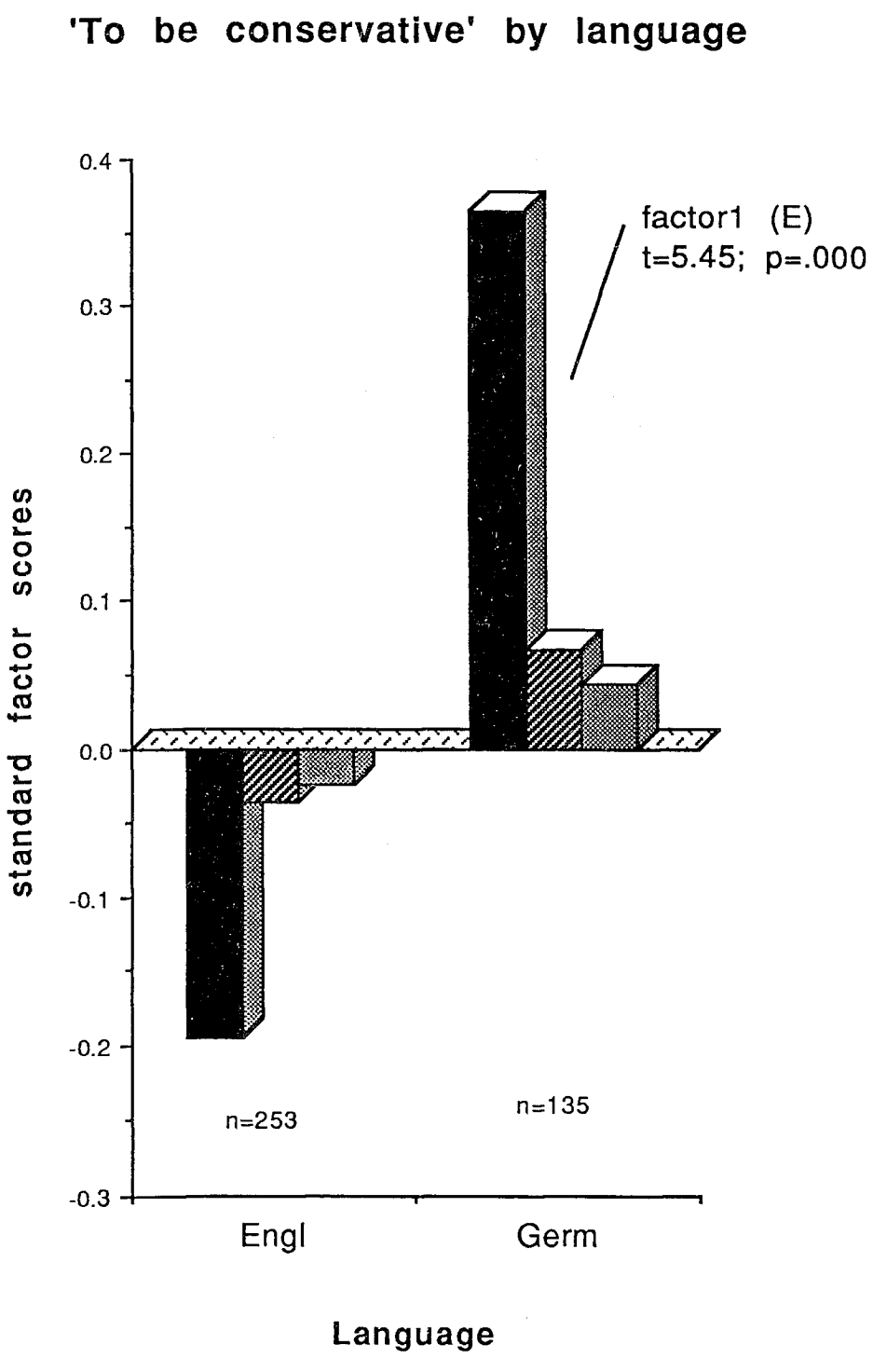
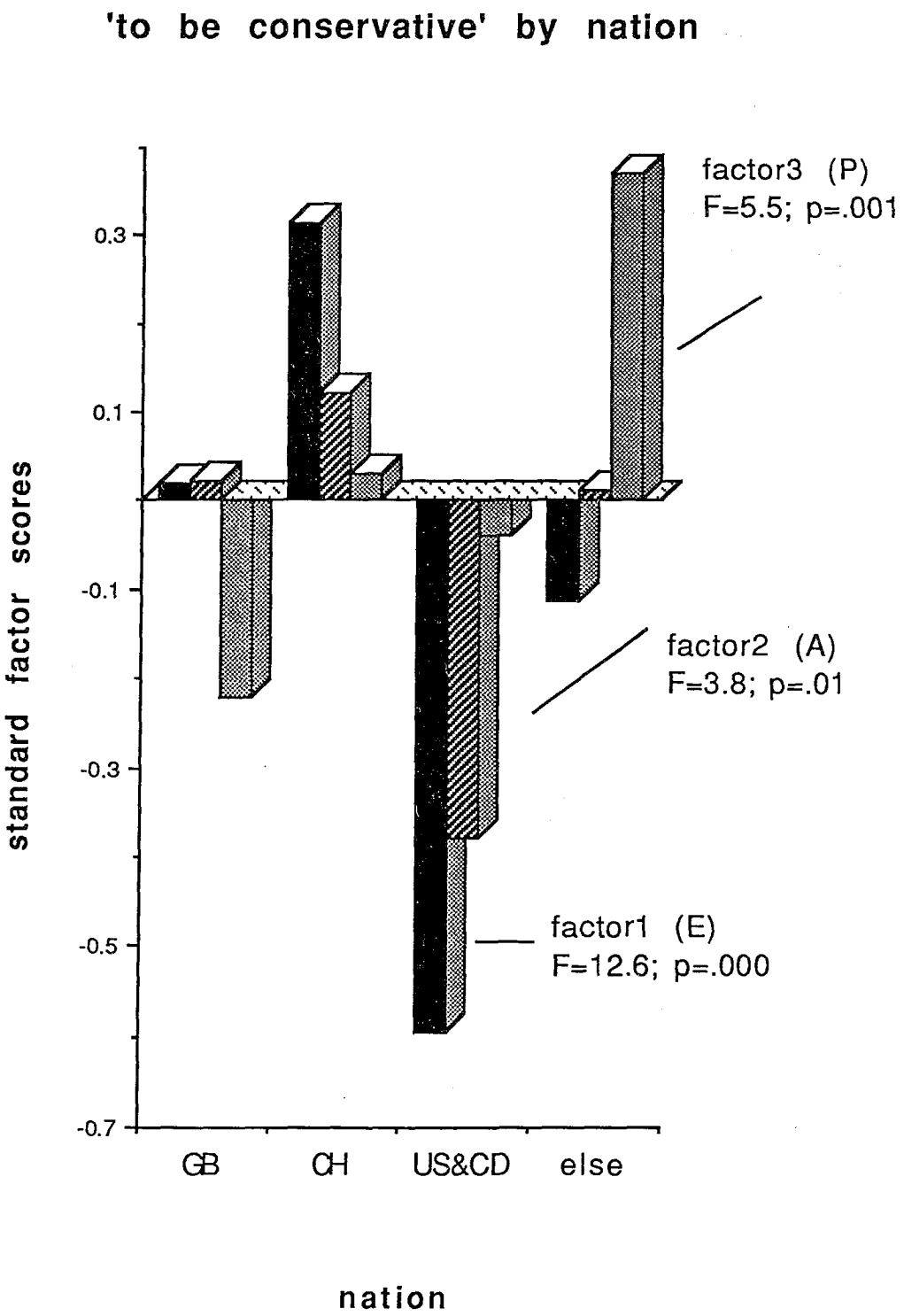

'To be conservative' by language
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-0.3
standard factor scores
factor1 (E)
t=5.45; p=.000
n=253
n=135
Engl
Germ
Language

Figure 5.4


'to be conservative' by nation
standard factor scores
0.3
0.1
-0.1
-0.3
-0.5
-0.7
GB
CH
US&CD
else
nation
factor3 (P)
F=5.5; p=.001
factor2 (A)
F=3.8; p=.01
factor1 (E)
F=12.6; p=.000

The two concepts 'resistance' and 'conservative' are equally similar for the Swiss as for the British and for the North Americans. Rather the opposite is the case. The Osgood distance of the two concepts is bigger for German speakers (9.8) than for English speakers (9.1; p=.054)[6].

Hypothesis **H5.6** is supported by the data as shown in figure 5.3. The English and the Swiss German speakers think differently of 'to be conservative'. For the Swiss it is more negative than for the Anglo-Saxon to be conservative (t=5.45, p=.000). The other two factors do not discriminate. Significant differences are found in all factors for 'to be conservative' by the nations as shown in figure 5.4. For the Swiss 'to be conservative' connotes more negatively (cons1 = 0.31) than for the British, for the British (cons2 = 0.02) more negatively than in the North Americans (cons1 = -0.60 / F = 12.6; p = .000), who see 'to be conservative in a clearly positive light. This might well reflect the group of Southern Baptist people in the North American sample. 'To be conservative' is most potent for the British, for the North Americans more than for the Swiss (F = 3.8; p = .01). For the Swiss it is more passive than for the British, while for the North Americans 'to be conservative' clearly connotes 'Activity' (F = 5.5; p = .001).

Results from the Free Association

The 388 respondents produced a total number of 1773 associations to 'resistance to change'. The associations were either in German of in English. On the average respondents gave 4 to 5 associations as instructed. In English the most frequent associations were fear, anxiety and afraid of (26 mentionings), bureaucracy (23), and conservatism (23). In Swiss German the most frequent association was 'Angst' (fear: 60 mentionings). Others were 'konservativ' (29), Ungewissheit (uncertainty: 20), Tradition (18) and Faulheit, Traegheit (laziness: 18). The content analysis of free associations corroborates the evidence of the semantic profile and the factor analysis for the four hypotheses, H1a, H1b H2a and H2b. Figure 5.5 shows the relative distribution of associations (N = 1773) classified as positive, neutral, negative, or deficient total

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[6] the distance measure is defined by Osgood et.al (1957) as: D(xy) = (Sum(x-y)squared)square rooted The mean of the distances of the sample is 9.4 with a standard deviation of 3.36. The measures range from 3 through to 21. The distribution is skewed as the median is smaller than the mean: median = 8.9, mean 9.4: skewness = .620, N = 388.

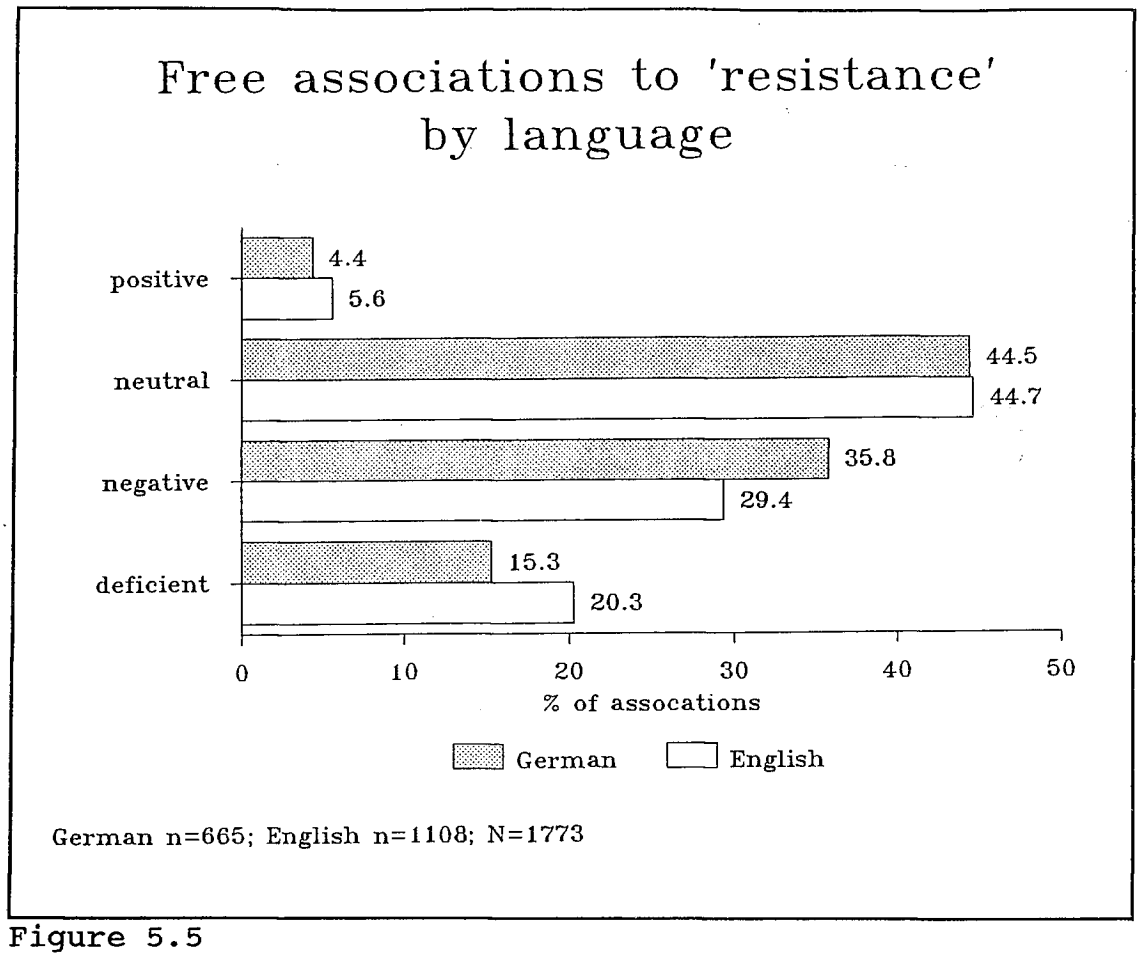

Figure 5.5

and by language. To test the hypothesis **H5.1a** the categories 'negative and deficient' are combined. 50.3% of respondents produce negative associations to resistance to change. Only 5.1% of all associations are positive. 'Resistance to change' connotes mainly negatively. Hence hypothesis H1a is supported. 18.4% of all associations allude to some kind of 'deficit'. The deficit concept of resistance is salient, although less prevalent than the purely negative or neutral associations. **H5.1b** is not falsified. 'Resistance to change' is indeed a deficit concept with nearly a fifth of all connotations. The two distributions are statistically identical, if the categories 'negative' and 'deficient' are combined into a single 'negative' one. 49.7% of the English (n = 1108) and 51.1% of the German associations (n = 665) are negative, while only 5.6% and 4.4% respectively are positive (chi square=1.39; df=3; p=.49). There is a consensus in the connotations between the English and German language in the connotations to 'resistance to change'. **H5.2a** is supported by the data. In both language groups 'resistance to change' is mainly negatively connoted and strongly associated with a state

of deficiency. Hypothesis **H5.2b** cannot be falsified either. 'Resistance to change' seems to be a deficit concept in Swiss German as well as in English. However, the English (20.3%) are a quarter more likely to associate resistance with deficiency than the Germans (15.3%). The two distributions in figure 5.6 are statistically different (chi square=12.09, p=.007). In addition the free associations to 'resistance to change' clearly show the residual positive emotional meaning, 5.6% in the English and 4.4% in the German context. A similar ambiguity is found for 'resistance to change' by free associations, as was found for the semantic differential profile. A positive connotation of resistance is possible in change agents' common sense, albeit residual.

5.5 Summary and Conclusion

With a process definition of meaning as an open system of connotations, the meaning of 'resistance to change' is temporarily frozen and connotations among change agents are explored between 1989 and 1990. Content analysis of free associations, semantic differential profiles and factor scores give a frame of reference to test the influence of language, change agency experience, and nationality on the meaning of 'resistance to change' and 'to be conservative'. The idea is to measure the generalized emotional connotations of the these terms. The sample includes change agents from Switzerland, Great Britain and North America. Of eight hypotheses, three have been falsified. Five are supported, and one is partially supported by the data as summarized in table 5.4. It can be shown that (a) the term 'resistance to change' consensually connotes negatively in the community of change agents, and (b) a strong association with deficit concepts can be found. Resistance to change clearly connotes negatively. This is shown with all three data sets. There is no difference across nations and training institutions. A direct effect of the experience of the Second World War on the evaluative meaning of the term 'resistance' could not be found. However, English speakers connote it less active and less potent than do German speakers. The German use of 'resistance to change' seems to convey more confidence than the English use of the term, but not a more positive evaluation: some sort of strong activity, although bad or illegitimate. Resistance as a deficit concept is clearly salient, for the English speakers slightly more so than for the

German speakers, as shown in the free associations.

Table 5.4: Results of the semantic exploration

hypothesis	type of data	evidence
H5.1a	semantic profile free associations factor scores	**supported**
H5.1b	free associations	**supported**
H5.2a	factor scores free associations	partially
H5.2b	free associations	**supported**
H5.3	factor scores	false
H5.4	factor scores	false
H5.5	factor scores	false
H5.6	factor scores	**supported**

These results corroborate those of the analysis of the main literature on resistance to change on the level of change agents' common sense notions. The main tenor of the literature is found again in the main tenor of change agents' connotations. A three-dimensional factor space is found as frame of reference, with similarities to Osgood's three dimensions of evaluation, activity and potency. To be conservative is more negative for the Swiss than for the British, and for the British more negative than for the North Americans. The latter, even, see it in a markedly positive light. The British see 'conservative' as passive, but potent. The North Americans see it as active and potent. For the Swiss, 'to be conservative' is passive and impotent. The consensus on 'resistance to change' is stronger than on 'to be conservative' across nations, languages and change agencies. Although 'conservative' is often associated to 'resistance to change', the two terms are clearly contrasted within the SD frame of reference. Resistance to change is not emotionally synonymous with 'to be conservative'. Finally, SD profiles as well as free associations show a residually positive connotation to 'resistance to change'. This gives the common-sense ground for the reconstruction of 'resistance to change' in a functional, positive light. Hence, such a functional analysis is not totally counter-intuitive, although it is relatively uncommon.

Part III

A Functional Analysis of Resistance

6. A Theory of Self-Active Systems

The aim of this thesis is to view of resistance to change as positive, non-deficient and functional, and to provide evidence for it from an organisational case study. In this chapter I introduce the concepts that are needed for a functional theory of resistance to change, and I reflect on the structure of analogy and system thinking. Resistance to change is an opportunity in the process of technological change of an organisation, which can be grasped or can be missed. This view of resistance to change is accomplished by making an analogy between 'resistance to change' and 'pain'. Pain and resistance are functional for the continuation of processes. The pain-resistance analogy is made across different levels: from the individual to the social (Miller 1986; Ochsenbein, 1989), in terms of 'self-monitoring subsystems' (Cranach & Ochsenbein 1985). The theory of self-monitoring is part of the theoretical framework of self-active systems. The Bernese Group of Action Psychology has committed themselves since the late 1970s to provide an integration of formerly unrelated psychological phenomena in the unified analysis of social behaviour (Cranach, 1987). The tools for a functional analysis of resistance to change include system thinking, action psychology, a view of social organisations as self-active systems, the theory of self-monitoring subsystems, and reasoning by analogy.

6.1 System thinking

System theory or system thinking (Boulding, 1956; Bertalanffy, 1968; Emery, 1969; Cranach, 1972; Durand, 1979; Checkland, 1981; Luhmann, 1984; Miller, 1986) is a style of thinking with a tradition. It competed for a long time with mechanistic preconceptions arguing for a historical, developmental, and organismic concept of social behaviour (Philips, 1970). Thinking in terms of developing systems is an interdisciplinary enterprise that is often nourished by a romantic and metaphysical vision of a unified universe where most things are interrelated, and by a desire to recreate this unity symbolically by means of a unified scientific understanding beyond reductionism. Bertalanffy (1968) has stressed the point that system thinking must not be reduced to

cybernetics and computerized information processing with its technical culmination in target-seeking rocket systems and cruise missiles. The idea of developing systems is informed by theoretical biology and its attempts to demarcate living from non-living matter. Goal-directedness may be a necessary but not sufficient criteria for living systems. These attempts produced paradigm changes from closed systems to open system, and from open systems to autopoietic systems (Luhmann, 1984). The idea of developing systems has recently been shown to be able to unify the microcosmic and the macrocosmic in a new metaphysics that transcends mechanistic metaphors such as the 'clock work' or the 'computer' (Jantsch, 1979; Prigogine and Stengers, 1984). With the recognition of irreversible time in physical and chemical processes makes the boundaries between the natural and the social and historical sciences crumble. Cranach and his group have tried to draw some consequences from that for the study of social and psychological phenomena (Cranach, 1987 or 1990) for people with a taste for 'macroscopy'. System thinking is the **tool box** of an **observer** that allows him or her to assimilate one section of reality to another section of reality in order to gain useful information. A system is defined as a **set of relatively stable elements** and **relations among these elements** (Marchal, 1975; Schwegler, 1992), which **transform a set of inputs into a set of outputs** (Lazslo et al., 1974). A machine like a computer is included in such a definition. Living systems by contrast are characterized by additional criteria like **self-activity** and **historicity.** (Cranach, 1990).

Multi-layered reality

Systems thinking is process thinking for which the notion of identity is problematic, as one can never step into the same river again, and it implies a multi-layered analysis of reality (Boulding, 1955; Miller, 1986). Information is processed on many levels in a characteristic ways. On each level of analysis processes are discovered that are similar to processes at other levels. This is expressed in cross-level analogies (Ochsenbein, 1989). Higher level systems are not necessarily more complex (Luhmann, 1984; Brooks, 1986). They display additional characteristics, that cannot be reduced to lower level characteristics. Systems thinking is non-reductionist. The analysis of individual or social action requires the simultaneous description of several levels of activity. Information is generated and stored on all levels. It is processed within and across

different levels, and in different directions: within, inside/outside, bottom-up, top-down, middle-out. A living system must be analyzed in its multi-level structure, functions, developmental and history. Machines only have structure, functions and decay; and neither development nor self-conceived history. The structural changes of a machine are entropic, loss of structure, not development.

Self-activity

Living systems actively strive to continue functioning, i.e. surviving, under various conditions by purposively changing the environment and themselves in being active. Self-activity implies direction and irreversible development. Spontaneity, detour behaviour and repetition of unsuccessful actions are indicators of directed behaviour. The characteristics of living systems are shared by animals, human individual behaviour, group behaviour and behaviour of larger social systems like organisations: they direct behaviour variously in order to continue existing by changing their own structure under most variable environmental conditions. By contrast machines are artifacts constructed to simulate and extend part functions of human living systems. Machines, albeit processes, are not living systems. Machines like computers simulate what living systems accomplish only within the narrow but nevertheless astounding limits of technological developments.

Historicity

The goal-directedness of self-active systems is always historically situated in time and space. Activity includes the reactive adaptation to external affordances. At the same time activity adapts to the requirements of the internal milieu and therefore expresses the past of the system. The past of a system influences the future in two ways: each system is the product of past development, the **historical process**, and at the same time it may have a more or less elaborated reconstruction of that past, its **history**. Knowledge of that past is situated information processing, that is therefore relative, which influences present and future developments of the system that produces it. Human individuals and social systems rely on history to gain perspectives for the future and to maintain identity.

6.2 Action Psychology

The Psychology of Action defines a scientific community, which I have encountered in the attempt to ground the psychology of work theoretically (Hacker, 1986; Volpert, 1989; Ulich, 1984). The intellectual sources are threefold: system theory, symbolic interactionism, and Russian activity psychology (Cranach et.al., 1982). However, in recent years the interests of knowledge are wider than work and organisation (Frese and Sabini, 1985; Cranach, 1990). The analysis of actions is non-behaviouristic and postulates a twofold structures: a latent and a manifest structure that mutually constrain and enable each other. The latent structure is potential or competence. The manifest structure is a situated actualization of potential, the performance. Competence becomes manifest in various performances. The same performance can depend on various forms of competence. To grasp the meaning of an action needs the analysis of both the manifest and the latent structure. A research interest of action psychologist is to study the constraints, which inhibit the potential from realization. They study environmentally and internal constraint of manifest actions and its short and long-term effects on the actor (Hacker, 1986a; Volpert, 1989). The aim is to free the potential and to enable the optimal development of the individual and collective actors in terms of efficiency and effectiveness (Hacker, 1986b). A prerequisite for such an attempt is a adequate framework of analysis as a guide for intervention. The Bernese group of action psychology, on whom I will mainly rely, develops a framework for the integrated and psychological study of individual, group or organisational behaviour[1] since the 1970s (v.Cranach et.al., 1982). This aim is expressed in the following statement:

> 'Action theory forms a point of view from which a system's structures, functions and processes, as also its development can be understood from a unified viewpoint' (1986, 225). Self-acting systems are 'wholes moving against their background', they are 'systems which actively strive towards certain ends by means of directed behaviour.'.. 'the systems are on their way to their goals, reacting to landmarks' (Cranach et.al. 1986, 198f).

Directed behaviour serves the purpose of inward and outward adaptation. Self-active

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[1] Although part of action psychology enterprise the Bernese group does not explicitly subscribe to the knowledge interests of the work psychologist (Hacker, Volpert, Ulich et al.). They are preoccupied with the theoretical framework and with empirical studies to demonstrate its feasibility rather than with design and intervention into social settings (Cranach et al., 1987).

behaviour systems of any sort affect the environment with an exchange of matter, energy and information, under guidance of feedback processes: the system itself changes in action. It may relax, get tired or learn for future actions. Latent information processes are directing and energetizing the action system. Directing involves various types of information processing. These processes combine recollecting information from 'memory' and ad hoc generating of internal and external information. Information processing means the changing information by selecting, accentuating, organizing, complementing and creating (Cranach, 1990; 28ff). The more or less distinguishable information processes are nine:

Perception of the environment

The environment is permanently assessed with regards to events that are relevant to start, to end or to alter an activity.

Self-monitoring

Self-monitoring comes with the increased internal complexity of a system. The links between the parts become more frequent and stronger at the same time. Progressive system differentiation is compensated by integration. Self-awareness is a form of integration and a product of self-monitoring. Self-monitoring represents important internal events and is a source of information for steering and altering the course of activity.

Selection of goals

By comparing internal and external messages and recollections from memory the system decides and represents a future state of affairs as feedforward processes. Goals may be determined by the history of the system, by affordances of the environment or be part of a hierarchy of strategic and tactical goals. Feedforward processes normally precede the activity.

Adoption of a plan

The system has to chose a plan that represents the trajectory from the present state of affairs to the goal situation. Such a plan may be recollected from memory or be

generated ad hoc or a mixture of both. Goals and plans are often diffusely mixed.

Transformation into behaviour

A chosen goal and a corresponding plan need further processing to become real. The steps of plan have to be unfolded in concrete actions which draws again upon memory.

Control of execution

It is necessary to assess whether the action unfolds according to plan and goal that are the standards of comparison. This is done by steering and negative feedback loops. Deviations from the projected course are compensated with steering activity. Steering refers to regulating the action with reference to a preset goal. Steering is differentiated from (re)directing which refers to the process of goal setting and altering a goal altering.

Stopping behaviour

As soon a the goal is reached the activity needs to be stopped, otherwise the target may be missed or the system exhausts.

Evaluation and storing

The system represents the details of the activity, evaluates and stores the features and the context of behaviour. Successful and failed episodes are stored to improve future activities.

Evaluation and consumption of outcomes

The outcomes are evaluated and consumed to prepare for future actions. This process may include the problem of distribution. The resulting satisfaction is often the motivational focus of the whole activity. Exaggeration in consumption can jeopardize the overall adaptation of the system. Particular systems differ in the way they focus on certain phases of information processes and neglect others. This characteristic defines their individuality.

Energetizing or the mobilization of energy is elicited by environmental scanning and self-monitoring. **Energetization** is the psychological process that controls the energizing of the system, that is the supply of physical energy. Information processes can release, enhance, inhibit or suppress the energy that moves matter. Energy is necessary for any kind of activity. The processes of energetization are described in psychological concepts like instinct, motivation or will. They serves at least the four following functions:

To get moving and stopping

Once a goal and a plan is chosen, a particular decision, the resolution to act, is necessary. This additional information process is quasi a message that get the whole system moving. A similar effort may be necessary to overcome the difficulty to stop the system in mid flow.

Overcoming difficulties

Any planned activity may encounter unforseen difficulties. Such situations may need additional energy to deal with the obstacle. To maintain the same dynamic of action as well as the extension in time needs extra effort.

Changing directions of action

Once a course of action is initiated it has it own inertia. To alter the course of action requires additional energy when the action is in full flow, fast and powerful.

Resolve conflicts between competing goals and plans

In situations where several goals and plans are activated and competing, additional information processing is necessary to prioritize one of the options.

Directing and energetization are both information processes. In individual actions they describe the functions of consciousness. In social systems they describe the functions of communication (Cranach et.al., 1987).

6.3 Social organisation as self-active systems

I endorse the Bernese theory of group behaviour and behaviour of social organisations (Cranach et.al. 1986). Firstly, organizations are acting. Organization exhibit analogous structures to other acting systems. Additional features emerge on higher levels of analysis. Individual action is steered and energetized by cognitions, emotions and pain. Group actions are steered and motivated by face-to-face communication. Organisational actions are steered and motivated by formal communication, accounting and resistance to change. Other subsystems are possible. Secondly, the organization's manifest behaviour is steered, controlled and energetized by internal communication. Organisational communication can be differentiated into subprocesses like orientation, self-monitoring, planning etc.. Thirdly, the behaviour of organizations is based on coordinated group actions. Group action is based on individual actions. Individual actions are an organized system of movements controlled of cognitions, emotions, and pain. The features of lower system levels are integrated into higher levels. When an organisational or a group 'acts', an individual is always acting simultaneously. Different levels are variously interacting: mutually constraining and enabling. An institution is unable to function without the individual contribution. An individual may be able to do things that he or she would never be able to do without the backing of that institution. On the other hand any institutional functioning is selective and therefore constrains individual freedom. The degrees of autonomy of members is a variable of organisational design that is crucial for the well-being of members and the efficiency of the system (Ulich, 1991). The long-term survival of an institution is variously constrained, not least by the skills and motives of members' contributions. Fourthly, organisations maintain self-monitoring subsystems like a communication network, an accounting system and resistance to change; possibly others. These SMS tend to be integrated. The accounting figures are communicated within the organization. Resistance to change is communicated within the organization. Integration is a process of representation that includes selecting, accentuating, ordering, completing and creating.

Organisations as acting entities

It is linguistic practice to refer to collective units as if they were persons that act.

Business language treats organisations as acting units when we read head lines like: 'Nestle has made a hostile take-over bid to Rowntree', 'Swiss Bankers Corporation has increased its profits by 27%' 'British Coal scaps 2000 jobs' etc. What justifies to treat organisations like Nestle, Rowntree, Swiss Bankers Corporation, British Coal as units? Often corporate units are identified with a single person. That will mask the common effort, which makes it possible. Berthold Brecht asked: 'Cesar conquered Gaulle. Did he not have a cook with him ?'. It is legal practice to attribute agency to collective units. This is necessary to attribute liability to corporate actors. Corporations can take decisions and have legal responsibility, although individuals are signing papers and make statements. The legal system is, however, cautious. The attribution of agency to collectives can diffuse individual responsibilities into the collective where nobody is to be blamed. On the other hand there are systemic accidents caused by a multitude of factors. No individual is directly responsible for causal neglect. Without the notion of corporate responsibility no one will be liable and the victims may not be compensated. The various legal systems have adopted in the past and further develop notions of collective responsibility in response to the range of social activity (Teubner, 1992). It is important to clarify what is meant by an acting and potentially liable social unit. Organisations are seen as **self-active units** that preserve identity and move against the background of their environment. Organisations have characteristics which allow them to exist relatively independent from individual contributions (Haworth, 1959). This relative independence of the institution from the contribution of individuals normally demarcates an institution from a social group. Taking the social system as actor is quasi banned from Western liberal thinking and individualistic psychology due to unacceptable political implications such notions had in the past (Brooks, 1986; Douglas, 1986; 16). Brooks discusses the possibility of 'group minds' and gives a functional definition of an agent:

> 'An agent is an entity which processes and stores information about the world and changes the world in pursuit of goals on the basis of that information' (Brooks, 1986, 463).

This definition does not make any assumptions about individual or collective agency. The functional criteria of 'processing and storing information', 'changing the world' and 'goal-directedness' can be attributed equally to individual as well as collective units.

However various notions of the 'group mind' that go beyond the aggregation of individual mind are thinkable. A group mind, that controls groups actions, can be conceived as a) two minds sharing some information, b) as a fusion of many minds, where the individual minds disappear, or c) as a fusion of N single minds taking over some beliefs, desire and memories without the single minds disappearing (ibidem, 459). After the fusion there are N+1 minds. The latter is the most fruitful notion to date. The group mind may have goals that are not held by any individual. To prevent the problematic political consequences further assumptions are necessary. No hierarchy of importance is implied. The collective mind is not more important than the individual mind. The group mind may be less gifted than individual minds. A group mind does not exclude conflicts (ibid., 468f). On the contrary the function of a group mind may be to deal with conflicting tendencies for action. The notion of the 'group mind', albeit in particular versions, becomes respectable periodically (Douglas, 1986; Cranach et.al 1987). I will follow this eccentric approach and ask the reader to judge the enterprise by its outcome.

Organisational actions are a higher level of analysis of behaviourial systems. When an organisation acts, it is that groups of people and individuals variously contribute and act simultaneously in their various functions. The term 'organizational' does not refer to the mere fact that an action takes place in social context. It refers more specifically to the phenomenon that a certain structure of cooperating individuals is formally dignified to represent the organisation. Common language says 'Philip Morris has bought Jakobs-Suchard'. Individuals sign a contract when corporations act. At the same time it is not Cesar alone that conquered Gaulle, he had at least a cook with him. Organisational actions cannot be individually attributed. Not all individual actions, performed in a corporate context, have this corporate quality. The legitimization of individual action as corporate action is a characteristic of the communication system and its economy of symbols that is historically contingent (Luhmann, 1984). Organisational actions depend on group actions and individual actions and vice versa. On each level of analysis new characteristics emerge within the otherwise similar structures and functions of all these levels of analysis. The characteristic which emerges on the level of organisations is the **formalization** of various structures and processes (Cranach et.al., 1987). Formalization refers to the

process when activities are standardized by rules, so that procedures become relatively independent from the person enacting them. Every person on the job can be expected to follow the rules and to do roughly the same thing. In the Bernese approach social systems are characterized by self-activity, historicity, and multi-level organisation (Cranach, 1990). Organizational action is analyzed with the help of four classes of concepts. The latent structures of the task, the roles and of communication, and the manifest structure or execution.

The task structure

The task structure decomposes the overall task into a sequential and hierarchical network of subtasks. A task is always situated and expresses the aspirations of the system as well as the affordances of the environment. Task structures are often the subject of formal planning exercises. The combination of 'internal shoulds' and the 'external necessities' gives every system a task. The task may be primary. A system may come to existence to fulfil a task. This is the case with a task force. The task may be secondary. An existing structure can give itself a new task. Technology is part of the task structure: workplace equipment, machinery, computers, telecommunication technology constrains the ways a task is decomposed into subtasks. The optimal decomposition of tasks in relation to productivity and human well-being is a main concern of the psychology of work (Ulich, 1991).

The role structure

The social stratification of an organisation is characterized by positions and roles. Positions are bundles of roles. Role are bundles of expectations from the self and others. Roles are defined more or less ambiguously, and they are more or less hierarchically ordered (Katz and Kahn, 1969). The number of hierarchical layers is an organisational variable. The role structure describes the likely distribution of knowledge and skills, power and responsibilities in an organisation. The relation of the task structure and the role structure at any given time reflects the potential of the system. Can they do it ? In principle a task can be mapped in many ways onto the role structure. Most of the time there is room for negotiation and redefinition. But one mapping will eventually be realised as a result of additional information processing.

Information processing structure

Communication is the information process of the social organisation. With many people involved communication takes place in networks of more or less complicatedness and complexity. Complicatedness refers to the number of people involved in a network. Complexity refers to the number of links in a given network (Luhmann, 1984). The how, what and with whom people communicate determines how things are done in an organisation. Information is processed horizontally with a level of hierarchy as well as vertically across level of hierarchy. It integrates the individual, the group with the organizational level or action. The internal information processing transforms the role and task structure into the manifest structure of action, it selects the actual from the potential. The distinction of role structure and information processing structures is similar to the distinction of the positional and the relational approach to network analysis. Positional network analysis leads to the delineation of hierarchical structures, the relational analysis looks at social processes in terms of communication (Monge, 1987, 247).

Manifest structure

The execution of the action is described along three dimensions: hierarchy, sequence and complexity. Social systems unfold parallel actions simultaneously that involve groups and individuals in various combinations. The manifest structure is the actual action of the organisation. It can be described in form of a network of action steps. The execution structure and the task structures do rarely map one to one. Reality tends to divert from the projected plans. The discrepancies manifest the workings of the latent structures. Changes in the environment are perceived as such by the communication structure. This model of describing acting systems on the group and organisational level assumes that the outcome of action feeds back to the task, the role and the communication structure. A social system learns and develops by differentiating, i.e. by increasing complexity. It increases the potential for further actions. The system changes the environment and simultaneously itself. The system learns by changing its task, role and communication structures and by storing successful and failed practices. The description of any of these structures is rarely more than a snap shot of the process in time. The very description of a structure is an input into the communication system,

either as a legitimization of past changes (standard of feedback) or as a guide line for future changes (feedforward standard) (Luhmann, 1984). The crucial observation is that the process continues at any time. The problem arises whether the changes go into a conducive or a problematic direction with regard to long-term prospects. This is a matter of educated guess and political negotiations, but not of certainty.

6.4 The Theory of Self-Monitoring Subsystems (SMS)

It has been said that self-acting systems of a certain complexity display self-monitoring and self-awareness as an integration process. A complex system produces and reacts to a vague image of itself (Luhmann,1984, 51). The assumption is that phenomenal awareness, the image of oneself in a situation, is not an epiphenomenon, but an important phase of information processing (Vygotzki, 1924; Shallice, 1972; Cranach, 1983; Mandler, 1985,70ff; Marcel, 1992). This implies that substructures, which monitor the internal milieu, have to be analyzed. The internal as well as the external environment is subject to observations. Cognitive scientists working with that assumption have the problem to relate self-observation and awareness to the mechanics of computing. Awareness is a special form of mechanical processing (Johnson-Laird, 1988; Shallice, 1992). I am exploring a weaker and more verbal model. I will use the notion of self-monitoring subsystem SMS (Cranach and Ochsenbein, 1985; similar Bogart, 1980) in order to develop the theoretical ideas and to guide the empirical study of resistance to change in a Swiss bank. The notion of self-monitoring was developed in order to avoid the term 'consciousness'. The question what consciousness may be, either permanent, fictitious, false or irrelevant, is replaced by the analysis of its concrete functions. The question is: under what conditions does self-monitoring and awareness arise and what difference does it make? SMSs play a role in adapting actions to the internal requirements of the system. SMSs direct actions in the beginning, and redirect and energetize in the face of obstacles at later stages. A SMS achieves **representations of internal states** that need to be taken into account to direct and motivate system activity. This representation is the outcome of an information process which other subsystems take as input. One would normally assume that several SMS

compete, inhibit, or reinforce each other in a complex action. Functions describe the way a subsystem is useful for action process. Seven functions of SMS have been identified based on the analysis of group communications, conscious cognitions, emotions and pain (Cranach and Ochsenbein, 1985). Conscious cognitions are associated with emergency situations, conflict resolution and transfer of knowledge. Emotions allocate attention, motivate actions and evaluate situations. Pain is a more or less specific warning signal that damaging event are happening or have happened.

Emergency function

When difficulties in any subprocess of action arise, conscious cognitions and communication is activated. It is also called the trouble shooting function.

Conflict resolution function

When several action tendencies compete for attention, conscious cognitions and communication facilitate the decision making.

Transfer function

Additional information may be necessary. If necessary conscious cognitions or communication transfer information from one location to another, and make it available where it is necessary. This may include the access to stored information in memory or other storage devices like files, archives etc..

Attention direction function

Emotions direct attention to important features of the internal and external situation. Important features express the development of the system.

Motivational function

Emotions direct and energize actions by pointing to the importance of certain goals and plans. Emotions activate and prepare the system for action, and visually express that state of affairs.

Evaluative function

Emotions evaluate the ongoing activity and the outcomes. This is a basis for altering the course of action and for learning for future actions.

Warning signal function

Pain is a warning signal about actual or impinging structural damage. It may trigger immediate reactions, taking care and permanent avoidance of certain situations.

The representation of internal states that SMSs achieve is selective and schematic. They depend on attention given; they may be erroneous, and one SMS can be integrated in other SMSs which mutually facilitates or inhibits the signalling. There is a hierarchy of SMSs. These characteristics of SMS make it possible for them to achieve their functions the way they do:

Selection

SMS select certain states or processes of the systems internal milieu as a message: the representation of the internal state. The internal milieu is continuously changing. Any selection creates a foreground on a background. Selected states or processes have form and intensity (threshold), deviate from normal state of affairs, require fast and energetic reactions, or they demand reconsideration of information processing and action.

Schematic representation

The messages are represented in a particular code. This code includes certain schemata which are stored in memory and which are triggered by certain events. Schemata can form a relatively fixed link between perception and action. Such diagnosis-action-schemata are verbalized as rules of thumb: 'if that happens, I/we have problem A, then I/we have to do that to solve the problem'. Codes indicate time and location of internal events which direct of attention and redirect actions. The ability to experience and to differentiate internal processes is the distinctive characteristic of the SMS.

Attention and increased self-awareness

By means of attention messages are selected and represented in awareness. Attention

is unified and narrow; it selects and thereby structures the internal milieu in foreground on background. Self-awareness is increased. Many messages from different SMS compete for representation. Content and intensity of the message is crucial to gain priority attention. On the basis of represented events, attention is redirected to external and internal events (attention direction function). Further cognitive, motivational and volitional processes are elicited. This generally leads to increased self-awareness of the system in its environment.

False representation

SMS can produce errors: they produce reports of intensities out of proportion with its trigger; reports without real basis (illusions); representations may not appear when a real basis is present. Schematic information processing is particularly bound to error as classified by Norman (1980).

Integration of several SMS

A system may have several SMS, which are interrelated. SMS can be integrated into each other, they can mutually inhibit, elicit each other, or they can be relatively independent. One SMS can further process the messages from the other SMS. This integration of SMS has a history and constitutes individuality. Pain normally elicits emotions, emotions are normally accompanied by conscious cognitions and so gain a new quality. Conscious cognitions are the top of the hierarchy of human individual SMS. Analogically formal communication is the highest level of information processing in organisational actions. Resistance to change is represented in organisational communication and influences the action process. The way SMS are integrated characterizes the individuality, culture and the self-concept of a active system.

6.5 Analogical reasoning

Analogy is one of four basic forms of reasoning: analysis and synthesis, deduction, induction, and analogy. It is a spontaneous way of thinking. Reasoning by analogy has been prevailing in European intellectual history until the 16th century, when with the

dawn of Rationalism it fell into disrepute. Reasoning by analogy is regarded since as an intellectual imprudence. Not until the 20th century that its rehabilitation began. Reasoning by analogy reemerges as thinking in models of the world (Durand, 1979; 48ff).

Holyoak defines the analogical thinking in the following way:

> 'An analogy provides a mechanism for augmenting the mental model of an unfamiliar situation with new rules derived from a source analog' (Holyoak, 1986;67).

An analogy assimilates two areas, the source and the target area, in terms of a **model** of the source area. With the source area one is familiar, the target area is widely unknown. Thinking in analogies is a form of creativity, a way of generating ideas. An analogy allows one to understand the target area with the help of concepts of the source area, and to make predictions which can be tested empirically (Boden, 1990). Analogy is an economic starting point for theoretically grounded empirical research. Logically, an analogy is a relation with four arguments (Holyoak, 1986) between a source area, a target area, an abstracted schema, and an the intention of the observer, who makes the analogy: analogy (source, target, schema, intention)

For the present thesis the source area is 'pain', the target area is 'resistance to change', the abstracted schema is 'a self-monitoring system'(SMS), the intention is to show the functional value of resistance to change in organisational processes:

analogy (pain, resistance, SMS, show functional value).

Any description of source or target area are models of some reality, the abstract schema is a model of models, i.e. a second order model. A model is a set of structural and functional attributes. Functions are rules of the form 'if... then....' which are made possible by a certain structure. To map an analogy involves a series of steps of thinking that include: describing of the target area; finding a useful source area for a certain purpose; abstracting a schema of which source and target area are instances; mapping source onto target area; extending the mapping until new insights are gained or the similarities become overwhelming. Analogical reasoning has four characteristics. Firstly, analogies have limits. An analogy is either strong or weak, depending on how complete the source area can be mapped into the target area. The more features that can be mapped from the source into the target area the stronger is the analogy (Boden,

1990; 318). Features of source and target area are separated into similarities (positive analogy) and dissimilarities (negative analogy). An analogy brakes down when the dissimilarities are greater than the similarities, or when derived prediction do not stand the empirical test. Secondly, an analogy is neither right nor wrong, but useful for a purpose. Like a pudding, its proof is in the eating: its practical value for action and empirical research. Thirdly, an analogy is a second order model. It is a purposeful reduction of complexity of both the source and the target area that represents source and target area schematically. Fourthly, making an analogy means making a model which allows one to make predictions about the target area on the basis of the source area. The validity of these predictions will prove whether the analogy is good or not. My model of resistance to change makes a functional analogy in the manner defined by von Cranach:

> 'a structural similarity resulting from a [system's] adaptation to its environment (external adaptation) and/or to conditions of its own organisation (internal adaptation)' (Cranach, 1976; 384)

The two ways of explaining the similarity of behaviour are homology or analogy. A homolog is a structural similarity that is due to stored information, that is shared. The two systems are using the same information be it genes, habit or tradition. Analog is a similarity between system that is due to the same environmental pressure or problem (idid.). A functional analogy is a similarity due to adaptation, internal or external, of an evolving system. Consequences produced by a behaviour system are either neutral, detrimental or beneficial for the system's immediate and long-term continuation to behave (Hinde, 1982; 102). Beneficial consequences are called 'functions', detrimental consequences will be called 'dysfunctions'. The anchor point of any functional argument is adaptation: The outcomes of the process allow the system to continue effectively to exist: the show must go on, any show. A functional explanation of resistance explains in terms of beneficial consequences for the organisation. Elster (1984) criticises functional reasoning in the social sciences and sets criteria for a valid functional argument. Translated into my problem resistance to technical change is explained functionally, if and only if:

(a) a technical improvement is an effect of resistance to change;

(b) the technical improvement is beneficial for the organisation;

(c) the technical improvement is unintended by the actors of resistance;

(d) the technical improvement in result of resistance is unrecognized by the actors in the organisation;

(e) resistance recurs because it is reinforced by such effects and is recognized as an organisational problem.

These statements are empirical and have to be tested with data. Organisational communication of resistance to change will be analyzed as self-monitoring subsystems following the Bernese model. Conscious cognitions, emotions and pain have been suggested and analyzed as examples of self-monitoring subsystems (Cranach & Ochsenbein 1985, Cranach et.al. 1987, Ochsenbein, 1989). The functional analogies of conscious cognitions and communication have been experimentally studied for group actions by Ochsenbein (1989). The theory of self-monitoring subsystems allows us to make the analogies as shown in table 6.1: these are employed first to relate individual pain and conscious cognition as integrated SMS, and second to relate resistance to change and formal communication as integrated SMS on the level of organisational action.

Table 6.1: Two cross-level analogies

level	SMS	integrated in	SMS
individual level	pain	-----	conscious cognitions
organisational level	resistance	-----	formal communication

This framework allows us to generate a number of cross-level hypothesis about resistance to change.

6.6 Summary of the argument

In summary the theoretical discussion so far postulates a functional analogy between pain and resistance to change. To do that, a theoretical abstraction or schema is

necessary: self-active systems. An organisation is a self-active system which arranges itself for continuing existence. This provides an analytic framework for organisational actions with four classes of concepts: task structure, role structure, information processing structure, manifest structure of action. Information processing directs and energetizes action with the help of various distinguishable processes. One of these processes is self-monitoring. A complex action system relies on one or more self-monitoring subsystem to achieve adaptation to internal requirements under external constraints. Self-monitoring subsystems process and alter each other's information. Resistance to change can be seen as an organisational self-monitoring subsystem. The pain analogy provides a source of ideas and hypotheses. Resistance to change is a functional subsystem of technological process in organisations. A weak or a strong functional argument can be made depending on the kind of empirical evidence that is found.

The choice of the pain analogy is intuitive, but is made with the hope that it provides new insights into the workings of resistance to change in social systems. The pain analogy has four elements: the target area is resistance to change, the source area is 'pain', the schema of abstraction is 'self-monitoring subsystems', and the intention is to show the positive effects of resistance to change for the future of social systems. The analogy between pain and resistance is functional, in the sense that both have beneficial consequences for the acting system, and they produce these consequences in a similar way, i.e. via self-monitoring. Other analogies are conceivable. 'Bereavement' has been suggested to me. The 'battle field' metaphor which implicit in Lewin's field theory is widely used. It may be that these are equally fruitful or even better, but that is a matter of taste and a matter of demonstration. I explore the pain analogy as far as possible. Having clarified the method of thinking, I proceed first to explore the structure and functions of the pain system, before looking at communication and self-monitoring in more detail with the help of a organisational case study of implementing a new computer system in a Swiss bank.

7. Self-Monitoring by Pain

In order to make an analogy between pain as an individual experience and resistance to change in an organisation, the workings of the pain system in individual experience have to be explored. A pain model is a performance model, that produces an output which matches the reports of pain experience and pain behaviour. It explains pain phenomena, and it successfully guides and explains intervention methods. More specifically my analogy draws upon acute pain. Many of the pain phenomena suggest that we conceive of the pain system as a self-monitoring subsystem (Cranach and Ochsenbein, 1984 and 1985). It feeds the state of the organism into higher levels of information processing, and it ushers a change of action. Pain urges us to think, reflect and to act differently. The pain system has structure, functions and history. The structure and functions of the pain system are studied with various experimental techniques: tracing the pathways of neural transmission; local stimulation; inducing structural changes in the pain system (cutting of pathways, stress, drugs, brain surgery); and observing changes in experience and behaviour in reaction to noxious stimuli. Four observations summarize the pain phenomenon for the present purposes:

> Subjective experience is a sufficient criterion for human pain.
>
> Pain promotes the healing process by altering the motility of the organism.
>
> Pain and injury are loosely coupled. There is pain without injury and injury without pain.
>
> Pain is paradoxical: an unpleasant experience (pain is bad) that is, by that very quality, biologically functional (pain is good).

7.1 The Pain Phenomenon

Pain has traditionally been conceived of as a sensation. One assumed that a particular location of the cortex would represent a specific sensory input, the nociception. Recently the dominant view of pain has fundamentally changed. Pain cannot be associated with a pain centre in the brain. Pain expresses a state of the situated

organism. Whether a noxious stimulation is painful depends on physiological, psychological and social and cultural conditions (Cervero, 1985). According to Wall (1985, 253) pain is rather the awareness of a need-state than an isolated sensation. Pain is closer to motivation like hunger and thirst than to perceptual systems like vision, smell or audition. Pain is not intentional and not referring to something else than itself. Pain increases the awareness of one's body. It enhances and differentiates the body image (Schilder, 1935, 99f; Melzack and Wall, 1988, 32). Attention focuses inside. The pain reduces environmental awareness to the extent of being indifferent. The location of pain may be different from the location of the injury and may change over time. Pain **promotes healing rather than helps in avoiding injury** (Wall, 1985, 253ff). Wall defines pain as:

> 'an unpleasant sensory and emotional experience associated with actual or potential tissue damage ... pain is always subjective' (Wall, 1987, 904)

This definition stresses a) the subjective experience of pain, b) the mixture of pain and emotion, and c) links pain only loosely to injury and damage. Subjective experience is a sufficient criterion for pain. It does not make sense to distinguish objective and subjective, real or unreal pain. Pain is a multi-dimensional experience. A painful experience is always a mixture of many qualities. Pain mostly implies fear and anxiety and triggers thoughts. The reverse may be the case, but not necessarily. Analytically one could say that pain is integrated into emotion and cognition (Cranach and Ochsenbein, 1985). The relationship between pain and injury or strain is variable. There is pain without injury, and injury without pain (Wall, 1979). Under conditions of hypersensitivity non-noxious stimuli may be painful. Pain may persist even after an injury is healed. The intensity and quality of pain changes while the injury stays the same. Pain is biologically necessary. People who are incapable of feeling pain are likely to die rather sooner than later. It is existential and can fundamentally alter a person's life. Its paradoxical nature of being essentially unpleasant (pain is bad) but biologically functional (pain is good) gives rise to religious or anthropological thoughts on the human conditions and on the limits of human effort (for example Lewis, 1940). Pain is a necessary evil. It is important to make a difference between acute pain, which is a normal biological function and preserves life, and abnormal chronic pain, which is an excruciating experience and biologically dysfunctional. It can drive people to suicide.

The two kinds of pain are based on different mechanisms. Chronic pain may result when the pain system alters its working (Wall, 1985; Cervero, 1985). Acute pain develops into chronic pain under certain conditions. Clinical work on pain focuses on alleviating chronic pain. It is of pivotal interest to understand the normal pain functioning in order to avoid its decay into dysfunction. Describing the anatomical structure of the pain system is the first step towards the understanding of pain. A particular structure allows for a certain pattern of functioning. The process of research is often reversed. Evidence of a certain way of functioning makes the start. Structures are postulated which account for certain functions. Different structures can account for a given function. The next step is to clarify the functions of the pain system, which are made possible by its structure. Structures and functions are mutually constraining. Structures fulfil functions; functions require structures.

7.2 The structure of the pain system

The pain system is a relatively fixed, but nevertheless flexible neural network, which mediates sensory input from the body surface and the viscera into pain expression: experience, vocalization and verbal report, autonomous reactions and patterns of motor behaviours. A model of the pain systems can be characterized by the following components (e.g. Dennett, 1978): the input, parallel processing, and modulation.

7.2.1 The input system

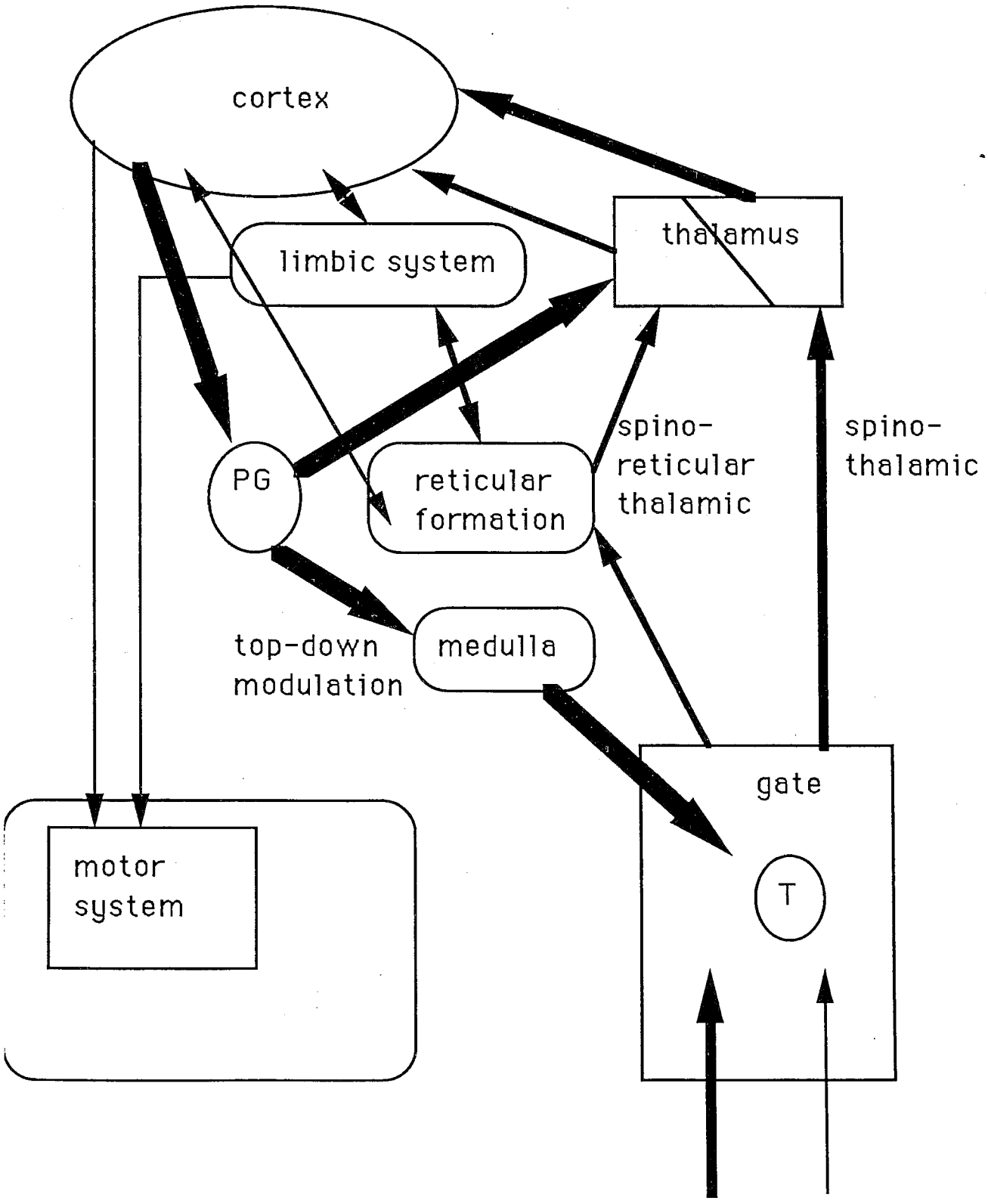
The input system is part of the peripheral nervous system. Specific nerve fibres, 'nociceptors' with a high threshold, are sensitive to tissue damage. They connect the body surface and the inner organs with the spinal cord and the brain. Body surface pain is based on two types of input channels: fast and slow. The fast channel is well defined and directly linked to higher levels of processing. A-beta fibres are large and fast. A-delta and C fibres are slow. Fibres are sensitive specifically to pressure, heat, or chemicals others are polyvalent (Melzack and Wall, 1988, 171; Willis, 1985). Nerve

fibres are unequally distributed in and on the body, which explains the higher sensitivity of these areas. Denser areas are more sensitive. The input from internal areas is slow with diffuse links to higher levels of processing. Slow C fibres signal **visceral pain.** They link internal organs to the spinal cord making many connections to other pathways. Diverse connections explain 'referred pain'. Signals from internal organs converge with signals from the body surface. Internal damage is erroneously located on the body surface. Such patterns of referral are consistent. It can be used for the diagnosis of visceral problems. Visceral pain is poorly of falsely localized, and triggers a general alertness and arousal, autonomic reactions and increased motor activity (Cervero, 1985; Melzack and Wall, 1988, 183ff). People in visceral pain often are irritable and hyperactive.

7.2.2 Parallel processing and dual coding

Information about injury or strain is processed parallel on several levels of the brain and through different pathways. These levels of processing and pathways are interacting in a complex way. Processing on different levels correlates with different experiential qualities. The pain system has basically two ascending pathways: the older, medial spino-reticular pathway, which is slow and diffuse, and the newer lateral spino-thalamic pathway which is fast and specific. The two pathways are schematically shown in figure 7.1. The newer pathway cannot be found in lower animals. The multiple ascending pathways of the pain system were the focus of research in the 1950s. The highest level of processing is cortical projection. Psychologically this correlates to the secondary coding in symbolic representation and verbalization. Lower level processing involves the reticular formation, thalamus, and the limbic system. Psychologically this correlates to the primary coding in activation, attention allocation, emotional reactions and memory activation. Secondary coding feeds back into primary coding and may inhibit or enhance it. Integration or disintegration of primary and secondary coding can explain different motivational qualities of pain: reflexes; 'cold' pain; 'hot' pain. The complexity of the processing explains why the same injury has rarely the same effect. Pain experience is the outcome of diverse processing and integration of other inputs.

Figure 7.1: Anatomy of the pain system



This is in line with the refutation of the 'constancy hypothesis' (Merleau-Ponty, 1945, 14; Wall 1979; Melzack and Wall, 1988, 32, 89, 124; Cervero, 1985). Figure 7.1 shows schematically the brain areas that have been associated with the processing of pain: the formatio reticularis, the thalamus, the limbic system, and the cortex. The spino-reticular pathway is slow and projects into the reticular formation, the thalamus and the limbic system. Most of the fibres are multimodal and signalling is diffuse. The reticular formation, the thalamus and the limbic system form part of phylo-genetically older layers of the central nervous system, the mid brain. The reticular formation (RF) in the midbrain converges divers and unspecific sensory inputs and connects widely into other parts of the brain. From the RF neural activity projects onto the thalamus and the limbic system. The RF produces the variable background of arousal, a precondition for the functioning of the brain (Nauta and Feirtag, 1979, 46). Little is known about its specific functions in the pain system (Willis, 1985b, 275; Melzack and Wall, 1988, 132ff). The thalamus is a relay where sensory data converges before being projected into the cortex. Orienting and attention processes are controlled by the thalamus. The limbic system (amygdala, hyppocampus) is correlated to the emotional and memory component of pain: the emotional aversion, conditioned reactions, reminiscence of past experience. Pain mostly has an emotional and a reminiscent colour. The cortex is the phylogenetically youngest centre. It correlates to conscious experience, symbolic representation and verbalization, and the discrimination and localization of pain in relation to the body image. Signals reach the cortex via the thalamus and project onto the sensory and motor areas of the cortex (Nauta and Feirtag, 1979, 50). Depending on the pathway the information is diffuse or discriminate and comes via the spino-reticular-thalamic pathway. More specific information, reaches the cortex via the more direct spino-thalamic pathway.

The phylogenetically younger, faster and specific spino-thalamic-cortical pathways project more directly onto the cortex. The reticular-cortical pathway is slower than the thalamic-cortical pathway. The latter triggers top-down feedback to block the dorsal gate control (Melzack and Wall, 1965). Feedback also blocks the affective-motivational system. These younger pathways are associated with the discrimination of the pain: its location, intension, and quality. Several pathways with yet unclear function link the thalamus to the cortex (Willis, 1985, 278). Cutting the spino-thalamic pathway

makes pain disappears, only to recur soon after. The pain system traces alternative pathways to the top (Willis, 1985a). Cutting the links between components is only temporarily effective to control pain. The risk of interfering with other neural systems is high. The cortex has no pain centre. Projections from different areas interfere with each other. Cortical information processing correlates to the conscious experience of pain, the secondary coding of the pain signal. Cognition and emotions change the excitability of cortical cells in a yet unknown way (Anderson and Rydenhag, 1985, 353f). The conscious pain experience has quality, intensity and localisation; allocates attention, activates and alerts; activates memory; shows the unpleasant 'colour' of events; and is expressed in vocalisation and verbalizations. The pain experience is not an epiphenomenon. It feeds back onto the processing at lower levels and opens the pain experience to wilful control. The distinction of two pathways of processing explains 'asymbolic pain' or 'reactive dissociations'. A person may report intense pain that does not matter. This can occur as a consequence of damage to certain brain areas, under drugs, or in meditation (Melzack and Wall, 1988, 137; Dennett, 1978, 191ff). It is assumed that in such cases the pain signal is projected into higher cortical levels via the newer thalamic pathway, while the processing in the lower emotional-motivational level is inhibited. The secondary coding occurs without the primary coding. The painful event still hurts, but the person feels no urge to move. The result is a 'cold' experience of pain with intensity and location, but its emotional and motivational quality is gone: it does not matter. The relative importance and the interaction of these different pathways of processing correlates with what has been called the integration of the pain system into the emotional system, and into the system of conscious cognitions (Cranach and Ochsenbein, 1984 and 1985). Such a distinction allows for a typology of four kinds of pain: pure pain: pain reflex; emotionally coloured pain: primary not secondary coding; cold pain: secondary coding, but primary code blocked; hot pain: emotionally and cognitively heeded.

7.2.3 Internal modulation of pain

Pain processes alter themselves in activity. Three such process of modulation shall be discussed: gate control, plasticity, and top-down modulation. Gate control explains the immediate control of pain after an injury has occurred. Plasticity refers to irreversibly changes in the system that have long-term consequences. Top-down modulation works from the middle, upwards and downwards. If triggered it blocks at all levels of processing and prevents the pain experience and motor reactions. The pain control basically works by releasing drugs to block the transmission of information. Alternative stimulation can activate the pain control. The internal modulation of pain explains the variability of the injury-pain relation.

Gate control

The gate control system is based on the interaction of diverse inputs and top-down information on a node. Signals passing the gate control act as triggers for top-down signals. Nociceptive fibres end in the spinal cord dorsal horn area together with other nerves fibres. The substantia gelatinosa (SG) in the dorsal horn acts as a gate control. The transmission cells T project to higher levels of processing and to the motor system. T cells receive multiple inputs. Large and fast A-beta cells inhibit, small and slow A-delta and C cells facilitate the projection to higher levels. Fast incoming signals inhibit slower signals. Competing non-noxious inputs as well as top-down signals at the 'gate' block the projection of a noxious signals to higher processing. Immediate blocking and the differential speed of transmission explain the latency of the pain experience after the injury (Melzack and Wall 1988, 101ff, 120f, 179ff).

Plasticity

The pain system changes its way of working under prolonged activation. These changes explain the development of chronic pain (Willis, 1985b, 279): Transmission is changing, the receptive field becomes larger, spontaneous activity arises, inhibition is blocked, processing areas degenerate. The system becomes progressively self-active and independent of its initial trigger. Some of these changes are reversible, many may persist and alter the pain system to a dysfunctional process: pain without a cause (Wall,

1985,399). The slow and facilitating C cells are active in an immediate and a latent phase. Different chemicals are involved in the two phases. The latent phase of the C cell causes the hypersensitivity which is characteristic of prolonged pain experience (Wall, 1985, 396ff). In prolonged pain the whole body becomes very sensitive. Minor stimulations can be painful. The body image of pain areas inflates.

Top-down modulation

The pain system has a third pathway: the endogenous pain control system, the focus of pain research in the 1970s when body opiates were discovered. The top-down pain control system involves a distinct pathway that blocks the gate in the dorsal horn and the ascending pathways. The descending pathway runs from the RF via periaqueductal grey (PG), the medulla, and raphe nucleus magnus to the dorsal gate as schematically shown in figure 7.1. Pain modulation has its centre in the mid brain. It works from mid areas top-down, across and bottom-up (Jurna, 1984, 4ff). The periaqueductal grey area sends inhibiting signals downwards to the gate control as well as upwards to the thalamus (Willis, 1985, 276) and inhibits the ascending pathways. Descending signals reinforce the inhibitory effect of fast afferent A-beta fibres at the dorsal gate. Endogenous pain control works by releasing body opiates and another still widely unknown process (Melzack and Wall, 1988, 137ff; Lewis et.al, 1986,90ff); processes which reduce the synaptic activity in the pain system. For pain treatment drugs are applied to provide localized and timed pain relief. Strong or targeted stimulation (stressors, sexual behaviour, fighting, food deprivation, acupuncture) activates the control system and relieves pain. This method is called **'stress induced pain control'** or 'stimulation-produced-analgesia'. As pain tends to reduce motor activity it seems biologically useful to prevent that from happening in order to maintain, at least for some time, full motility to escape danger, to hide or to fight.

Endogenous pain control works as a unit. A trigger activates all areas at once and blocks the ascending pathways and the dorsal gate (Fields and Heinricher, 1985, 368). Because of these blocks often no pain is felt immediately after injury or strain has occurred. People with heavy injuries report no pain at all. However, overall body sensitivity is very high, and pain sets in later. Pain modulation contributes to a characteristic dynamic of the pain experience. Pain control, albeit functional in the short

run, has dysfunctional effects on the long run. The chemical changes, which stress induces in the body, suppress the immune system and enhance the growth of tumours and cancer (Lewis et.al., 1986, 98). The **top-down modulation has costly long-term consequences** when sustained over a long period. The pain experience is not an epiphenomenon, although pain reactions may occur non-conscious and reflex based. In more complex pain behaviour the pain experience is information which feeds back into the system and opens up possibilities of wilful control, e.g. via meditation and relaxation. Higher mental processes may trigger the control (Lewis et al., 1986, 96). The many connections of the RF with higher brain levels suggest a top down influence from the cortex, the thalamus and the limbic system.

7.3 The alarm system 'pain'

Pain alerts the organism that something is going wrong, and that something needs to be done about it. This is the alarm signal function. The unpleasant quality of the experience is part of that function. Pain is a biological necessity. People incapable of experiencing pain, e.g. people with a rare congenital analgesia, will die rather sooner than later of the consequences of minor injuries. Without pain they do not escape a source of injury to prevent further damage, and they do not preserve injured parts from further strain. Minor problems develop into lethal complications (Melzack and Wall, 1988, 3ff). The signal function can be analyzed further: a signal works within a more or less complex code. A signal is on or off, attracts attention, evaluates ongoing activity, and induces a change of action according to the code. A code links the signal to actions. Some of these links are innate reflexes, others are learned, cultivated and symbolically mediated. The internal code of pain mediates experience and action. What the observer sees or hears is pain expression.

7.3.1 Pain expression: report, reaction and action

Clinical research develops methods to control and alleviate pain and to use pain for diagnosis. In order to test the relative effectiveness of such techniques, pain is

objectified. Objectification brings with it the observer's doubt whether a verbal report is posturing or a reliable account of the person's state. Such scepticism is relevant for the observer who wants to construct valid measures of pain, to evaluate treatment methods (Chapman et al., 1985), or allocate scarce resources. On the part of the actor pain is always real as it affects his or her actions. The pain system produces various outputs which are used to measure pain. Pain expression includes autonomic reactions, motor actions, reports of unpleasant sensory experience, self-observations. For measurement purposes standardized verbal reports and observations of behaviour indicate the locality, intensity and quality of pain. These are links to possible sources of the problem.

Observation is essential to assess the pain of animals and pre-verbal children as they lack speech to communicate with linguistic complexity. Behaviour patterns may indicate a state of pain: Sudden movements of limbs, limping, the whole body retreats from a stimulation, escape, flight, or defense. These reactions are accompanied by autonomic changes like increased heart rate, sweating, skin temperature, blood pressure, muscle tension, all characteristic of emotions like fear, anger, and distress (Frijda, 1986, 126ff, 161). Some behaviours are simple and innate reflexes like tail flick in rodents, the jaw opening reflex or vocalisations in animals and humans. Others patterns are more complex and learned. Pain reactions are very unspecific problem indicators. Behaviour patterns reflect the synaesthetic organism. The same pattern may be associated with various sources of pain. An observer can only tentatively infer the source of the problem from behaviour. Further examinations are necessary. For our purposes it is important to note, that further actions are triggered by pain expression if the observer has a helpful attitude.

The verbal report of pain is confined to humans with language competence. It is obvious that animals and small children feel pain. They express it but cannot speak it out. The symbolic representation of pain is a later development. Language encoding is a higher system of integration which ties the individual to a culture that co-determines the experience of pain. Probing a person on pain means asking to engage in self-observation. The semantics of self-observation are socially shared. Culture shapes the pain experience and what is to be done about it. Cultural and historical differences in sensitivity and behaviour are well known (Melzack and Wall, 1988, 15f; Elias, 1939).

Verbal reports on pain fall in five categories: intension, location, duration, quality, self-reported behaviour changes, causal attributions.

Location

The location of pain is relatively independent of speech competence. The location of pain can be pointed at with the hand or legs. The frame of reference for the location is the body image. In a primal distinction pain is either inside, visceral, or outside, on the body surface. If it hurts on the surface, when the structural damage is visceral, one talks about referred pain.

Duration

The report of a pain duration depends on a time frame of reference. It is often described as brief, periodic or persistent.

Quality

Pain is experienced with a certain quality (host, burning, cold, unbearable, itching etc.). It is most of the time unpleasant. Verbal reports of that quality draw upon a pain vocabulary. The analysis of pain lexica reveal four qualities of pain (Radvila et.al. 1987): sensory (hot, burning, itchy, dull etc.); intensity (mild, severe, unbearable etc.); affective-emotional (raging, killing, cruel etc.); evaluative (unpleasant, annoying, radiating etc.). The quality of pain alludes to its integration into the emotional system and to its function: evaluation.

Self-reported behaviour changes

Persons in pain can be asked to observe themselves and to report changes of their normal behaviour. This might include reports on drug intake, eating, drinking, working, dating and mating, leisure activity, socialising, performance levels. Behaviour reports depend on verbal competence. People differ in the extent to which and how they observe themselves. Such reports may be problematic because people tend to report according to personal needs. The self-serving bias (social desirability, face keeping) leads to exaggeration or under-report. Chapman et al. (1985,19) studied the under-reporting of drug intake under pain. The problem is to have a standard of comparison.

Self-observations, however, are far from being epiphenomena. They are likely to feedback positively or negatively as self-suggestions.

Causal attribution

Causal attributions refer to explanations of pain. Surface pain is easily explained by localized influences impinging on the body. An open wound causes pain, the sting of a bee hurts. Viceral pain is more complicated. Pain referral explains why the source of pain is not necessarily identical with the location of pain. Sophisticated symbolic codes are necessary to see why pain in the toes may reflect a problem with the teeth. Pain diagnosis as an 'art' of pattern recognition aided by a theory of the body and numerous 'if..then' schemata (Jenzen,1981).

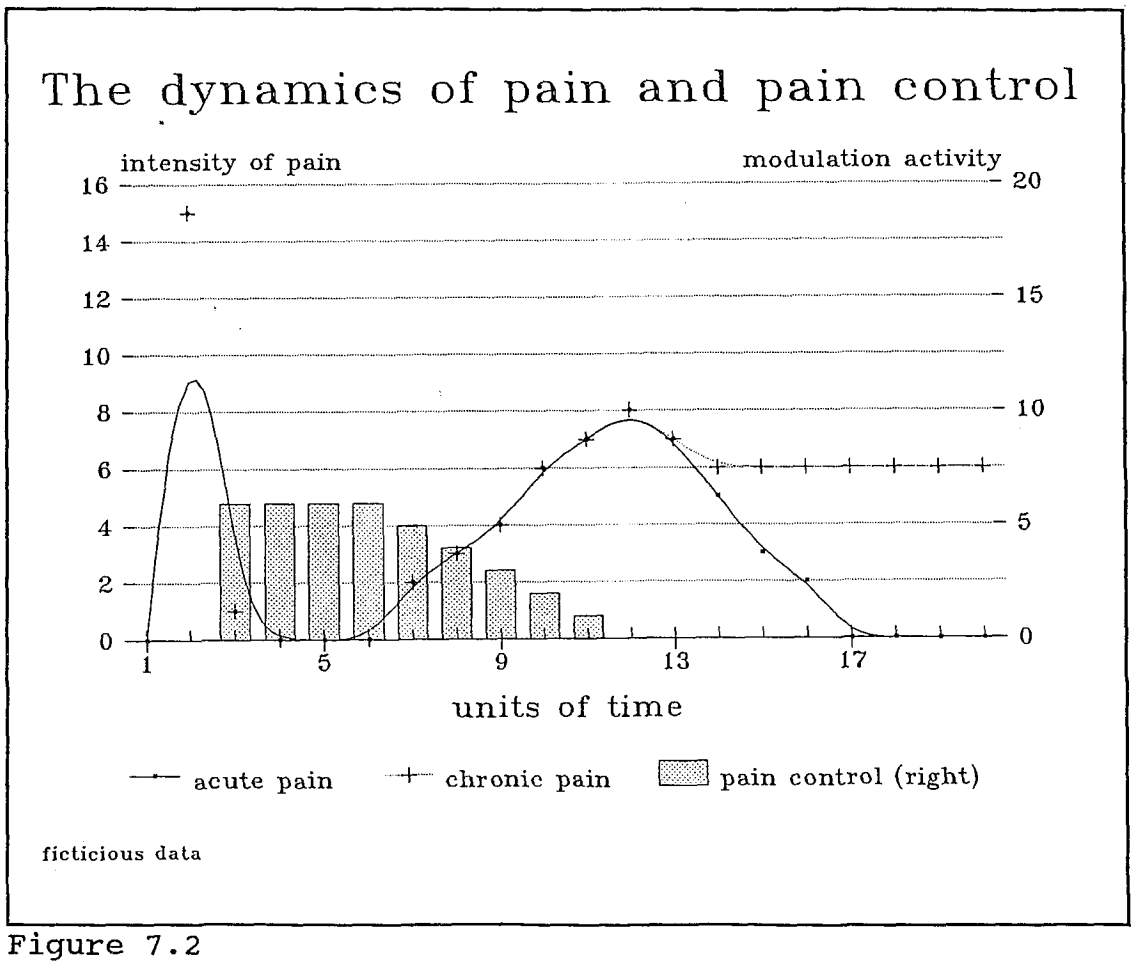


Figure 7.2

7.3.2 The dynamic pain experience

The pain experience itself is dynamic and relatively independent of the state of the structural damage or strain. Acute pain seems to follow a pattern as approximately modelled in figure 7.2. The pain after twisting an ankle or braking a leg changes in intensity and quality over time (Wall, 1985; Melzack and Wall, 1988, 35, 177). The three peaks are associated with qualitatively different kinds of pain after an injury: initial flash of white pain, latent dark and radiating pain, and chronic pain. An initial burst of pain is quickly dampened. White pain is clearly localised and functions as an alarm signal to focus attention and prepare for immediate action. Pain is dampened as soon as modulation sets in. This allows the organism to counteract further structural damage. Secondary coding based on memory is important for actions: what is the problem and what can one do? In a third phase dark pain sets in with delay. It is diffusely localized, radiates and warms the area of damage, inflates the corresponding areas in the body image, fills the span of attention, and exerts a compelling urge to reduce activity. The painful being will mostly rest and protect the damaged area. In a fourth phase a bifurcation may take place between a) a gradual relief from pain due to regeneration of the structure to normal state, or b) a chronic phase with a persistent level of pain. The system may decay into disfunction. The bifurcation depends on how far the pain system has undergone irreversible changes. That may in turn depend on the initial injury, the initial adjustments of activity, and the kind of external treatment received.

7.3.3 The attention allocation function

Pain is a source of knowledge, both for the painful person as well a the observer. This points to the attention allocation function of pain. Suppose I am running through the woods and my knee suddenly hurts. This is a signal which focuses my attention on my knee. Pain is a signal that structural damage has occurred, and that further damage is possible if the action is not altered. It reallocates attention internally to certain areas of the body. Pain is localized in relation to the body image. In pain my knee becomes an

inflated figure on ground (Schilder, 1935, 99). Pain changes the body image and by consequence disturbed the stream of behaviour. The body image is a memory structure. It is relatively fixed to serve as a internal standard of comparison for the control and flow of motor behaviour (Schilder, 1935, Fisher and Cleveland, 1968). The painful being becomes increasingly indifferent towards the environment, attention fully concentrated inside. Pain calls for self-observation. Pain is a very compelling experience. It fills the mind, and it strongly urges for action according to internal needs. Not only the person in pain reallocates attention, but also the observer with a helpful attitude, who might use the pain report I give him, or the kind of observations about my pain he makes himself, to diagnose my problem or to empathize with me.

7.3.4 The evaluation function (emotional integration)

Pain is a trigger for action. The trigger is basically its unpleasant quality. This points to the evaluation function of pain. Pain links the unpleasant experience to the ongoing activity. Activity is evaluated as painful, being unpleasant and possibly problematic to continue. I am running through the woods, my knee suddenly hurts and my attention is focused. My hurting knee is an evaluation that running is not good for the time being and may have serious consequences if I continue running as before. The evaluation may be reinforced or inhibited by rising emotions. Fear of further damage and anxiety about the future is evoked. I am a sports person and my social identity depends on being able to perform with a functioning knee. A future without sport activity is threatening to my identity. The emotional colouring of my pain enhances my motivation to alter my activity and to do something about it, or it makes me bear my pain to preserve my identity. Different evaluations compete. A problem of short and long-term considerations arises. This points to the integration of the pain experience into the emotional system. Emotional and motivational colouring constitutes the primary encoding of pain. Unless inhibited pain creates a state of alertness, and an inclination to alter the flow of activity: I have got to change the way I do things.

7.3.5 The learning function (cognitive integration)

Under pain animals and humans alter their activity to enhance the healing process. Typical behaviour changes are: escaping from dangerous situations, slowing down activity level, resting and seeking help. Animals and humans limp, guard their movements, brace, and slow down the pace of movement or rest totally. Motility is reduced in order to preserve injured areas from further strain. Motility is restricted, or the activity is even halted entirely. Pain has the function to preserve, to take care, and to improve conditions for the healing process of damaged or strained areas, and, in the end, protect the organism and to allow to live on. Many everyday human activities may be altered: losing appetite for eating and drinking, working, dating and mating, leisure activity, socialising, and performance. Most of the time pain decreases the level of activity. However, acute pain may initially increase activity providing arousal for initial actions and triggering the modulation system. Wall observed that pain serves rather to mend damage and to **promote the healing process** than to avoid injury (Wall, 1985, 253ff). Animals lick the injured area and in doing so increase the blood circulation in the injured area and speed up the healing process. Certain activities are avoided. This might include the change of plans and goals and the building of new habits. Painful stimulation results in **avoidance learning**. Pain is a good punishment. A behaviour which is associated with pain will be stored with that negative quality in memory and will be less likely to occur in the future. The unpleasant experience remains associated with a particular behaviour. In the future caution is deployed in similar situations, or in extreme cases the situation is avoided totally. In the case of a phobia this effect restricts the person's freedom seriously.

It has been said that pain is a principle of knowledge as well as a principle for action (Jenzen, 1981). The pain experience provides information about the requirements of the body that need to be integrated with memory information in order to act adequately. Pain stimulates further information processing. My pain is localized and qualified. I am running and feel the sudden pain in my knee. Is it 'meniscus' or did I hit it against a piece of wood. Anyway I start altering my pace after a while: slowing down, slightly limping, stronger limping later. I examine my knee further to see whether it has swollen and changed its colour. I consider consulting a book on knee

injuries or seeing a knee expert. The significance of pain for action beyond an initial change of pace is learned and is symbolically stored as diagnosis-action schemata (Janzen, 1981). Pain elicits diagnostic cognitions, it activates schemata, which are stored in memory. A diagnosis classifies a pattern of observations and links the classes to remedial actions. Such schemata can be described as propositions of the following kind: 'if A, then is B, therefore do C in order to reach D'. These schemata of information processing are more or less automated and conscious in daily practice. They are learned. The removal of pain is a strong negative reinforcement. Any behaviour which relieves pain is stored as such in memory and is likely to reoccur in the future. The painful being uses the secondary code as the observer does. Self-observer and observer share ideas about pain, because they rely on the same resources. Diagnosis-action-schemata are part of a stock of the social knowledge. Such social knowledge is unequally distributed. The distribution demarcates the boundary between experts and laity. The stream of activity is controlled by cognitions. Attention processes change the content of that information process. The knowledge of the experts can be taught and learned to relief pain by oneself or seek adequate help of others. These processes involve cortical activity of the brain and presuppose language capacity. Secondary coding of pain feeds back into the pain experience: positively to reinforce pain by giving rise to anxieties about what the problem may be; and negatively by motivating me to do the right thing to alleviate pain and sort out the problem at the source.

7.4 Summary

A model of acute pain as a self-monitoring subsystem has been proposed. The pain paradox says that pain is at the same time bad and good for the organism. It is a necessary evil. Pain has three functions: it promotes the healing of structural damage by focusing attention inside (**attention allocation function**), by evaluating ongoing activity as conducive for future actions (**evaluation function**) and urging the organism to act differently at present and in the future (**learning function**). Pain is awareness of a need-state. Pain triggers emotions and thought processes. The conscious and unpleasant experience is the criterion for the existence of human pain. Pain is

compelling and fills the narrow span of attention. Pain is located in the body image (areas, inside, surface), has duration (brief, periodic, persistent), quality (cold, hot, itching, dull), intensity (light, unbearable, excruciating), expression (vocalizations, reports, autonomic reactions, behaviour patterns), and comes with causal attributions. Causal attributions are the outcome of higher level symbolic processing with the help of diagnosis-action schemata. The structure of the pain system may explain its functions. Pain is the outcome of a dual information process. Pain gains its diffuse, affective and activating quality from the primary coding process that is located in lower parts of the hierarchy. The discrimination of pain is achieved in the secondary coding on higher levels of symbolic processing. The symbolic coding of pain involves language and culture. Pain is mostly integrated in other self-monitoring subsystems. Pain is a mixture of 'pure' pain, emotions, and conscious cognition. Cognitions are shared in a culture. The pain experience internally modulated by gate control, plasticity and top-down influences. Incoming signals are blocked from further processing, which explains the loose coupling of pain and structural damage. 'Censorship processes' explain the absence of representation when structural damage has occurred; and other modulation processes explain its presence after the damaged structure has regenerated. Modulation can be triggered by top-down influences or by strong alternative stimulation. Prolonged modulation of pain may have undesirable side-effects. The pain system changes in action. Many experiences of acute pain have a characteristic time structure: an initial, sharp pain signals a problem, modulation dampens the signal immediately, and then diffuse pain reemerges that either disappears with the regeneration of the structure or persists chronically due to alterations in the workings of the pain system itself. Functional pain can decay into dysfunctional pain without a cause.

I have introduced the notion of pain as a self-monitoring subsystem among others. I now proceed with the analogy to social organisations and resistance to change, and analyze issues of organisational communication to give examples of self-monitoring subsystems in an organisation. Finally I discuss resistance to change in the context of an organisation which is implementing new technology at work.

8. Organizing by Self-Monitoring

In the following chapter I will conceive communication and resistance to change as organisational self-monitoring processes. Therefore a number of conceptual distinction are necessary, which will later be used in the analysis of documents and interviews. It has been postulated that organizations are self-active systems, i.e. perceived wholes moving against a background. Self-active systems adapt to the environment and to their internal conditions. Both contexts are constraining. The environment and the internal milieu are changed by the system's activity. The functional point of reference is effectiveness, i.e. the capacity to continue the activity: the show must go on. By processing information the system is directed and energized. Directing involves **steering** or goal changing, i.e. anticipating future states of affairs by feedforward. Directing involves **regulating** or goal-seeking, i.e. monitoring outcomes, comparing it to the goal and adjust the course in the case of deviations. The process is called negative feedback (Deutsch, 1966,92). **Energetizing** refers to processes which initiate activity, maintain activity in the case of obstacles and stop activity. Information processing regulates the flow of energy, and by doing that uses energy. Directing and energizing involve both scanning the environment and self-monitoring. What conscious cognition does for the individual action, communication does for the social system. Self-monitoring highlights the **internal milieu** of a social system. It maintains the **self-reference** of the organisation by providing a description of what is going on internally as the basis for further action. Complex system produce and act upon a blurred picture of the themselves (Luhmann, 1984,51). Social systems have **several self-monitoring subsystems**. Different self-monitoring subsystems inform about and organize particular features of a system, which are encoded in a characteristic way. Several self-monitoring processes may compete for attention. Self-monitoring subsystems may integrate each other or may contradict and mask each other. Self-monitoring is schema based. A schema depicts certain events as relevant and omits others as irrelevant. A schema generates information by making a difference which makes a difference. Schematic information provides a clue about is to be done in the form of 'if ..., then....' rules.

To avoid misunderstandings in a social context it is important to demarcate self-monitoring from controlling. The function of self-monitoring is **steering and regulating**, the function of control is **regulating** only. The word 'monitoring' evokes the image of a video system monitoring people's movement in order to constrain their freedom. The term is not used here in that sense. A distinction between control and self-monitoring has to made. In this context 'monitoring' refers to the gathering of information for the planning of an action in order to decide what to do. Its basic function is to generate options, which then are decided upon, or to change goals during the move. The term control implies a fixed standard of comparison. Organisational control sets in, once a goal and a plan have been decided upon. Control makes sure that the targets are reached with the help of feedback and corrective moves. Control implies self-monitoring. The function of control is narrower as it does not cover the generation of options. It has been postulated that neither conscious cognitions nor organisational documents are epiphenomena, but relevant in the information processing in steering and setting standards for action (Cranach, 1983, Mandler 1985). This is expressed in the notion of their functions. Written material in organisational function like conscious cognitions in individual actions and informal communication in group actions (Ochsenbein, 1989). These functional analogies are summarized in table 8.1.

Table 8.1: Functional analogies on three levels

level of analysis	self-monitoring subsystems
individual	conscious thoughts
group	informal communication
organisational	formal communication

In following the studies of the Bernese groups (Cranach et al,. 1985, 1986, 1987) I am postulating the content of communication serves three functions for actions: When problems arise formal communication often takes place in order to find and decide upon solutions **(emergency function)**. This may be the case when a new program is adopted, in a crisis, under pressure for public justification, or under turbulence in supply and demand (Katz and Kahn, 1978, 470). It can take the form of a commissioned piece of

research. Many possible problem solutions may be the outcome. A decision about competing options is necessary. A formal communication settles a conflict between different factions by argument of authority and power **(conflict resolution function)**. Alternative options are already available from earlier research and from the diversity of opinions among staff. Such solutions are dignified in a formal decisions and redistributed as valid guidelines within the organisation **(transfer function)**. Formal communication is the highest form of self-monitoring in organisations. Other self-monitoring may be integrated on that level, but need not. Different self-monitoring subsystems may inhibit or reinforce their signalling power. Inhibited self-monitoring is not represented.

8.1 Self-Monitoring by communication

Many authors regard communication as the basic process of social systems. Social collectives are networks of communication, that come into being, evolve, continue and disengage (Hawes, 1974). Communication is the operator that transforms a system at time1 into the system at time2 (ibid., 500). Besides matter and energy information is the third basic resource of self-active systems. Communication is the essence of organisations especially the nearer you go to the centre of decision making in organisations (Katz and Kahn, 1978, 428). Luhmann (1984, 191ff) proposes a solution to the problem of whether communication or action is the basic unit of analysis. Communication is a social system, and all social systems involve communication. Individual or collective action arises when communication becomes reflective. One talks about communication in terms of actions, and one does those action with others. Actions are a way of communicating about communication. An action always offers reduction of complexity. Communication can continue on that or break down. The order, which arises from the mutual constraints of sender and receiver, is always fragile.

Two traditions of research about communication processes exist (Luhmann, 1990, 86). The one tradition is stultified by the very occurrence of order and mutual understanding against all odds, and tries to clarify how it is possible at all. The

problems are: how can information arise? How can information be **presented** to recipients in space and time? The solution of both problems leads to **understanding.** A standardized code is an actual order that conveys and makes understandable a difference, that makes a difference for action (Bateson, 1972). The third problem is the acceptance of the information, because understanding does not guarantee **acceptance** (ibid.). The focus is the unpredictable reaction of the receiver egos, the audience. The other tradition takes communication for granted and is basically concerned with the improvements of its functioning for example in the organisational context, i.e. with maximizing acceptance of message. At the core is the **transport metaphor** (Sfez, 1991). A message is moved from a sender to a receiver, and this transfer may encounter various problems like barriers, capacity overload, noise; with the effect that the message sent is different from the message received. Research is conducted to improve the performance of senders, channels and the effectiveness of the messages, all taking into account the characteristics of the receiver, in order to optimize the effect, i.e. to convey a difference that really makes a difference. The focus of research is on the sender: what can be done to get the message across? For my problem I will take the second approach. The problem is what is it that prevents resistance as an organisational signal from getting through? I will be concerned with the **problems of transfer and acceptance of the signal**, with the problem of buffering and ignoring the signal.

By means of communication tasks are defined, options for action are selected and transferred; jobs are supervised and the intended outcomes evaluated. Henceforth the terms **communication, presentation** and **information** are operationally defined as:

> **D8.1a**: Relevant communication is any verbalization, oral or written, related to the change project. Communication is the process and its outcome can be recorded. For purposes of analysis the process is time sampled.
>
> **D8.1b:** The sampled outcomes of communication are presentations, which contain information about the project; information are conceptual distinctions that may make a difference for action.

Communication is analyzed in samples of outcome. Presenting information and analyzing it is time consuming. Meanwhile the process of communication is continuing. Presentation are inputs into the communication process about itself at an earlier stage. They are generated either within the organisation as self-observation, or they are generated from outside as observations or research. The observer compares external

observations and internal self-observations, and report differences back into the social system. Such differences may be important new information, differences that make a difference, and stimulate organisational learning (Luhmann, 1991). In the analysis of communication I will be concerned with structure as well as with content. The content relates to its functions. Self-monitoring is selective and focused, schematically coded, possibly false or inadequate, and variously integrated.

8.1.1 The structure of organisational communication

People communicate in networks with nodes representing social roles, and links between the nodes representing contacts. The order of communication is depicted by mapping the various links onto the organisational role structure, which is ordered hierarchically according to responsibility and supervision. Such a structure has emergent properties that can be described in various variables. They are more or less complicated, counting the number of participating roles, and more or less complex, counting the number of links between participating roles. Complicated networks are always restricted, compared with their maximal combinatorial possibilities. Their complexity is reduced (Katz and Kahn, 1978,430). A link between two roles can be more or less strong and be symmetrical or one-sided. For my purposes the following structural distinctions are necessary: information follows single or multiple steps of processing; the process is formalized and has direction; the timing in relation to the action; the audience is mainly internal or external; a multitude of mechanisms transform the content during the process. Communication networks develop by differentiation and integration, hence they have a history. A single graph represents a time slice of that process. Technological innovations paradoxically constrain **and** expand the possibilities of communication. With a computer, TV or a telephone one excludes oneself from many a social network. Using these devices one gains new possibilities. The quality of that exchange is subject to debate.

Multi-step-flow

The hierarchical structure of organisations implies that most messages move in a chain

of multiple nods between the top and the bottom end. A model often used is the two-step process of Katz and Lazarsfeld (1955). To be effective a message first reaches **opinion leaders** or **gate keepers** (Lewin, 1947). Such persons are more likely to reach the targeted audience thanks to their personal characteristics of power, credibility, authority or trust, which they enjoy in relation to their group. A gate keeper is a filter and a translator. He or she selects suitable messages and translates them into a form which is most effective in the particular context. The two-step process is the common formulation of indirect flow. Multiple steps of gate keeping can be conceived. Bureaucracies tend to rule that official information should follow the line of command. **Short cutting** and **crisscrossing** across lines of the hierarchy are causes as well as expressions of conflict. Those passed by normally resent such a move because it is a statement distrust. The two-step model normally refers to top-down flows of information (Katz and Kahn, 1978, 443). However it seems equally useful to assume gate keeping processes for bottom-up or lateral communication. Certain management positions may be targeted in order to reach indirectly and effectively the higher decision making strata.

Formalization and parallel processing

Moving to higher levels of analysis from individual cognition, through group communication, to organisational communication the emergent feature is **formalization.** Formalized procedures are unusual on the level of groups. The formality of organisations is as much descriptive as it is prescriptive under the term 'bureaucracy' (Weber, 1947, 329ff; Crozier, 1964). Formalised operations guarantee a degree of predictability of actions and independence from the actions of an individual. To keep together their differentiation all organisations formalize procedures, but vary in the extent that is carried through (Pugh, Hickson and Hinings, 1969; Kieser, 1974). For efficiency and effectiveness the problem becomes one of degree. There is an inverted U-shaped relation between formalisation and effectiveness of a social system in a certain environment (Child, 1984, 153). Too high and too low degrees of formalisation causes stress for the staff and rigidity in the operations. We encounter formalisation in task descriptions and organisational hierarchies, and in standardised communication procedures like forms, protocols, chaired meetings, corporate image.

Formality is identified by **markers** in speech or on written material (Cranach et.al 1987, Tschan, 1990). Such markers dignify events as super-individual corporate events, as actions of a department or of the whole company. Based on markers it is possible to say, that the ECU has produced a report on X, although one or several individuals have written the text. Markers identify the position of the sender and the receivers of the message, the network within which the message is distributed (March and Simon, 1958, 3). Written material is often standardized. Special paper guarantees standard layout of texts like letters, memos, minutes or reports (Tschan, 1990). Formality expresses the social structure, the tasks, and the responsibilities, and corporate identity. Formal communication is stored in formal memories, the archive. Formality means that procedures are rule guided. Setting up meetings, timing and conducting is regulated. Oral communication may equally be formalized using formula and rituals to demarcate social differentiation (Giles et al., 1979). Formal communication is the highest form of organisational information processing and reflects the centralization of power (Elias, 1939). Things written reflect past decision making, are often binding, and are guidelines for future actions.

The structure of organisational communication is either formal or informal. Formal communication uses markers and is geared towards organisational objectives; informal communication expresses more individual needs. People constantly choose with whom to liaise, to continue or the stop interacting, often motivated by a drive to increase their influence (Monge and Eisenberg, 1987, 323). Information is processed formally and informally, often parallel. **Informal communication** is faster, more spontaneous and gratifying, more reliable under conditions of censorship and provides the essential social and emotional support to participants on the job (Katz and Kahn, 1978, 449). The purposeful leaking of secret information uses these characteristics. Fast informal channels are used to deceive, to distract, to test reactions, to signal intentions, to induce discussions, and to alter the course of negotiations (Kielbowicz, 1988. 291). Official secrecy stimulates grapevine activity and rumours. However, one observes that generally the intensity of formal and informal communication correlate positively (Katz and Kahn, 1978, 449). Informal events often precede formal events. Through formal events informal events become effective as they are dignified in official documents and are legitimized in formal decisions. Formal as well as informal information processing

constrain the range of possible individual actions and thus open up new options for collective actions (Luhmann, 1984). The parallel working of both channels is essential for the effective information processing in actions.

Directions of information flow

Network activity has three directions. Communication takes place top-down, bottom-up and horizontal. Top-down refers to messages that comes downwards the hierarchical order: decisions, guidelines and job instructions, rational why things should be done they way they are, commands, and performance feedback in form of appraisals, and ideological messages about the mission of the enterprise. Bottom-up messages going upwards the hierarchical order: reports on performance and problems of oneself or others, comments about organisational practices, ideas about what needs to be done. The steeper the hierarchy the less likely are bottom-up messages. To overcome the inherent barriers for bottom-up information flows, these processes are formalized by suggestion systems, grievance and complaint procedures, periodic systematic feedback or research. Horizontal flow refers to communication among peers on the same hierarchical level and is often associated with stress-reducing social support. This may include task related exchange or job unrelated chatting. Authoritarians view lateral communication with suspicion. It distracts from the immediate fulfilment of tasks and checks on the power of the time. Funnelling information directly to the top and horizontal isolation is a major means of social control of totalitarian regimes (Katz and Kahn, 1978, 446). Lateral communication is a source of creativity and flexibility and is necessary in many cases where group work needs coordination. Concepts like 'autonomous work groups' and 'quality circles' are formalized attempts of enhancing horizontal communication.

Position with regards to the action

Communication can be classified according to the time relation to the action (Cranach, 1983). At different times different content will be salient in communication. **Antecedent** communication prepares the ground for an organisational action. One would expect that environmental scanning, self-monitoring, and goal setting dominate the content of such communication. **Accompanying** takes place after the action has started. One would that

planning, execution and control related communication dominates the content. Finally, after the action is completed **post festum** communication sets in. One would expect that evaluation and consummatory communication dominates together with antecedent communication for further actions.

Internal or external target

Organisational presentations are externally directed for public relations and marketing, or are internally oriented, in companies newspaper or on notice boards. External communication is rhetorical to manage public opinion as a long-term asset, identity management, to keep the corporation distinct among the many organisations, and political, to emit politically relevant messages without being overtly partisan (Cheney and Vibbert, 1987). The latter is a form of enacting the environment in order to influence the conditions for future activities. Network analysis identifies the boundary spanner, who is the person bridging two networks by communicating internally as well as externally (Katz and Kahn, 1978; Monge, 1987, 255). I will be mainly concerned with the internal presentations of resistance to change.

8.1.2 Contents of organisational communication

Communication is social information processing and is basic for steering and motivating organizational behaviour. Content of communication is important. by communication options are pointed out, constraints are set, actions are coordinated, conflicts are solved, and individual actions are kept in the projected direction. Communication reduces complexity in order to enable new things to happen (Luhmann, 1984, 45ff).

Functional classification of content

Based on the theory of self-active systems one can expect that organisational communication can be classified along the nine basic functions: orientation, self-monitoring, goal setting, planning, execution, control, stopping, evaluation, and consumption. I will use these categories for the analysis of documents and interviews.

Coding

Communication is based on language and metaphor (Lakoff and Johnson, 1980). The words, concepts, schemes, frameworks and arguments which are used make the organisational information environment (Monge, 1987, 255). A certain way of talking about organisations selects certain features of reality, omits others. If the way of talking is systematic one can identify a code, a finite number of symbols that combine in certain ways and so express state of affairs. Organisational theory deploys, describes and classifies these codes of organisational functioning as images (Katz and Kahn, 1978; Morgan, 1986). A newcomer has to learn the code in order to understand what is going on. Learning is done best with the help of an insider (Louis, 1980). When an organisation produces descriptions of itself, i.e. communication turns upon itself, people draw upon a stock of knowledge, images, metaphors which are available in a culture. I will use the notion of **social representations** (Farr and Moscovici, 1984; Moscovici, 1988) to refer to the process of deploying that stock of knowledge. Social representations of organisations are images which familiarize the unfamiliar with the help of objectification and metaphorical anchoring. Metaphors allow to understand and to experience something in terms of something else. Images of organisations as machines, organisms, brains or prisons, are informative as they make a difference. Different metaphors have different implications for actions (Lakoff and Johnson, 1980). They can be pragmatically analyzed by the various consequences of endorsing them as did McGregor with his theory X and Y (McGregor, 1967; Morgen, 1986). Social representations drive and are driven by individuals' cognitions. Such images are commonly taken for granted until analyzed as such. Social representations are in written material or in interviews with persons in the firm. A social representation reflects the culture in which the organisation is embedded in and shapes that culture at the same time (Smircich, 1983). A particular social representation adopted by a firm is called an **organisational presentation**. The function of an organisational presentation is to establishes a **common language** in the sense of word meanings, helps the individual to **make sense** about what is going on outside and inside the organisation and **guides him or her to act and to survive** in that milieu. Several presentation may exist along side each other competing for prevalence in the communication process.

Individuals process information with schemata in mind that filter, organize and

construct inputs. These schemata are partly individualised and partly shared with others. In group communication metaphor express these schemata. On the organisational level formal presentations makes use of metaphors. These metaphors are brought in by authors who in turn rely on social representations of organisations (Farr and Moscovici, 1984). Schemata, metaphors and organisational presentations and social representations are functionally equivalent concepts on different levels of analysis as shown in table 8.2. Higher level processing will make use of lower level processing. They select, transform, generate, accentuate, complement, and order information for guiding and motivating ongoing action.

Table 8.2: equivalent concepts on different levels

concept	level of analysis
schema	individual
metaphor	group
organisational presentation	organisational
social representation	culture

Table 8.3: Selection and representation of information

level	individual	group	organisation
selects from	cognitions	conscious cognitions	communication
represents as	conscious thoughts	informal communication	organisational presentation
kind of data	verbalisation	verbalization recorded interviews	verbalization recorded interviews written material

Formal markings will be the criterium to talk about **organisational presentation**: i.e. the organisations speak about themselves. Such a presentation is the outcome of at least three step information process from individual cognition, to group communication, to

formal presentation as summarized in table 8.3. In the first step information is produced in individual thoughts and verbalizes them. In the second step it is selected, organised, discussed and transferred on the group level. In the third step the information is reorganised in an organisational presentation, which then is distributed and stored as an official document. An organisational presentation is a filter of group communication and individual cognitions transformed into other media: formal minutes, memorandums, visions, protocols, reports, tables etc.. Individuals think (individual level), they communicate some of it informally within their network (group level). A formally marked document defines information as a part of an organisational presentation (organisational level), the origin being individual cognition on the one side, group communication on the other. Organisational presentations are the outcome of formal communication. They draw bottom-up upon individual cognitions and informal communication, and they organize at the same time that information top-down. Not everything relevant for action is formally communicated and stored. Those events that are transferred are likely to influence the course of future actions. Formal presentations can direct as well as post-hoc rationalize past actions in the sense of a self-serving bias or of impression-management (D'Aveni and MacMillan, 1990). But rationalisations of past actions can become the guidelines for future actions. This renders their analysis informative. It is important to point out that organisational presentation are made on all levels of the hierarchy. Not only the top management can produce them. Organisational presentations have a hierarchical structure. Organisational presentations are not associated with any particular position in the hierarchy, but their order of importance will be likely to correlate with the hierarchy: statements issued at the top will overrule the validity of statements issued at lower levels of the hierarchy when it comes to guide actions. Lower level information is the basis for higher level decision making.

The access to the relevant presentations is a matter of valid methodology for the individual as well as for the collective level. The scrutiny of introspection (Ericson and Simon, 1980, Kalbermatten, 1982) finds its equivalent in the method of critical examination of sources (Barzun and Graff, 1977, 83f; D'Aveni and MacMillan, 1990, 651ff) which needs to be applied to organisational presentations. The question is: Under what conditions do formal reports, minutes etc. reflect the actual discussions and arguments in formal meetings validly ? This question has to be answered with regards

to the author of the report, his possible intentions, and the completeness of the available records about the problem.

Organisational self-image

The self-image of an organisation is implicitly or explicitly expressed in organisational presentations. The continuous and consistent self-presentation of such an image is integral part of public relations efforts. It includes the picture of the functional hierarchy for reasons of internal orientation about 'who is who, who does what', symbols for common identifications (logos, means of corporate identity), an emphatic language like: 'we are all the X family', 'we are the greatest' etc..

Narrow span of attention

Information generated in an organisational setting continuously competes for a narrow span of attention. Selectivity has many sources: e.g. the codes used, and the people making decisions. Decisions are made by a limited number of people, who all have a limited capacity for cognition, and in addition are under time constraints. Most of the time, selections are made which result in heeding some information and discarding some, and the search for information is stopped before it is completed. Decisions are made in a satisficing rather than optimal way on the basis of a partial model of the world. This means that under pressure for action certain things will be taken into account and others not, certain things will be on the agenda and others not. The question is, how do things get onto the organisational agenda? (Simon, 1987, 351). Ignoring information can be a dangerous state of affairs, because the unknown may be the important bit of information. Formal structures are used to avoid that danger. Various departments and committees set agendas, construct and store alternative analysis of issues, and provide alternative agendas for action at best independently from each other. Maintaining such resources for options reduces the overload of decision makers and at the same time keeps alternative solutions ready should a chosen agenda fail (ibid., 535). Organisational information from environmental scanning and self-monitoring produce information which competes for the narrow span of attention. The allocation of attention to external or internal matters may define roles in an organisation. The balance between boundary spanning and self-monitoring may shift in

the course of a project. In periods of organisational crisis a positive ratio of external to internal attention seems to be crucial for the success or failure of the organisation (D'Aveni and MacMillan, 1990). The selection and transfer from one medium into another is done by **attention processes**. Attention opens up an area in the perceptual field with information for further processing. It is narrow, focused, and directed by intense internal or external signalling (Ochsenbein, 1989). Within the context of collective action the problem is: how is attention of the organisation allocated (Simon, 1987; D'Aveni and MacMillan, 1990).

8.1.3 'Mis(re)presentations'

The theory of self-monitoring postulates that erroneous information may be generated. The source and its representation may be various deviant: self-monitoring messages may be mere fiction, under or overrepresenting or otherwise distorting their source, or there may be no messages in cases where one would normally expect one. The notion of 'false representations', or in mass communication terms, a bias, assumes a baseline of comparison to make a judgement about an inadequate or adequate representation. This is notoriously difficult to justify as it implies a privileged point of view from which to demarcate the correct from the false. One would touch the problem of 'false consciousness' on the individual level, and the problem of 'ideology' on the collective level. For my purposes I assume only that the 'deviant message' is identified as such by an observer who observes the source as well as its representation and compares them. The bias shall be explained by various processes, and shall be fed back into the communication system, where it has an effect or not, i.e. focuses attention, becomes information and alters the course of action or not. No ontological claim is made with here about that. I postulate two classes of processes at work, when 'deviant representations' can be identified: gate controlling with regards to transmission and various kinds of recoding, like being vague, to contextualize, to simplify and to assimilate with regards to information generation.

Transmission problems: 'package transfer'

I have identified parallel processing in formal and informal mode, and the multi-step-flow as structural characteristics of organisational communication. Problems of transmission are the traditional focus of organisational communication (Campbell, 1958). The transport metaphor assumes that messages have fixed qualities (their 'meaning'), that are moved from A to C via B. A 'package' content is unchanged while it goes through B or not. The transmission is differentially selective depending on the direction of transfer, the characteristics of the message, the sender and the receiver. Lateral communication is more frequent than upward or downward. Downward communication is more frequent than upward. Upward communication is the most problematic information process. Trust, the intersubjective achievement of selective indifference between people (Luhmann,1989; 26), renders information transfer more likely. The subordinate's mobility aspirations and the superior's influence on his or her future make upward communication more likely. Information favourable about the sender is more likely to be transferred upwards than is unfavourable information. Upward communication is more likely when a) no unfavourable consequences are to be anticipated, b) the superior needs the information, c) confirmation is given by other sources. However, the empirical replication of these results variously complicates the picture (O'Railly and Roberts, 1974). The most obvious case of a 'misrepresentation' arises from **gate keeping** (Lewin, 1947; White, 1950). A gate keeper is a person, who decides whether a messages is sent or not. Gate keeping assumes prepackaged messages from which to select, without altering the messages in any way (McQuail and Windahl, 1981, 100). Gate keeping means selection and can mean denial, all messages on a certain issue are blocked from transfer, or partial censorship, selected messages are blocked.

> **D8.2**: To operationalize gate-keeping one (a) measures the intensity by counting the difference between incoming and outgoing messages per time unit, (b) assesses the type by identifying the censorship instructions, and (c) characterizes the gate-keeper's position within the network.

Gate keeping is triggered. The parallel interplay of formal and informal messages may be important. The fast informal channel may be able to trigger a blockage in the slower formal channel. The effect would be that resistance, albeit present, would not figure in official documents or meetings. A potential censor gets instructions top-down, bottom-

up or lateral on when and how to block messages in the communication network.

D8.3a: To operationalize the censorship effect of parallel processing one compares the content of informal and formal communications.

D8.3b: It is weak censorship when an issue is presented informally but not formally.

D8.3c: It is strong censorship when formal instructions to censor can be identified.

Forms of recoding: alterations of meaning

I have identified coding as a foremost characteristic of any content of organisational communication. Recoding assumes that an original message is available against which the recoding can be tested. This may not be easy, because that may be individual perception, casual observations, or unrecorded communication. Again the observer plays the crucial role of filling the gap. The observers own coding of an issue is the standard of comparison. Recoding alters a message in various ways allowing bias to arise. A particular recoding may increase the complexity, for example by introducing vagueness and ambiguity or contextualization, or reduce the complexity, for example by simplifying or assimilating to familiar ideas. increasing the complexity loosens the connection between message and change of action, while reducing the complexity strengthens the connection. **Being vague** about an issue is a way of avoiding conflict and to keep up or expand communication to many different people. Vague and ambiguous presentations allow an issues to be A or B or C, no clear problem definition is given. People can read, whatever they please. Nobody needs to be blamed for having made mistakes, and many different ways for future cooperations are kept open. The effect of being vague is that actions are not clearly identified and therefore delayed. Introducing ambiguity is playing with time. A game that diplomacy has cultivated for centuries. Being vague produces underrepresentation of an issue.

D8.4: Being vague is operationalized by an issue, that has been identified clearly in one interview or document, and is presented ambiguously in a later interview or document.

To **contextualize** has a similar effect as being vague. It delays actions. To identify an issue depending on certain conditions, that can be present or not, removes the sense of urgency from an issue. Once an issue is contextualized it is marginalized at the same

time. A problem is related to specific situations, that need not general attention, but attention of some specialized subunit. To contextualize underrepresents an issue or may factually block a message from getting through for decision making and action.

> **D8.5**: Contextualizing means identifying an issue with a marginal group in the organisation, or as a problem with very specific conditions.

In **simplifying** an organisational issue becomes clearer. It is clearly identified which allow to make direct connections to what needs to be done. In some organisations it is the rule that no policy document may exceed one or two pages. Simplifications include condensations, omission of detail, abbreviations, complementing or closure of gestalt, enhancing of contrasts, categorizing, central tendency and loss of variance (Campbell, 1958). Simplification strengthens the link between coding and action. The initial complexity of the issue is reduced by making it a X issue clearly distinguished from Y of Z. Because several ways of simplifying may be possible, a particular simplification is risky. It may miss the point. The risk is amplified when a simplification is granted 'truth character' by getting the formal 'blessing' of people with authority and power. Once simplifications have gained the status of truths, they are difficult to be recognized as such. Simplifications accentuate an issue as being of a certain kind, and hence may be the source of over-representations or even fictitious representations.

> **D8.6**: Simplifying means a problem is structured by solutions, i.e. with few features and directly linked to known actions. A rule of thumb is a good example.

Assimilation brings in the element of information storage and memory. A new message is altered in the sense that it is made similar to things encountered before by way of anchoring (Moscovici, 1988, 235). The use of metaphor and analogy is a way of making oneself familiar with an unfamiliar event. This may include making abstractions and, by applying abstractions somewhere else, making generalizations. It may also include changing a message so that it is similar to a previous other one. Such changes have various reasons: to please the receiver, to fulfil expectations, succumbing a stereotype or response set, to integrate conflicting messages, or to conform to group pressures (Campbell, 1948).

> **D8.7**: Assimilation is either strong or weak. A strong assimilation means a new problem is structured to conform to an older familiar one. A weak assimilation is the use of metaphor or analogy to define the problem.

8.2 Self-Monitoring by accounting

Several self-monitoring subsystems coexist and compete for attention in an organisation. The most familiar one, and the one which probably received most attention, is cost accounting. An accounting system is a system of indicators of organisational processes in a money terms. In the analysis of Hopwood (1984 and 1987) accounting shares quite clearly the characteristics of a self-monitoring subsystem: selectivity, schemata based information gathering, signalling deviations from conventional standards, erroneous messages, indicating time and location of internal events, historical developments and cultural differences, top-down filtering of messages. Historically accounting was introduced in organisations to tighten the control of operations and to guide the steering of operations in financial terms. Having an accounting system has proven crucial for survival in competition and in economic crisis, because it allows to identify successful and problematic areas within the same organisation. Problem areas are detected and investments are allocated according accounting information. Historically the introduction of an accounting system produced a strong economic advantage, it allowed to produce goods much cheaper, and hence be in a better position on the market (Hopwood, 1987). Nowadays the problem is no longer having or not having an accounting system, possibly with the exception of Eastern European and developing countries, but which accounting system to have.

An other important function of accounting is **self-monitoring for external presentation.** This function is often under conflicting demands. The optimal message for the tax office and the stock market is not the same. There are legal requirements for tax and public presentation. The presentation of accounting figures is information for the stock market (the more profit shown, the better) or for industrial relations (the less profit shown, the better). In that sense accounting is not only bottom-up but strongly top-down information processing and preparation, which includes strategic selection, suppression and accentuation. Hopwood also points to **dysfunctions of accounting systems**: they only assess past performance. The present situation will be conceived in terms of the past, which limits the view of new opportunities. Accounting figures are often used to reduce costs thereby constraining possible actions instead of opening up new actions. Short-term obsessions with cost reductions at the dispense of costumer

needs contributes to organisational failure (D'Aveni and MacMillan, 1990). Accounting systems are schematic in the sense that they represent certain processes in terms of costs and benefits, others are omitted. This selectivity runs the risk of missing important internal developments when depicting negative results too early and positive feedback too late. Complementary self-monitoring in a firm is necessary to avoid the risks of singularity. Another way out is to avoid accounting all together. Paradoxically Hopwood (1985, 183) argues that certain organisational actions should be temporarily excluded from accounting in order not to be strangled by inadequate and outdated criteria of success. Accounting harbours the ghosts of the past. The primacy of the accounting system is a widespread and institutionalized by a strong expert profession. It reflects the power of the financial department in the most operations. As a consequence organisational events do not exist until they are integrated into some accounting figure. Accounting as a self-monitoring subsystem has colonized most areas of business, and it is about to colonizes other areas, which were traditionally excluded from such observations like training, arts and education.

8.3 Self-monitoring by consultancy and research

Consultancy research is another organisational self-monitoring subsystem. A consultancy creates information about the performance of a firm by comparing external and internal information, proposes definitions of problems and possible actions. Its reports are formal communication and are most of the time integrated into organisational self-monitoring. This argument reflects the situation of the present thesis in the organisational process.

A consultancy is called upon in a state of crisis **(emergency function)**. Consultancies use standardized procedures and diagnostic theories for the analysis and the redesign of businesses. They 'know' what to look for in order to identify a problem. The kinds of problem that are identified characterize the type and corporate identity of the consultancy. A financial consultancy will predominantly find financial problems, a personal consultancy will find manpower and management problems. Their diagnosis is legitimized by past success and reputation. They will present a solution for the

problem which is based on their analysis. That is what they are paid for. The information produced by a consultancy comes in form of a report or an oral presentation to the decision makers in a firm. This report contains an analysis, an evaluation of the firm, and possible actions to be taken in order to reach certain objectives. Initially this report constitutes an external observation of the firm. The observation becomes a self-observation of the firm as soon as the report is integrated into the formal communication system of the firm, i.e. it is published, copied and handed around, mostly however in a selected network. The firm will describe itself in the terms provided by the consultancy, see the problems in that light, and by doing so, open up actions for the future. By internalizing the external information the results become self-monitoring.

The analysis of a consultancy may be paralleled by efforts of self-monitoring from within the firm. In organisations more knowledge and know how is distributed than is obvious at any one moment. In the case conflicting messages may arise from within. The report of the consultancy may solve that conflict among many view of what by tipping the balance in favour of one view of what is the case and hence what should be done (**conflict resolution function**). In conducting the analysis of the firm in trouble the consultancy is most likely to talk to many people in different positions. They collect information from many sources, combine them, evaluate them, and integrate them into their report. Information is combined which would not have been combined without the external consultancy conducting their investigations. This report is fed back into the organisation (**transfer function**) as new information for further action.

8.4 Summary

In this chapter I have put forward the idea that consciousness and communication are functionally equivalent for different levels of analysis. Communication is the highest level of self-monitoring in a social system. In the analysis of organisational communication the structure, the content and various forms of 'misrepresentations' are distinguished. Communications in organisations flows in multi-steps; information is parallel processed formally and informally; the information flow can be characterized

by its direction, the position of source and target, and whether it is internal or external communication. Organisational information is verbally coded by schemata and representations, presents a certain self-image, and expresses a narrow span of attention. Various forms of misrepresentations are distinguished: errors of transmission by the gate keepers and forms of recoding. I will focus on four kinds of recoding of content: being vague, to contextualize, to simplify, and to assimilate with metaphors or analogies. Accounting, external consultancy and research are introduced as others forms of self-monitoring. Having clarified the notion of self-active systems in the previous chapter, and the importance of self-monitoring subsystems in general in the present chapter, I proceed now to discuss the workings of resistance as a specific self-monitoring subsystem of changing organisations and develop, based on that, the main hypotheses of the thesis.

9. Self-Monitoring by Resistance to Change

After introducing the concept of self-monitoring in general and for organisations in particular, I now proceed with the functional analogy of pain and resistance to change. Pain is a life saving signal for individual action, similarly resistance is an important signal for organisations. To talk about the 'pain' of the organisation may be a challenging metaphor that is rhetorically useful. Caution is necessary. Pain is an individual experience albeit socially conditioned. Organisations do not 'feel pain', however, resistance to change may have similar effects on organisational actions as pain has on individual actions:

> Allocating attention internally, stimulating further information processing, slowing the pace and altering the course of action, and providing the conditions for the recovery from structural strain or damage.

Pain and resistance to change are similar only in the light of such an outlook. An analogy creates similarities and the dissimilarities between the source and the target area. Processes may have the same function, although their history is different. This biological method of reasoning is used (Cranach, 1975). The structure and function of resistance, its integration into organisational presentations, which is a precondition of its effectiveness, are clarified. A working definition of resistance to change is explicated, and several core concepts are operationally defined. Over 30 hypotheses will be formulated, to show the fertility of the analogy. Finally, the limits of the analogy are discussed.

9.1 A Working Definition of Resistance to Change

Organisations move in time by transforming inputs of matter, energy and information into marketable products, and as such maintaining identity while constantly changing structure (Katz and Kahn, 1978; Morgan, 1986; Luhmann, 1984). Outcomes are products, services, and people with skills, motives and well-being. This process is described by a task structure, activity structure, the division of labour, and a communication network. Multiple activities are coordinated along the dimensions of

hierarchy, sequence and complexity. The focus of the present study is a single organizational action: the **implementation of a computer system** in a Swiss bank between 1984 and 1991. The implementation of the new computer system damages organizational 'fabric' and activates a temporary substructure of the organisation, called resistance.

Implementing a new computer system includes among other things the client group and the change agency; events, actions and attitudes; information processing and communication; and accounts of 'resistance'. The client group may cut across all levels of the hierarchy. Resistance refers to attitudes and behaviour of the client system. However, it is **the outcome of an information process of the organisation**, which cuts across the social hierarchy. Resistance is constituted by a cross-level network of communication as shown schematically in figure 9.1. With information technology we know of negative attitudes and avoidance behaviour at all levels of the hierarchy. Resistance is relational and includes an event, an observer and an information process, and a system of which all these are subprocesses. The performance of the latter is the result of the **interaction of the client system and the change agency.** I propose a working definition for resistance to change:

> **D9.1**: Resistance to change is a temporary network of communication, that includes some members of the change agency and of the client system who are in conflict with each other, that is informal and not anticipated by the change agency in form and content, and that processes the information according to which the project needs alterations.

Organisational conflict

A conflict binds temporarily two or more constituents that are simultaneously opposed to each other on certain issues, and their positions are perceived as incompatible. Conflicts occur in time and persist, escalate or deescalate depending on the kind of interactions that takes place. Conflicting issues may be values, goals, means, the distribution of outcomes, or styles of interaction. Conflicts are either within or between social units and tend to block the stream of experiences and of action individually and collectively for a period of time. Conflict management refers to measures, more or less institutionalized, to avoid the escalation of conflicts. Conflicts are neither good nor bad, but generally perceived as ambivalent; it all depends on the outcome. They block

actions as well as they are forces of innovation. Sometimes one would rather stimulate conflicts than solve them (Berkel, 1989). New technology is generally introduced to increase outputs and efficiency by substituting labour with capital. Efficiency is the ratio of human effort and output. Efficiency is often distinguished from effectiveness. The former relates input to output, the latter measures the long-term viability of an activity in relation to the environment. Efficiency is necessary but not sufficient for effectiveness. A service may be provided very efficiently; however, if nobody asked for it, the service is unlikely to survive on the long run (Katz and Kahn, 1978). New technology redefines how old and defines new tasks. The old routine of work changes. Any routine incorporates goals, plans, technological tools, and the organisation of work, all with little individual awareness. In the context of computer technology views are likely to divert on how to design the new technology and on how to organize work to maximize efficiency. To test the relation between resistance and efficiency hypothesis H9.1 states:

> H9.1: Resistance to change deploys an organisational conflict about how to increase efficiency.

I am making three implicit assumptions in H9.1: a) Local people in an organisation are their own experts of efficiency, because they are familiar with the necessary details. This cannot be substituted by the central planning of change. Planning is based on reduced complexity of the local work situation. Relying on planning is a risky business, it often misses the point. The planning of efficiency needs the local know-how of how to do it best. b) New technology should be introduced primarily to increase output rather than to substitute human effort, to avoid technological unemployment. This is an optimistic assumption, albeit in line with economic arguments for a change in innovation policy (e.g. Coleman and MacLoad, 1986; Cyert and Mowery, 1989).
c) Working people in industrialized countries to a large extent share a concern for efficiency with management as part of their culture of work (Furnham, 1990), particularly among white collar employees in the manufacturing or the service industry (Littek and Heisig, 1986). The conflict is therefore less about 'yes or no' on efficiency, but about how to maximize efficiency in concrete work situations.

Change agency and client system

The analysis of resistance assumes at least two interacting sets of activities: the change agency and the client system. Both groups are temporary and may cut across the layers of the hierarchy. The client system are those activities that are the target of the planned changes. The degree to which the client system is participating in planning the changes is likely to affect the process of change (Coch and French, 1948). Change processes are mostly planned, initiated and carried through by a change agency, that may have a rich structure of different roles (Ottway, 1983). The initiative is per definition on the side of the change agency which implements the new technology. Any change elicits actions and attitudes on the part of the client system, their communication and organisational presentation by the change agency. Resistance takes many forms as shown above.

Informal

The conflict is informal, which demarcates resistance from opposition. Opposition follows a formal procedure to settle disagreements. Institutionalized conflict management like collective bargaining between unions and employers, workers councils or forms of organisational participation are examples of formal procedures to put conflicts on the agenda for negotiations. Resistance is a form of conflict that is outside established procedures of conflict management, in the realm of pre-politics. Change agency and client system are temporary social coalitions that disagree about the values, goals, plans of the project, or about the change agency's style interaction. In the present context this may include disagreement about the design of hardware, software and orgware. Orgware stands for job design, information and participation, and issues of training.

Not anticipated

The conflict is not anticipated in form and content by the change agency. The change agency does not anticipate the resistance and the issues at stake, beyond general expectation of problems. There is an element of surprise that stimulates the collection of further information to understand and to make sense of what is going on. It is first step in learning. Surprise shows that things do not happen as expected. Institutionalization is a way of avoiding surprises by creating routines.

Representation as signal that something is going wrong

Resistance per definition opposes change, while it is left open, whether any change or only a particular kind of change process is in question. The change agency's attention is an internal signal, that indicates the deviation from an expected course of action. It affects the course of a project via organisational presentation. Resistance as a concept is mostly used by the change agency to diagnose a problem; it is rarely used by the client system to describe their own actions, attitudes and identity. To avoid self-description might be part of an effective strategy: the fish does not talk about the fish-in-the-water and swims easily against the stream (Scott, 1987). As the change agents notice problems, they observe the client system refusing their proposals, plans or actions, or parts of it. The change agents discuss the issue informally, and will formally make a presentation of the conflict. In order to be effective it seems resistance needs to be formally documented. Only formal representation of the issue redirects the course of the implementation. A number of phenomena of resistance may be explained through making a functional analogy to the pain system as stipulated above. Some of these claims will be specified in terms of testable hypotheses:

- The relationship between implementing new technology and resistance to change is variable. The link between computing and resistance is mediated by other factors than technology.
- Non problematic events may activate the resistance system under conditions of strain and stress.
- The functional resistance subsystem can decay into a dysfunctional subsystem by altering its structure.
- Resistance events are processed by communication and organisational presentations. In processing it is variously recoded: this may be accentuate or censured the problem depending on the modulation process involved.
- The form and the location of resistance in the organisation may change over time.
- The location of resistance within the organisational role structures may be misleading. The sources of the conflict may be in unexpected areas.
- The resistance subsystem may persist beyond the duration of the project of implementation.
- Resistance to change can be without consequences for the change project. Its effect

depends on the internal processing of the conflict.

- Resistance without consequences can results in conflict displacement. Problems may surface in unrelated areas at a later stage.
- No resistance is ambiguous: either there is no problem indeed, or internal censorship covers up the problem: no resistance is risky, it can meaning missing opportunities.

9.2 The structure of the resistance system: A scenario

The pain model of resistance is illustrated by the following scenario, that contains features of the analogy, and introduces the context of implementing a computer system in Bank: The implementation of the computer information systems in Bank X will alter the way things are done in the various branches. Users, bank managers and their employees, have been promised improvements for their daily work, and are concerned with the efficiency of their work. Their initial experience with the new system is not satisfying. They reject all or parts of the project of the change agency for various reasons: additional work load during the transition period, work load in operating the system, costs, lack of competence and training, deficiencies in hardware, software or orgware of the system. They are the experts of their immediate tasks, albeit not the computer experts. Refusal varies in intensity and takes various forms, individually or collectively: absenteeism, work to rule, sabotage, complaints hardware or software, strike, excessive turnover, refusal to buy the system etc.. Refusals to meet expectations is noticed by some change agents, who discuss the issues informally among themselves (laterally), with managers (bottom-up), and with the user (top-down). The change agency is concerned about the future of the project, that builds on the cooperation of the client system. Without the users no computer system can be successful, whatever its performance. They assess the user reactions in relation to an image of the organisation. Resistance is located and its power base estimated. The strength, forms, importance and contents of disagreements are discussed. If they judge matters significant enough, more information is collected, a formal investigation by an outside consultant promises a solution. Design options may be explored drawing upon diagnosis-action-schemata: Under conditions X, we do Y, then it will be right for the users. Some members of the change agency may advocate alterations in the project.

Others do not get involved because they have other priorities. Resistance mobilizes a network that only involves parts of the task force. Alterations of the project need time and money; higher level decision making is needed. A formal presentation of the problem is required to justify the additional resources for analysis and alterations. As soon as the money is granted, the alterations can go ahead. Thus resistance has affected the course of the implementation through information processes of individual recognition, informal discussion and formal representation. However, such a report may never be written, and the problem be officially denied; a report may be written, that misrepresents the problem. In consequence the additional resources are only partially allocated if at all. Other issues compete for limited resources of attention, time and money in any project. Official denial of the problem frustrates the users, the temporary resistance structure may persist. On record, written or orally, bad experiences are kept. The industrial relations climate may deteriorate by entrenched conflicts. Future change projects are even more problematic and may be doomed before the start. This scenario contains many of the elements that are now further analyzed.

9.3 Five characteristics of the resistance signal

Five characteristics of a self-monitoring subsystem have been stipulated earlier: selection of certain events, schematic presentation of these events, internal attention allocation and increased self-awareness, possible misrepresentations, mutual integration of competing subsystems. These characteristics will be now explored for resistance to change.

9.3.1 Resistance information processing

Event which can be analyzed as resistance are first of all individually perceived. Such observations are then informally communicated and may finally take a written and form. The transition from individual perception to informal and formal communication is a transformation process, that takes place in a temporary network of communication. This temporary network defines the boundaries of the resistance system. The network is

twofold, formal and informal. This network is only a substructure of the whole communication networking. It reflects 'who talks to whom about resistance'. This is expressed in the following definitions:

> **D9.2**: The resistance system includes all events of resistance and all communication, formal or informal, about these events.
> **D9.3a:** Formal communication of resistance is any communication that is documented. Formal communication is a slow process.
> **D9.3b:** The content of documents defines the narrow span of organisational attention.
> **D9.4:** Informal communication of resistance is any communication, be it project-related or not, that is not documented. Informal communication is a fast process.

During the implementation of a new computer system events occur that are perceived by the change agency as resistance. Users express negative attitudes or other forms of dissent to the particular proposal of the change agency.

> **D9.5**: A project proposal defines the expectations that the change agency has towards the client system. Expectations can be behaviourial, to do with what is to be done, or attitudinal, to do with what is the right mind set.

Resistance can arise in many locations in an organisation, and can take various forms. The implementation of a computer system has three dimensions: hardware, software and orgware. Orgware refers to issues of project organisation, information and participation, and user training. The implementation of the computer system and resistance are linked via the disruption of old work routines. An assertion that needs testing.

> H9.2a: The implementation of a new computer system brings disruptions of work routines, additional workload.

> H9.2b: Additional workload is related to resistance to change.

The particular information carried by the resistance signal is information about what people reject or resent in a particular project.

> H9.3: Resistance events implicitly or explicitly express criticism of hardware, software or orgware of a computer project.

Users are concerned with the efficiency of their work and possible disturbances of it. Efficiency relate the effort to the outcome of a certain task. A hypothesis is:

> H9.4: The bigger the additional work load, the more likely is resistance.

Disturbances of the task routine are problematic. However, some people are more

concerned about it than others, particularly if they are more effort conscious in relation to personal resources and motivation. People will react differentially to the proposed changes to the work routine that are brought about by new technology. This leads to hypothesis H5a, and more specific H5b to H5d:

> H9.5a: Users are differentially prone to resist changes in technology depending on their skill level, their work motivation, and their concern for work efficiency.
>
> H9.5b: The lower the level of skill, the more the resistance to change, as training means more work effort.
>
> H9.5c: The higher the work motivation, the more resistant people are, provided the new technology disrupts their work routine.
>
> H9.5d: The more efficiency oriented the client system is, the more critical it will be, provided the new technology disrupts their work routine.

Resistance is localized in relation to an **internal image of the organisation**. The internal image represents the functioning of the organisation and does not necessarily correspond with any formal chart. An official organisational chart represents the role structure of the organisation. The role structure and the real working structure may diverge. A corporate image is developed through informal talk about the organisation. Corporate identity is analogue to the body image. It develops out of self-observations and internalization of external views. It serves as reference to smoothen the ongoing activity. Its lack of differentiation or distortion can seriously impede effective activity. People may not know whom to approach in order for things to be done. The relation of resistance and corporate image is expressed in the hypothesis H9.6

> H9.6: Resistance is localized relative to an informal image of the organization.

9.3.2 Modulation and mis(re)presentation[1] of resistance

Organisational communication selects and variously transforms the messages of the computer users into the message the change agency has in the end. Events of resistance to change are subject to gate control and internal modulation like pain is. In empirical research, one can infer the working of **gate control** and **modulation processes** from the discrepancies between external observation of conflicts and the organisational presentation of issues.

Several cases of mispresentation of resistance are postulated: a) resistance to change is non-existent although there is a presentation: This would be a ungrounded presentation of resistance to change; b) Users are resistant to the project, but they are not formally presented at the organisational level; hence resistance is ignored or denied. c) Resistances are analyzed and formally presented at the organisational level, but this has no implications for the activity of the task force; it does not matter. d) Resistances occur, but they are incorrectly identified and misinterpreted. Resistance is mispresented. Situations b, c and d constitute missed opportunities for the task force to generate alternatives for action.

> **D9.6a**: Modulation of resistance means informal and formal communication of resistance are different.
> **D9.6b:** Modulation of resistance takes at least three forms: gate control, symbolic mispresentation, and lack of consequences for action.

Three processes of modulation are considered here. In **gate controlling** a decision is made whether to pass on information or not, hence selecting content without changing it.

Each position in a multi-step communication network can decide to pass on a message or not. Because other issues are considered more important for the success of the project, resistance may not be given high priority for action. Such a decision is more or less conscious; it may be motivated by management orders or personal judgement. The extreme form of gate control is organisational denial of any resistance to the computer project.

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[1] I do not want to use the term representation for resistance, because it is unclear what is the original and what is the picture. The presentation of events as resistance is the resistance to change. The presentation is constitutive for the phenomenon not merely representing something else.

D9.7: Gate control means resistance is documented selectively, compared to informal communication. Other problems of the project have priority of attention.
D9.8: Organisational denial means resistance is not formally documented, even so it might be observed informally.

In contrast symbolic (mis)presentation changes the content of messages passed on. A possible source of bias may be to conform to higher level expectations or orders. Symbolic presentations can be vague, contextualizing, which increase the complexity of the problem and lead to inactivity; or they can be simplifying or assimilating, which decreases the complexity of issues and makes actions more likely, but at the same time increases the risk of missing the point and doing the wrong thing. The outcome of mispresentation is that resistance is observed, described, communicated and documented in a way that reduces its full significance as defined in D9.9 to D9.12.

D9.9: Vague presentations of resistance are formal accounts that divert from the clearer descriptions in informal communications.
D9.10: Contextualizing means presenting resistance events as particular events in time and space; hence no implications for the project.
D9.11: Simplification means resistance events are accounted for monocausally and by easy solutions, e.g., rules of thumb.
D9.12: Assimilating resistance means identifying and explaining events in terms of past experiences or metaphorically.

Lack of consequences refers to cases where resistance is perceived, communicated and documented, but the allocation of time and money resources to the problem is denied. The enactment of resistance is blocked, similar to a block of the pain reaction. Top-down modulation blocks the translation of user resistance signals into alternative designs for hardware and software and work design. Without analyzing the user reactions, no relevant improvements to the project can be made. The occurrence of resistance is acknowledged, but the necessary resources to develop design options is not allocated.

D9.13: Lack of consequences means resistance is formally documented, but necessary resources are not allocated (a) to analyze user requests or (b) to coordinate alterations of the project.

The top-down modulation, which is defined in definition 9.13, is a case of asymbolia resistance in analogy to 'pain asymbolia' (Melzack and Wall, 1988;137): resistance is properly localised and evaluated, but not taken into account to alter the course of the

computer project. Resistance does not matter. The discrepancy of presentation of resistance and lack of consequences for the project lead to hypothesis H9.7:

> H9.7: In cases where organizational presentations of resistance do not lead to alterations in the project, the formal prevention of resource allocation occurs.

In analogy to the pain system a time pattern of resistance can be expected. The frequency of organisational presentations of resistance is fluctuating with at least two peaks during the project. Resistance is formally observed in the beginning of the project. Then, triggered by the initial, informal alarm, gate controlling or modulation sets in. In extreme cases organisational denial may filter all evidence of resistance. At a later stage resistance may be presented again. This simple time pattern of resistance is clarified in two hypotheses H9.8 and H9.9:

> H9.8: The frequency of presentations of resistance fluctuates characteristically over time: higher at the beginning, lower after that, and higher again later, declining again or remaining on a high level after that.

> H9.9: During periods where resistance is not formally communicated gate control and misrepresentation of resistance are working.

9.3.3 Integration of resistance into formal presentation

Without the pain experience, pain has limited effects. By analogy resistance to change seems to require the organisational presentation to affect significantly the course of the project. Informal communication and formal documentation have been distinguished as **two parallel levels of processing** in analogy to the emotional and cognitive processing of the pain system (see chapter 7). The data access to informal communication is difficult. The access to documents is principally easier, it can however be politically blocked. Empirically I am looking for documents that refer to resistance and relate that observation to adequate actions for the project, particularly into design options for hardware, software or orgware. The kind of communication is partially defined by the method of analysis.

> **D9.14:** Organisational presentations of resistance are content analyzed from formally written documents.
> **D9.15:** Informal communication is content analyzed a) from interviews with members of the task force, or b) from participant observations.

Various members of the task force will perceive and communicate resistance during the implementation of the computer system. A double network of informal and formal communication will be used to network that information across the levels of the hierarchy as shown in figure 9.1. It is postulated that organisational presentation identifies, locates and assesses resistance, and decides the alterations of the project. It is discriminatory and decision oriented. In informal communication people are creative, mutually motivating, exploring the available options for actions and feeding that into organisational presentation. On the other hand formal presentation may restrict of the space of options that are informally explored. These relations are clarified in the following hypotheses H9.10 to H9.12.

H9.10: Organisational presentations and informal communication of resistance differ in content.

H9.11: Organisational presentations assess resistance and convey decisions about alterations of the project.

H9.12: By informal communication of resistance options of design and alterations to the project are explored.

9.4 The hypothetical functions of the resistance system

The claim is that resistance to change in an organisation is a warning signal, that something is going wrong. Ignoring that signal may be tempting in a short term perspective, but may have serious consequences on the long run. Resistance to change comes in a variety of forms defining its quality; it has intensity that may reach a threshold of tolerance, beyond which it has effects on actions, below which it does not matter. Organisational projects differ in the amount of resistance they manage to absorb. It is postulated, that resistance serves at least three functions, summarizing the way in which resistance affects the ongoing project activity: focusing attention internally, evaluation of the ongoing activity, and alter the course of action. Resistance signals that something is going wrong, and that actions needs taken about it. Non-action or the wrong action would jeopardise the long-term viability of the project.

9.4.1 The internal allocation of attention

When resistance occurs individual cognitions and informal communication among members of the change agency is directed towards the area which resists the project. The problem is localised.

> **D9.16**: Resistance is localised when change agents identify people in the organisation who reject informally their proposals for changing work procedures with new technology.

A problem is localized in an organisation with reference to an organisational image. Certain positions of the hierarchical structure become more salient. Some organisational positions have more potential influence than others. It makes a difference for the long-term success of the project whether people do collaborate or not. Localizing resistance triggers an image of the power distribution in the project. The relation of power and resistance is expressed in hypothesis H9.13:

> H9.13: In localizing resistance the potential influence of relevant organisational positions is assessed.

The relation of resistance, power and organisational attention is crucial. Power and influence is reflected in at least three ways: in the capacity to focus attention, to set an agenda, and in setting the boundaries for any agenda (Bachrach and Baratz, 1962; Simon, 1987). Power may correlate weakly with hierarchical position. The extent to which the client system is capable of influencing the change agency expresses their power. The effect of resistance as stated in H9.14 is mediated by power positions.

> H9.14: Resistance focuses the attention of the change agency on user requirements for hardware, software and orgware, provided their power is recognized.

It illustrates the power distribution when top-management resists the use of personal computers and attracts stronger attention of suppliers than the resistance of lower levels office workers ever would. It is likely that the management resistance computers was a major incentive for suppliers to secure the user-friendliness of that new technology in a historically unprecedented manner. Generally a buyers' market, where many suppliers compete for the same costumers with hardware, software or services products, puts users in a powerful position. Resistance may be more or less strong. This implies

some ordinal assessment at least. As standardised measurement are not available, this is done implicitly. The operational definition is:

> **D9.17**: The intensity of resistance is measured whenever change agents talk about resistance in comparative terms.

An assessment requires a baseline. The change agents draw upon their own experience, or they compare the present situation with other organisations, about which they know. If the intensity of resistance reaches a situation specific threshold, the attention of the change agency will focus. They will acknowledge a problem with the computer implementation, and will try to solve it. The operational definition is:

> **D9.18a**: Resistance reaches the threshold of attention when the change agency formally investigates users' requests for software, hardware or orgware beyond initially planned participation.

Power lowers the threshold of attention to a problem. Hypothesis H9.15 summarizes the relation of resistance, power and threshold of attention in the implementation process:

> H9.15: The more the change agency perceives the users as powerful, the more likely it is that resistance reaches the threshold of attention in the organisation. Empowered resistance is documented.

9.4.2 The evaluation of ongoing activity

It has been stipulated that internal attention allocation triggers further information processing. The change agency can investigate the disagreement with the users in various ways: by hearing, by survey, or by getting a consultant in, either do it themselves or commission the investigation to an outside expert.

> **D9.18b:** A formal investigation is done (a) by defining a special task for a change agent, or (b) by consulting an external expert.

Such investigation will always evaluate the change agency's work. This points to the evaluation function of resistance. The change agency collects information to get a more precise idea what the disagreements with the users are about. The disagreement is finally about the project design in terms of hardware, software and orgware, either on the strategic outlook or on the more detail level. The outcome is an evaluation of their work from the point of view of the user in terms of the definitions 9.19.

D9.19a: Resistance evaluates the project when the change agency formally collects information about specific deficiencies of the project in terms of hardware, software and orgware.
D9.19b: Hardware refers to matters of computer hardware and the physical work environment: VDU, keyboard, processor capacity, furniture, climate etc.
D9.19c: Software refers to matters of programming such as (a) the layout of the user interface, (b) the steering of the dialogue, and (c) the security of manipulations. The elaborate concept of 'user-friendliness' summarizes the criteria for good software.
D9.19d: Orgware refers to all matters of project organisation, job design, training, user information and participation as far as it is part of the project planning.

As the client system does not talk and think in technical language, merely to collect the remarks is not enough. User information needs to be organized. Effort and expertise is needed to translate criticism into design options with regard the technicalities of hardware, software and orgware. The change agency has to rely on the technical expertise and their investigations, and their knowledge about design options. The evaluation function of resistance requires the technical expertise and flexibility of the change agency. The collective pool of skills and experience of the change agency is activated. Skills, knowledge and resources are the constraints under which the change agency works. It shapes their thinking. The change agency classifies the criticisms as valid and invalid, feasible and unfeasible in relation to the available resources: the change's agencies skills and knowledge, available time and money, and the user's skills. The lack of resources can starve the information process in a project.

D9.20a: Criticism is valid or invalid depending on the attribution of error by the change agency. Attributions draw upon the knowledge and the experience of the change agency.
D9.20b: Valid means the project deficiency is outcome of an error of the change agency.
D9.20c: Invalid means the problem is attributed to deficiencies of the users' skills or attitudes, and hence does not call for alterations of hardware or software.
D9.21a: A user request is feasible or unfeasible depending on the skills and resources available to the change agency.
D9.21b: A user request is feasible if it can be altered within the constraints of time and money, and unfeasible if it can not.

A point of critique may be valid, but unfeasible to act upon within the current constraints such as skills, time and money. The change agency may acknowledge that a criticism is valid but that it is beyond the agency's control. The hypotheses are:

H9.16a: Change agents classify user criticism into valid and invalid, feasible or unfeasible points, when interpreting user resistance.

H9.16b: The more elaborate the skills and the knowledge of the change agency are, the more they classify points of criticism as valid.

H9.16c: The greater the resources available, the more points of criticism are classified as feasible by the change agency.

Hypotheses 16a to 16c stipulate that the evaluation function of resistance is not a matter of the resistance events, nor the quality of the computer design alone, but reflects the relation between the problem and the resources of the task force.
The extent of processing of resistance reflects the relation of user requirements and the resources of the project.

9.4.3 The alteration of the course of action

Once the disagreements are classified things are ready to do for further action. This points to the alteration and avoidance function or resistance. Pain has been described as a strong changer of goals. Resistance may alter the design of a computer system in at least two ways: strategic changes and fine tuning. Strategic changes refer to major alterations in the direction of the project, extending or dropping whole parts of it. Fine tuning refers to alterations of details of hardware, software and orgware where the global direction is maintained. The alteration function is the ultimate criterion whether resistance works or not. The operational definitions are:

D9.22: Resistance is effective when alterations are made, and the specifics of these alterations are defined by formal presentations and analysis of user resistance.
D9.23a: Alternations are new tasks of the change agency which change the project design.
D9.23b: Alterations are either strategic, concerning long-term planning, or are fine tuning, concerning details for adjustment.

The resistance sign needs the translation into design options for hardware, software and orgware in order to be effective. To do that the change agency has to rely on the knowledge, skills and resources of the task force or outside expertise. They need to diagnose the problem, translate them as technical options which can be handled by

programming and organisational redesign. Such professional competence comes in of expert knowledge, in form of **diagnosis-action schemata** or 'rules of thumb'. An diagnosis-action schema may be tacit, only implicit and difficult to verbalize. It can be described as conditional propositions of the form: If you change feature X of hardware, software or orgware, then situation Y, which will most likely promote user acceptance. Schemata help answer the question: what is to be done?. Professionally shared schemata can be analyze empirically as expert knowledge. The hypothesis H9.17 is:

> H9.17: Alterations to the project design draw upon expert knowledge and diagnosis-action schemata that guide the change agency's alterations to the project.

Alterations in the design and its implementation will affect the initial time schedule. New hardware is bought, new software is bought, old software is altered, jobs are redesigned, users need to be informed and consulted, and need to undergo training. All this takes time. Hence, the pace of the implementation will slow. This leads to hypothesis H9.18:

> H9.18: Effective resistance slows the speed of project compared to the planned schedule, or compared to similar projects.

The outcome of effective resistance to change is that the design and the implementation of the computer system is changed according to functional requirements of the users. This points to the paradox of resistance to change. Resistance acts often intend to prevent changes from happening at all. The unintended outcome is, however, not a brake to all processes, but 'other changes' than planned. Resistance signals to the change agency how the implementation cannot go on, and how it could, if it needs to go on; another aspect of organisational power. Resistance may sets the boundaries of what can be done in a situation (Bachrach and Baratz, 1962). Hypothesis H9.19 tests the three ways of expressing organisational power, and hypothesis H9.20 tests the resistance paradox.

> H9.19: Resistance sets the agenda and limits the freedom of the change agency in matters of hardware, software and orgware.

> H9.20: The outcome of effective resistance is not the total halt to the project, but to direct alterations to the project (The resistance paradox).

Another outcome of resistance is the learning of the change agency that things can be

done differently. Agents gain experience about how to implement a new technical system and how to redesign jobs. Certain courses of action will be avoided in the future. This experience is stored, informally or formally, as a resource for future projects. Next time some people would do things differently. This is expressed in operational definition 9.24 and hypothesis 21:

> **D9.24**: The resource of the change agency increases when change agents explicitly state their learning experience in the project, and what they will do differently in the future.
>
> H9.21: Effective resistance increases the resources of the change agency.

Similarly the client system gains experience. The disagreement with the change agency stimulates interactions and networking among the users, who are discussing their disagreements with the task force. The time gained allows them to get trained for the new computer system, and to get used to the new face of their jobs. Now they know how to handle it.

> **D9.25**: The resource of the client system increases when users gain time (a) for specific training, (b) for getting acquainted with the new technology of their job, and (c) setting up new social contacts.
>
> H9.22: Effective resistance increases the resources of the client system.

9.4.4 The functions of formal presentation of resistance

It has been argued that resistance is parallel processed: it is individually observed and informally communicated, and organisationally presented. Formal presentation means integration the information into a higher form of processing. The conscious pain experience is the crucial part of the workings of the pain system. Similarly the organizational presentation is a necessary condition for resistance to be effective in altering the computer project. This tested with hypothesis H9.23.

> **D9.26**: Resistance is organisationally presented by written materials, which identify disagreements with the client system, localise, and classify specific criticisms as valid or invalid, feasible or unfeasible for alteration.
>
> H9.23: Resistance that remains informally communicated, that is not organisationally presented, is not effective (formal integration).

It has been postulated that organisational presentations emerge under three conditions: a) in cases of emergency, when the success of the current course of action is doubtful (emergency function), b) when conflicts about future directions have to be resolved (conflict resolution function), and c) when new solutions have to be transferred from individual cognitions and informal communications into organizational presentations and legitimized as binding solutions (transfer function). The postulated functions of organisational presentations have to be demonstrated empirically. The emergency function states that organisational presentations are made, when current activities runs into problems, when its successful accomplishment is doubtful and new ideas and decisions are needed. A sense of emergency depends on the allocation of attention as well as on the negative evaluation of the project by resistance. Some change agents may become doubtful about the success of the project. They are aware of the conflict with the client system and its evaluations of the current action. The problem is defined in an organisational presentation. Organisational presentations are made when a new direction is needed, in order to continue the project. 'Needed' means that some actors doubt and communicate their doubts about the successful accomplishment of the project, and look for new ideas. This is expressed in hypothesis H9.24 about the occurrence of organisational presentations. A critical mass of similar opinions is necessary:

> H9.24: If some change agents doubt the successful continuation of the project due to user responses, they will come up with an organizational presentation of resistance.

Organisational presentation transfers information between different groups of people involved in the implementation of the computer system. They focus the attention of the change agency to a problem and the search for solutions by activating the tacit diagnosis-action-schemata of expert knowledge. Solutions are alterations in the project that increase the probability of success of the project. The operational definition is:

> **D9.27**: Transfer of information means the formal documentation of resistance contains information about resistance and possible solutions which one part of the change agency knows, but the other part does not.

Organisational presentations resolve conflicts between options of diagnosis and of action which are put forward by different people. This implies that different options are competing for legitimization. Hence we expect that the number of options for diagnosis

and action in the organisational presentation is smaller than in the informal communication.

> H9.25: Organisational presentations are less rich in options for diagnosis and action than informal talk on a particular issue.

An organisational presentation of resistance and its implications is a process of information which draws upon individual cognitions of the problem and informal communications. The focusing on a particular solution is the criterion for the existence of a conflict resolution. This leads to hypothesis H9.26 about conflict and organisational presentations.

> H9.26: When observations of resistance or plans for actions divert among change agents, an organisational presentation of resistance is made.

9.5 Two dysfunctional developments of the resistance system

In the presentation of this chapter, the structure and functions of the resistance system have been clarified in various definitions and hypotheses in an attempt to clarify the postulate that resistance is a functional phenomenon in organisations. This can be counterintuitive as has been shown by the semantic analysis of the term 'resistance to change' among managers (see chapter 5). However, similar to pain if resistance becomes chronic state of affairs and it might lose any possible benefit for people involved. This alteration is the outcome of a transformation of the system. Two hypothetical transformations of resistance are distinguished, which can be explained within the present framework: the effects of prolonged modulation and structural changes due to entrenched conflict. Prolonged modulation of resistance, be it gate keeping, censorship, mispresentation, denial, or prevention of resource allocation, brings about structural changes in the whole system on the long run: the brake down of communication and the escalation of the conflict into other issues than the present project. In such conditions not only the continuation of the project is jeopardized. This idea is reformulated in hypothesis 9.27:

> H9.27: Prolonged modulation of resistance, by gate-keeping, censorship, misrepresentation or denial, or the prevention of resource allocation, increases

the probability of project failure.

A resistance network has a history in the sense that people involved have experienced change projects before. The network may even have existed previously and is revived in the present context. The resistance system is a part of the organisational culture and experience. On a higher level of analysis, researchers speak of industrial relations systems. Prolonged modulation of pain damages the immune system of the body and increases the probability of tumours and cancer. In the analogy, functionally similar prolonged modulation of resistance creates a network of informal and alternative communication about the project. An activity pattern may arise that interferes with the requirements of any new project. That makes organisational changes even more difficult in the future. The escalation of conflict changes the organisational climate into a direction where any kind of change, well beyond the present project, is becoming impossible. Hypothesis H9.28 makes that point:

> H9.28: Prolonged organisational denial of resistance escalates into a structure of entrenched conflict and an inflexible organisational culture.

Continuous conflict about everything becomes a characteristic of an organisational culture and an industrial relation system that is not conducive to the social system's rate of innovation and viability on the long run.

9.6 Limitations of the pain analogy

An analogy is positive and negative. The positive analogy are all those features which a similar in the source and the target area. The negative analogy are all those features which are dissimilar. The dissimilarities decide on the strength of the analogy. I will briefly refer to some of the structural dissimilarities between pain and resistance and call recommend a cautious use of the analogy. The notion of 'organisational pain' may be a challenging metaphor, but it will always be a metaphor.

Hard wired versus lose structure of the subsystem

A dissimilarity is the relatively fixed anatomy of the pain system in contrast to resistance. The pain system is hard wired. The communications channels and the

processing centres of the pain system are identifiable, and their anatomical location and linkage is fixed. This is at least an assumption of physiological pain research. In social systems the communication structure is more flexible. Information about resistance to change can principally take any channels and can be processed in many hierarchical positions. No hard wired 'anatomy' can be identified. An social system is a universe of many possible resistance substructures, depending on the issues involved, past conditioning, and the present context.

Fixed location versus multiple gate keeping

Another dissimilarity concerns the **gate control.** Pain research locates the gate control mechanism in the dorsal horn of the spinal cord, a low level structure of the nervous system. In contrast gate keeping processes can work at all point of communication network independent of position in the hierarchy. No particular location can be privileged for the gate keeping function.

Complexity of the signal code: variety of presentations

The complexity of pain experience and resistance presentation is different. The variety of social resistance is probably richer than the variety of different pains and pain reactions. The analogy proposed here takes a simplifying view on both sides of the analogy, not least because the phenomenology of social resistance is hardly established. The present model is basically concerned with an analogy to acute pain or muscle strain. A good example is the sudden aching of the knee while jogging. The pain has obviously functional value, by slowing the pace of action, urging for rest and care, and thus preventing more serious injury from developing.

Evaluative connotations: clear versus ambiguous

Another dissimilarity between pain and resistance is the emotional quality of the experience and the presentation. The experience of pain is predominantly negative. Pain is unpleasant, repulsive, albeit there may be pleasant pain experiences under certain conditions. The perception, informal communication and organisational presentation of resistance is more ambiguous. A predominantly negative view of resistance can be found among actual and potential change agent as shown in chapter 5: resistance is a

nuisance and something to be avoided. The present thesis, however, proposes a more positive conception of resistance with regard to long term effects on any project of change.

Fast and slow parallel processing

A major dissimilarity concerns the parallel processing of information. The pain system processes the pain signal fast to the highest level of processing for signal discrimination, decision making, and top-down modulation. The lower level motivational processing is slower. The resistance system seems to operate the opposite way. Presentations of resistance, that serve to discriminate location and intensity of it, to legitimize decision making, to solve conflicts, and that modulate resistance works slowly. The informal channels of communication, that serve to explore interpretations and to press for actions, work fast. Pain is fast in discrimination and slow in action, resistance to change is slow in discrimination and fast in motivation.

Existential experience versus conceptual presentation

Ultimately pain is a unified, individual and existential experience, that can fundamentally change a persons long term outlook on life. It can integrate as well as disintegrate the personality structure. Resistance to change hardly has any kind of overall and integrating effect on a social system. I avoid talking about the 'pain' of an organisation. Rather I am using the term 'resistance' strictly to describe a process that is at most functionally similar by solving a similar problem: to represent internal requirements effectively. A unified presentation of resistance is unlikely for a social system, where various centres of power continuously compete for attention and agenda setting. I do not rely argue for the similarity of experience and representation, but for the similarity of processes and effects, albeit on different levels.

9.7 Summary of the functional model of resistance

The core of the argument is a **functional analogy of pain and resistance to change.** Pain is often a life saving signal in individual action. Similarly, resistance may be an important signal in organisational systems that something is going seriously wrong. The analogy of pain and resistance is summarized in table 9.1. The various features are classified according to the structure of processes, content, functions and dysfunctions. The postulated correspondences of the resistance and pain have been defined operationally in D8.1 to D9.27 and have provided ground for various hypotheses. It is stipulated that resistance allocates attention to issues of disagreement about how to improve efficiency, evaluates the computer system in terms of hardware, software and orgware, and elicits alterations in the design and the implementation of the computer system. In order to accomplish that, the pace of the implementation will slow down. In order to be effective, resistance of the client system has to emerge in formal communication within the organisation. Table 9.2 summarizes the major components, processes and postulated functions of the resistance model that are defined and are used in the various hypothesis. A structure of the resistance system is postulated which involves parallel processing and top-down modulation and gate keeping processes. Resistance is analyzed as a characteristic of the organisational communication network. The constitution of resistance, its absence or presence, its mode of presentation, within the communication network reflects the user reactions as well as the process resources of manpower, time and money. It is stipulated by that model, that the absence of resistance reflects internal processes rather than the absence of critical reactions on the part of the users. Assuming that criticism of the computer system provides useful information, its absence is therefore a risk or may be regarded a missed opportunity on the way to an efficient and effective work system.

Table 9.1: The functional analogy between pain and resistance

pain system		resistance to change
I. Structure of processes		
multi-step flow of information		
spinal cord		across levels of hierarchy
mid brain		several positions and roles involved
cortex		
parallel processing		
spino-reticular	(slow)	formal communication
thalamo-cortical	(fast)	informal communication
Processes of signal modulation		
a) gate control		
dorsal horn (fixed)		any interaction partner (flexible)
alternative stimulation		other priorities, objectives
		gate keeping by set priorities
b) top-down modulation		
endorphin release		message blocking and censorship
wilful body control		symbolic recoding
		being vague
		contextualize
		simplify
		assimilate
II. Structure of content		
Representations, awareness, integration		
location within body image		location within the organisational image
quality		various forms of resistance
intensity		extent of the problem
duration		duration and periodicity of events
emotional quality		negative evaluation
cognitive schemata		conceptual presentation
Mis(re)presentation		
referred pain		false location
phantom limb		fictional events, grievances about past
pain control		exaggeration or amplification of events
		down playing of problem
anaesthesia		repression, censorship
Timing in relation to action		
during strain, injury		planning phase
after strain, injury		during execution of plans
after the healing		evaluation phase
III. Functions		
Signal function		
a) attention allocation		
focus on injury		focus on user problems
accentuation of body image		salient organisational structure
b) evaluation of ongoing action		
action is dangerous		features of the project are unfeasible
		faulty hardware, software and orgware
c) alterations in future action		
alteration of ongoing action		to alter hardware, software, orgware
avoidance behaviour		
Functions of formal presentation		
d) emergency		
action cannot go on		project is blocked
e) transfer		
observing oneself and the environment		diagnosis of problems, expert knowledge
f) conflict resolution		
making a decision what to do		decision on diagnosis, options for action
IV. Disfunctions		
Forms of decay of the system		
chronic pain		chronic conflict
		conflict escalation
hysteric pain		any further change impossible
phobic avoidance		rigid organisational culture

Table 9.2: The elements of the resistance model

components	processes
client system	user reactions
task force, change agency	
efficiency	informal communication
positions, roles	formal communication
hierarchy	individual cognition
presentation	top-down modulation
mispresentation	bottom-up gate keeping
diagnosis-action-schema	
organisational image	formal integration
network	alterations
project	resource allocation
expectations, proposals	
functions	
attention allocation	
evaluation	signal function
alteration	
emergency	
transfer	representational
conflict resolution	

The next step in the argument is to test some of the bold conjectures of the last chapters on empirical data. For that purpose I will unfold a case study of the implementation of a new computer system in a Swiss bank between 1984 and 1991. This will be done in part IV of the thesis. Before that I will briefly pay tribute to some research that has anticipated a functional conception of resistance to change.

10. Other Functional Approaches to Resistance

Intellectual sincerity requires that one reflects and clarifies one's assumptions and their origins (Weber,1984;25). An idea is rarely new, and 'novelty' either reflects the play with words - old wine in new bottles -, a short historical memory - reinventing the wheel -, or the narrow boundaries of a discipline. Avoiding a false claim of novelty, I should like to pay adequate tribute to some of the sources of a functional view on resistance, as is attempted here. Three areas of reading constitute the background of the functional 'pain analogy' drawing on particular authors from organisational research, psycho-analysis, and the functional view of conflicts in sociology, I will briefly review some of the basic ideas.

10.1 Lawrence's 'pain metaphor' and Klein's 'defender role'

Two papers of the organisational change literature have accompanied me since I started to preoccupy myself with the problem of resistance in the early 1980s: Peter L. Lawrence's paper on 'how to overcome resistance to change' (1954) and Donald Klein's paper on 'some comments on the dynamics of resistance to change: the defender role (1966).

In his classical paper[1] Lawrence reminds us that 'the most baffling and recalcitrant of the problems which business executives face is employee resistance to change' (ibidem, 49), and criticises the cliche of the executives 'onerous job of forcing change down the throats of resistant people' (ibidem). The attack focuses on four widespread preconceptions that do more harm than solve the problem which they pretend to tackle: a) people do not resist technical changes as such but their social implications, b) most of the resistance which does occur is unnecessary, c) social and human costs of change, if recognized, can largely be avoided by thoughtful management of change, and d) workers resist change while managers foster and implement change. All of them are either wrong or inadequate. On offer is a new look at resistance most cogently expressed in the following three paragraphs, that is expressing the objectives

[1] 'How to overcome resistance to change' is a Harvard Classic first published in 1954, reprinted in 1969 with an after thought, and reprinted in German translation in 1980.

of my whole thesis:

> 'When resistance **does** appear, it should not be thought of as something to be **overcome**. Instead, it can best be thought of as a usual red flag - a signal that something is going wrong. To use a rough analogy, signs of resistance in a social organisation are useful in the same way that pain is useful to the body as a signal that some bodily functions are getting out of adjustment.
> The resistance, like pain, does not tell what is wrong but only that something is wrong. An it makes no more sense to try to overcome such resistance than it does to take a pain killer without diagnosing the bodily ailment. Therefore, when resistance appears, it is time to listen carefully to find out what the trouble is. What is needed is not a long harangue on the logics of the new recommendations but a careful exploration of the difficulty.
> It may happen that the problem is some technical imperfection in the change that can be readily corrected. More than likely, it will turn out that the change is threatening and upsetting some of the established social arrangements for doing work. Whether the trouble is easy or difficult to correct, management will at least know what it is dealing with' (ibid., 56: enhancements in the original).

The conceptual core of 'red flag', 'signal' and 'pain' is briefly introduced. It strikes immediate insights by couching the problem in terms the analogy resistance-red flag/signal-pain. Resistance and pain are similar in terms of a red flag signal, that something is wrong. The pain analogy gives three insights: a problem is indicated, but not yet defined; palliative treatment misses the point; from the point of view of the observer careful exploration rather than fast and ready cooked action is required - 'it is time to listen'. He warns that the instrumental use of participation, for a long time the latest managerial gimmick to sell changes to employees, is not a problem solver, but a problem creator. Resistance is an invitation for knowledge and awareness of dilemmas, rather than an principle for programmable managerial action. Attention is drawn to 'blind spots' of the change agency and the wasteful neglect of local and subsidiary competence for dealing with problem. The analogy reveals the myth of managerial omnipotence that is convincing us that everything is possible and falsely alludes to easy solutions. Lawrence may well have borrowed the link of pain and social change from everyday language use, and, to my knowledge, did not anywhere expand the analysis beyond the rhetorical use of the metaphor. I take the 1954 'new look at resistance' as my starting point, to explicate the pain metaphor as well as the organismic model of organisational change that is implicit with Lawrence. My contribution is less the very idea of the pain analogy than the elaboration of the pain metaphor into an analogy within the framework of self-active systems.

Another source of ideas is Klein's paper on the 'defender role' in social change (Klein, 1966). For Klein human beings seek change and reject it both at their time. The focus of the critique is the traditional bias and hence poor phenomenology of the dynamics of change processes in the organisational literature:

> 'In fact studies of change appear to be taken from the perspective or bias of those who are the change agents seeking to bring about change rather that of the clients they are seeking to influence. It seems likely, therefore, that our notions of change dynamics are only partially descriptive' (ibid., 498f).

Klein's notion of the defender role informed the present study in about the functions of resistance, internally to maintain integrity and externally to focus attention of the change agency to unanticipated consequences of their project: a) Opposition to change is desirable in more complex social system as the 'necessary prerequisite of successful change involves the mobilization of forces against it' (120); b) what is considered 'irrational resistance' is more likely an attempt to maintain the integrity of the system, or opposition to the change agents as persons, which points to the inner function of resistance; c) change is mostly a mixed blessing that necessitates a partial accommodation to the varying demands of those involved; d) social systems seek ways in which to defend themselves against ill-considered and overly precipitous innovations, where the function of defenders, often dismissed as 'rabble rousers' or 'crack pots', is to present the inner core of a valuable tradition. They are 'of great value to communicate about the nature of the system which the change agent is seeking to influence' (122). Klein refers to Freud when he describes the inherent ambiguity in resistance to change that is necessary, albeit blocking the attainment of the change agencies objectives. This leads to the second source of ideas.

10.2 Psycho-analysis and the dynamics of psychotherapy

Psycho-analysis and the diverse traditions of psychotherapy are the richest source of phenomenology, classifications, and linguistic analysis of 'resistance to change'. The reviewing literature on the topic has accumulated particularly in the 1980s (Milman and Goldman, 1987; Blum, 1985; Anderson and Stewart, 1983; Langs, 1981; Petzold, 1981; Schafer, 1976; Seidmann, 1974). Not being an insider of any psycho-analytic guild, I can only hint to some the conceptual ideas that informed or bear similarity to

my analysis. Langs summarizes the classical concept of resistance with 'the extent to which a patient cooperates or opposes his instructions' (1981, 455). The experience and concept of resistance played a decisive part in the foundation of psychoanalysis. I borrow from these writings the **emphasis that is given to the problem of resistance.** Freud, defining as far back as 1900 as 'whatever interrupts the progress of analytic work is a resistance' (after Langs, 1981, 457), initially saw resistance as something to be overcome by insistent efforts. Later he shifted conceptually, so that the interpretation of resistance became a cornerstone his technique. Resistance reveals the workings of the 'unconscious' (Laplanche and Pontalis, 1980, 395). I take this as the idea, that resistance is an observation, that tells the observer important things about the observed system. Resistance is a source of knowledge about the system to be changed. Much of the discussions in the 1970s and 1980s attempt a) to revise the classical view of resistance by focusing on **the problematic role of the therapist** in defining resistance by his or her failed expectations, and b) to **soften the intervention** into the process. Resistance becomes a problem of criteria and labelling, a **problem of the observer.** The difficulty of psychoanalysis to reach a consensual classification of resistances (see Petzold, 1981) is for Langs an indicator that what is recognized as resistance depends on the therapist and the concepts he or she is using (1981, 465). Hence, it is a **source of knowledge about the change agent** and not only of the system to be changed. Resistance tells something about the observer, not only about the observed.

Schafer's (1976; 212ff) linguistic clarifications are interesting in several respects: a) He draws attention to the traps of substantive language like 'resistance is' or 'resistance does'. **Resistance is an activity** preferably referred by the verb 'to resist', which implies an agent that resists, and an object, that is resisted (ibidem, 215). b) Resisting is **paradoxical action,** as it is opposing, and by doing so engaging in the change process at the same time. It is opposing change and partaking in it (ibidem, 219). c) Resisting is often described by 'don't', 'won't, and 'can't. As such it is an activity that is often **deliberate inactivity,** which is not doing something, that one might be expected to do. d) Schafer recommends the use of 'unconscious' in the adverbial form of 'resisting unconsciously' to avoid the notion that the unconscious is an impersonal force under the surface; it rather refers to the mode of resisting **reflected or unreflected,** being aware of it or not. It is important to maintain the distinction of

unreflected resistance-for-others and self-reflected resistance-for-oneself. This corresponds to my distinction of using 'resistance' to describe one own actions or solely as an observer category.

Caspar and Grawe (1981) introduced a useful typology of therapeutic resistance. Resistance is either against certain goals (goal resistance) which are not agreed, against means (method resistance) applied by the therapist to reach certain agreed goals, or against the interactional style of the therapist, his or her way of conceiving things and going about the therapeutic discourse (interactional resistance). They criticise the traditional view of resistance as being a nuisance in the therapeutic process. 'Resistance' is a form of everyday interaction that commonly occurs when one person tries to influence the other. Resistance is a source of information that widens the definition of the problem for the one who tries to influence (ibid., 355 and 373). This generalization makes the kind of reasoning relevant for the organisational analysis.

10.3 Functionalist sociology of conflict

For my treatment of resistance as a form of social conflict Coser's (1956) and Dahrendorf's (1959) study on conflict are valuable sources of ideas. In his review of the conflict literature Coser explicitly criticizes the later Lewin and his group for assuming that conflicts are disruptive, dysfunctional and therefore to be avoided by all means (ibid., 25f). Four ideas are important for my functional reasoning on resistance to change: a) The distinction between a **'real' conflict and an 'unreal' conflict** is preserved in the distinction of 'acute resistance' and 'chronic resistance'. For the former a problem can be identified and the conflict is a means among others to its resolution. In the latter case resistance is the outcome of past grievances and becomes an end in itself. b) Various of the discussed internal functions of conflict for the social system are preserved in the pain model of resistance: **Bringing together people** who had hardly anything to do with each other before by building alliances and coalitions (ibid., 148); the establishment and **reinforcement of subgroup identity** (ibid., 38); the **revitalization of old values** in new contexts (ibid., 154). c) An essential effect of conflict behaviour is that is establishes and **reinforces a relationship between opponents**, which may have been weak before (ibid., 121). Conflict relates antagonists

and reflects the vitality of that relationship. Without relationship there is no conflict (ibid., 85). Conflicts are a **source of learning** and increase the participation in a social system (ibid., 128). d) Coser makes a strong point that conflict cannot be explained by psychological dispositions and motives like drive or aggression. They may be necessary to maintain the action, but are insufficient to explain the onset and the course of conflicts. Structural conditions are necessary to explain conflicts (ibid., 55ff). I take that view in arguing that attitudes are not sufficient to operationalize resistance, although they may measure the potential. A dynamic analysis is required to account for resistance actions.

From Dahrendorf's study of conflict I borrow the notion of **institutionalization** (1959, 226ff). I have used the absence of formal procedures as the specific difference that demarcates resistance from opposition, both expressions of conflict (see definition D9.1). Conflict regulation is a standard procedure that arises in any relationship after some time, and conflict is a form of relationship. The institutionalization of conflict consists in establishing certain rules of how to proceed: where and how to meet, how to reach decisions, what sanctions to apply in case of non-compliance to decisions, and how to change the rules themselves (ibid., 226). For resistance to change this tells us that with the emergence of procedures a conflict is formally recognized, without them the recognition of the issue of divergence is itself an issue. That is where resistance to change is the indicator.

I have, in this chapter, made reference to some of the convergent sources of a functional model of resistance: some organisational researchers, psycho-analytic and psycho-therapeutic traditions, and functional sociology of conflict. After having extensively explored the context of acceptance of, attitudes to, and diffusion of computer technology in the societal and organisational context; after having discussed the traditional treatment of resistance to change, particularly in the Lewinian tradition; and after having outlined a functional conception of resistance within the framework of self-active systems and self-monitoring, that explicates the 'pain analogy', the stage is set for an empirical case study of resistance to change, its communication and its effects in a Swiss bank between 1983 and 1991.

Part IV

An Empirical Study of Computing in a Swiss Bank

11. Methodology: Observing the Observer Observing

> '... der Mensch sei ein beobachteter Mensch, .. der.. versuche, sich immer verzweifelter dem Beobachtet-Werden zu entziehen .. , .. Gegenmassnahmen gegen das Beobachtet-Werden, ..[das] Unbeobachtet-Sein würde ihn mit der Zeit mehr quälen als das Beobachtet-Sein ...., darum beobachten alle einander, ... [da] offenbar die meisten sich selber unbeobachtet nicht aushielten ...' (Dürrenmatt 'Der Auftrag', 1988, 20ff).

By observing the observer observing, I describe and justify the methodology of the research process. The rationale of the case study design and the field work, five methods of data collection, eight different kinds of data, their integration and analysis will be briefly described. A distinction is made between methods of data collection and types of data. The choice of method and data will be justified. The quality of the data is discussed in each case.

11.1 The study design and field work

11.1.1 The single case study method

The single case study is traditionally only an exploratory research method; suitable to produce hypotheses, but not suitable to test them, and therefore not powerful enough to justify new knowledge. The problem is the **lack of generalizability of findings.** A single observation does not vary statistically, it is therefore not suitable for statistical inference from a sample to a population. However, over the last 25 years the potentials of N=1 studies have gradually been rediscovered (Lewin, 1927; Dukes, 1965; Yin, 1984; Petermann, 1989; Westmeyer; 1991; Kebeck, 1983; Foppa, 1986). Dukes (1965) points to the paradox that case studies have been very important in the history of psychological ideas, while the methodological status of the method has been devalued. N=1 studies are justified in four situations: when the variance of central variables is small; when a single case approximates the prototypical case; when the phenomenon is rare and complex; and when one wants to falsify a universal claim. However, assuming

that a N=1 study is equally powerful to reject an universal relationship between variables as is a study of N=1000 is a 'naive notion of falsification' that is contested by Westmeyer (1991). Negative evidence does not necessarily falsify a general claim. The negative evidence shows either that indeed the relation 'if a, then b' is not universal, or that the boundary conditions are not met, because any relation is itself conditioned.

Since the 1960s the single case study method in psychological and social research has been considerably refined (Petermann, 1989) due to an increased interest in **process analysis**. The analysis of processes is able to depict and to explain variety in developments. The refinement of N=1 studies follows two strategies: First, inferential statistics is applied to large data sets from a single unit of observation. The unit of counting and the unit of observation are separated. Behaviourial elements are counted cross-sectionally or as time series for a single case. A single case can be an individual, a group, an business organisation, the nation, or a larger social unit. The unit of observation is its own standard of comparison for statistical analysis. Second, the logic of inferential statistics is challenged by **'typicality logic'** (Lewin, 1927; Kebeck, 1983; Foppa, 1986). The criteria of representativeness of a research sample are most of the time obscure and rather rhetorical. The question 'what is the sample representative of?' remains unanswered, because what constitutes the population remains unclear. Research practice substitutes the necessary scrutiny with the ritual of controlling for sex, income and age, simply assuming the relevance of these variables for everything.

Overgeneralization as well as generalization to an unknown populations are common practice. It seems more realistic to generate and to test deterministic causal hypotheses, and to revise them repeatedly in the light of negative evidence keeping in mind the search for typical situations: 'what persons or situation is the postulated relation typically valid for?'. Single case falsification has implications for the kind of typicality we claim. Whether we reject the hypothesis, alter the type of persons, or change the situations in which the relation is claimed to be valid, has to be argued situationally.

The present study combines both approaches: within case data is analyzed along the lines of inferential statistics, because population characteristics of the whole unit are

known. The final results of the case study have to be defended along the lines of typicality logic. The focus of the study is on a type of organisational actions, introducing a new computer system, and not banks as a type of business. Conclusive generalization of the final results must be based on replication and not on inference.

Petermann (1989, 3) characterizes the single case study as follows: First, the case study focuses on a **single unit of observation**, be it an individual, a group, an organization, or a larger unit like society or culture. In this case study the unit of observation is a Swiss bank implementing a computer service for some of its branches. Second, the **research question aims at the whole and not at subunits**. The behaviour of the whole is not reducible to behaviour of subunits. In this case study I observe the resistance of subunits of the bank in relation to the behaviour of the whole bank. Third, the units of observation are analyzed with regard to **induced stability and change.** External stability and change is due to intervention by an external agent. The direction and size of the effect of an intervention can be assessed. In this case study changes induced by intervention of the research process will be described. The focus is on the identification of the effect, not on the size of the effect. Petermann (1989) contrasts the study of 'single cases' to the study of 'group data'. Single case studies have many measurement points, often make use of time series analysis, and are ecologically more valid; generalization is based on replication. Group data studies are based on sampling logic, the analysis of means, and are based on one or a few time measurement points. Generalization is based on cross-validation. Yin (1981 and 1984) discusses the case study method in the context of the debate on qualitative versus quantitative social research. The case study is indifferent to that unfortunate dichotomy. The case study is a research strategy like an experiment or an historical study. Research strategies make use of both qualitative and quantitative data. A case study is an empirical inquiry that a) investigates a contemporary phenomenon within its real-life context; when b) the boundaries between the phenomenon and context are not clearly evident; and c) multiple sources of evidence are used (Yin, 1984, 23). Researchers have been warned of the 'attractive nuisance' of rich data (Miles, 1979). One can get overwhelmed by the mere quantity of material. Integrating the different types of data and controlled reducing of complexity is essential. To compare the different data the frame of analysis has to converge. Theory guides the reduction of complexity and makes it less arbitrary.

11.1.2 Design of the case study

The case study follows an embedded design (Yin, 1984, 44). The organisational action is analyzed at both levels, the organisation as a whole as well as on the level of subunits, the bank branches, and the task force. The study combines two research designs. The first is a **interrupted time series** (Spector, 1981, 30) with 14 measurement points, the 14 action steps that will be defined in chapter 12. If O stands for observations and T stands for treatment and intervention, the schema of the design is as follows:

$$O_1\ O...O\ O\ T\ O\ O...O\ O_{14}$$

The documentary analysis allows to observe the information processing of the task group backwards into the different stages of the project. The treatment or intervention included my field work at the central bank and in local banks, an the feedback of the results in three written reports to the task force in project step 10 and 11, April and September 1989: a secondary analysis of a survey; the evaluation of the PC software; and a report of interviews with local bankers (Bauer, 1989a, b and c). Process variations before and after the fieldwork and the feedback of results will be explained partially as the effects of the intervention. The second design is a multiple post-test design, schematized as follows (Spector, 1981, 44):

T O

T O

T O

Evaluation and interview data is available from 25 banks. Data is collected after the implementation of the new computer service. All bank undergo a similar change, but may well react very differently according to context. The 25 branches are grouped according to some context variables, e.g. a priori 'resistance' or performance levels, that might explain the differences. The observations are analyzed as dependent variables that show the differential effects of the implementation of the new computer system.

11.1.3 Field work

The initial contact with the bank was arranged through informal contacts. The collaboration was based on an outline of the project (see appendix), which listed the research requirements and deliverables. The project was partly financed by the bank, travelling expenses were covered. Data analysis and reports were paid separately. Field work extended over 3 1/2 years, from March 1988 to August 1991. On six occasions to a total of 69 days I worked at the bank, Raiffeisen Switzerland. I had unrestricted access to all files, conducted interviews at the centre in St Gallen and in 24 branches all over the country, and made my observations. On each visit I kept a logbook of activities. I used a laptop PC to inventory the material collected and to build a data bank. The six visits were as follows:

- March 1988 (1 day): First contact with project manager; Discussing the feasibility of studying the implementation of the computer service.
- August/September 1988 (25 days): Presenting the project; introduction to members of the task force; recovery of the 1985 attitude survey and building a data bank; conducting interviews with members of the task force; testing software interface.
- April 1989 (13 days): reports on software evaluation (Bauer, 1989a) and secondary analysis of the survey data (Bauer, 1989b); recovering media material and documents; diffusion and performance data; preparing questionnaires and interviews in 24 banks; French translations; inviting banks to participate in the project.
- June/July 1989 (21 days): Preparing the interviews in 24 banks; arranging appointments and itinerary; travelling and conducting 24 interviews all over Switzerland.
- September 1989 (2 days): Discussing evaluation of the project with task force; recording the reactions; written reaction to the evaluation follows in December 1989; discussing the possibility of a second survey in 1991.
- July/August 1991 (7 days): Discussing the alterations in the light of the evaluation report two years later; preparing 1991 survey; data collection.

11.2 Data collection methods

The present study is a multi-method study, that generated with five methods of data collection eight different types of data were as shown in table 11.1. N refers to sample size for each method.

Table 11.1: methods of data collection and types of data

N	data collection method	data type
34	standard questionnaire	job characteristics
314	survey 1985	
34	survey 1988	
326	survey 1991	computer attitudes
34	interviews	project evaluation informal communication
134	documents	formal communication diffusion data performance data media analysis
53	observation protocols	

Standard questionnaires measure job characteristics and computer attitudes. A secondary analysis of the 1985 survey produces a second attitude measure. Interviews and participant observations are used to evaluate the project and to reconstruct the content of informal organisational communication. Documents are the sources for a media analysis, the analysis of formal organisational communication, and the gathering of diffusion and performance data. Part of the data is used to reconstruct internal communication processes and to observe organisational structures. Diffusion data, media analysis and documents cover formal communication, the organisational level of analysis. Observations and interviews cover individual events and informal communication. These data are internally produced and are the secondary sources to observe the self-observations of the social system. Attitudes measures, survey analysis, job characteristics and diffusion data serve to characterize processes and structures from the observers point of view. These are externally produced, first order data from the observer's point of view.

11.2.1 Questionnaires

Three standard questionnaires were used: the Job Diagnostic survey (JDS), the Subjective Job Analysis (SJA) for psychological job analysis, and the Automatic Data Processing Scale (ADV-Scale) for measuring computer attitude. The data is used a) to characterize the job of a Raiffeisen Bank administrator in comparison to other jobs, for which norm data is available, b) to use the internal variance to test hypotheses with resistance to the computers as the dependent variable , c) to compare methodologically the two job analysis instruments, SJA and JDS, which are designed to measure partially overlapping job structures.

11.2.2 Survey data

In December 1985, at the beginning of action step 4, before the implementation of the new data service started (see chapter 12), the task force of the central bank conducted an opinion survey among about 500 clients banks. This data is used for a secondary analysis to operationalize 'resistance' ex post with an attitude measure. Secondary analysis has the advantage that it relieves from collecting the data, which is a time and money saver in any research project. It may precede and supplement primary data collection by providing a basis of comparison and a source of new hypotheses. The major problems associated with secondary analysis are twofold: a) data may not be easily accessible; if the are accessible, one has to work with the items that are given, which may be very restricted in scope for one's own purpose, and b) one uses somebody else's data with often unknown problems of quality and which have been collected for another purpose. The reconstruction of errors and constraints in the secondary data is itself a problem, particularly when the data documentation is incomplete (Kiecolt and Nathan, 1985). The function of the secondary analysis involves to check and possibly to improve the quality of the data and to get a feel for the remaining constraints, and to construct from the existing items the relevant variables for the present investigation. My secondary analysis of the 1985 survey goes in five steps (Bauer, 1989a): checking the quality of the sample, improving the data quality,

additional background variables, constructing an 'acceptance of computing' scale post hoc, and fitting a linear regression model onto the data. I conducted a second survey at Raiffeisen in October 1991; results are reported back to the task force (Bauer, 1992). The 1991 survey is not directly comparable to the earlier one[1]. 359 local banks with either PC solution, paper solution or hand accounting are asked to evaluate the system with regards to user friendliness, satisfaction with suppliers, costs, training, service, and their plans for the future. The response rate was 82%.

11.2.3 Interviews

Interviews are conducted in 24 local banks and with 10 members of the task force. Two kinds of interviews have been used one after the other: Narrative Interviews and semi-standardized interviews. 34 interviews were conducted, 10 with members of the task force, and 24 in local bank. The duration of the interviews varied between 30 minutes and 3 1/2 hours. The sample of local banks is balanced according to ratings of resistance. 10 are rated by task force staff as 'resistant', 11 are 'accepting', and 4 are 'neutral'. The 24 banks are selected from about 45 candidates, which have earlier agreed to an interview. In each local bank the manager is interviewed. 19 interviewees are German speaking, 5 are French speaking[2]. 14 are male, and 10 a female. 10 are less than 40 years old, 11 are between 41 and 60 years old, and 3 are older than 61 years. 13 of the interviewees had no computer experience at all. 11 had already dealt with computing in some form, mostly text processing. The average age on the job is 8.5 years, ranging from 1 to 25 years. The Narrative Interview is used to explore the events of the computer project since 1984, the semi-standard interviews are used to evaluate the computer project according to a list of criteria from the point of view of the users. I will discuss the theoretical concept and the rules of procedure of the narrative interview technique, and the some methodological findings of the present study.

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[1] It was initially intended to collect attitude data that was comparable to the 1985 survey and the my own data collection in 1989. For internal political reasons, and because the questionnaire would become too long, I did not proceed in that way.

[2] One italian speaking bank was planned to be interviewed, but was dropped for practical reasons.

11.2.3.1 The concept of the narrative interview

The narrative interview is a method to generate data, that is found among the qualitative research methods (Lamnek, 1989; Flick et al, 1991). Qualitative and quantitative techniques can be used to analyze narrative interviews (Muehlfeld et.al, 1981; Bauer, 1986). The technique of the narrative interview has been systematically described by Schuetze in a unpublished manuscript (1977) that received wide attention in the Germany. Basically it is a setting which encourages and stimulates interviewees to tell a story about a series of events. The origin of the narrative interview is the **critique of the question-response-schema.** Fixed questions may produce stereotypical answers which are prestructured a) by **selecting** the topics, b) by **ordering** the questions in a given sequence, and c) by **wording** the questions which constrains the language of the interviewee. The questions of the interviewer put too much content into the response already. Such data reveals more about the interviewer than about the issues under investigating. To avoid prestructuring, the question-response-schema is dropped by eliciting a narration. It is postulated that the **perspective of the interviewee** becomes accessible and the **language of the respondent is least restricted** by a spontaneous narration of events. It would however be naive to claim, that the narration is without structure. A narrative is formally structured rather than defined by content. It has its rules and follows a **self-generating schema.** Whoever tells a story seems to comply to three basic rules.

Detailing the account

The narrator gives details of events in order to make the transition from one event to another. The narrator tends to give as much details as is necessary to make that transition taking into account the listener: the story has to be plausible, otherwise it is no story. The less the listener knows, the more details will be given.

Deciding the relevances

The account of events is selective. It unfolds around thematic centres which reflect what the narrator takes as relevant. The themes present the relevance structure.

Closing the Gestalt

A story has a beginning, a middle, and mostly an end. The end can be the present, when the actual events are not terminated yet. This threefold structure of a closure makes the story flow, once it is started.

It is assumed that story telling is an **universal competence** relatively independent of levels of education and language competence, which is unequally distributed in any population (Schuetze, 1977). Accounts of an event can be either general or indexical. Indexical means that concrete events are reported and defined by place and time. Narrations are rich in **indexical statements,** because a) they refer to personal experience, and b) because of the tendency to be detailed with a focus on events and actions. The structure of a narration is similar to the structure of orientation for action: a context is given; the events are sequential and end at a particular point; the narration includes a kind of evaluation of the outcome (Lamnek, 1989, 70). Situation, goal-setting, planning, and evaluation of outcomes are constituents of human goal-directed actions. The narration reconstruct that action and its context in the most adequate way: it reveals place, time, motivation and the actor's symbolic system of orientations (Schuetze, 1977, 1).

The narrative interview is indicated, when 'hot' issues are investigated. **Hot issues** are social problems which are potentially embarrassing for the respondent, of personal nature, or may have negative implications for the respondent (Schuetze, 1977 and 1983 and 1984; Hermanns, 1991, 183; Muehlefeld et.al., 1981). The narration reveals knowledge which is not accessible to the interviewee himself at the time of the interview. It is gained by **abstraction and theorizing** and beyond the propositional statements during the interview. People often know more than they think they know. The 'more' is a task for constructive analysis. Resistance to change is a hot issue in most contexts. It has been shown in chapter 4 that resistance to change is often associated with negative values. People do not like to be seen resistant to change. If somebody is asked whether she is resisting change, she is unlikely to deny that. Social desirability leads to underestimation of the intensity of resistance when measured by a survey. The issue requires a more sensitive approach. Together with the positive experience of an earlier study (Bauer, 1986) this is the rationale for the choice of the narrative interview technique for the present study.

11.2.3.2 The procedure of the narrative interview

The narrative interview is conducted four phases: The initiation, the narration, the questioning, and small talk. Specific rules apply for each phase. The sequence can be repeated in a cycle. **Preliminary explorations** are needed to clarify the context. Based on the context and on the interests of the researcher a interview schedule is prepared as the **exmanent questions.** During the interview they will focus the attention of the interviewer. He or she **translates exmanent questions into immanent ones** by anchoring issues in the narration and by using the interviewee's language (Schuetze, 1977). The three phases of the narrative interview are characterized as follows:

Initiation

The 'topic of narration' is presented to the interviewee, who is informed about the context of the investigation, asked permission to record the interview, and is informed about the interview procedure: first narration, then questions. In order to elicit a good narration three rules apply when presenting the topic: a) The topic should be within the experience of the interviewee. This guarantees his or her interest; b) the topic should not be a merely personal matter, but a matter of social significance; and c) the formulation of the topic is broad enough not to constrain the narration.

Main narration

When the narration starts, it should not be interrupted until there is a 'coda'. The interviewee may pause and signals that this is the end of the story. The interviewer abstains from any comment other than non-verbal signals which show ongoing attention, and encourage the narration. The interviewer notes questions for later.

Questioning

After the narration has come to an end the interviewer asks questions to complete the gaps in the narration. Three rules apply to the formulation of questions: a) only event questions are allowed, e.g. 'what happened then ....'; b) the interviewer abstains from confronting the interviewee with his contradictions to avoid an atmosphere of examination; c) any question must be immanent to the narration. Events which are not

narrated should not be questioned.

Small talk

At the end of the interview, when the tape recorder is off, often interesting additional information comes up. The relaxed way of talking after the show often throws light on the account which has been given during the narration. It is important for the interpretation of the account. The small talk is summarized by a memory protocol immediately after the interview.

Researchers using the narrative interview have pointed to two major problems, namely the uncontrolled expectations of the interviewee and the unrealistic role requirement. The rules of the narrative interview define an ideal procedure which is may rarely accomplished. Rules rather serve as a standard of aspiration. The combination of narration and questioning may occasionally blur the boundaries to a semi-structured interview, which is enriched by narratives (Hermann, 1991). Witzel (1982) is sceptical about the claim that the relevance structures is revealed by narration. Any conversation is guided by **expectations of expectations**. An interviewee expects expectations on the part of the listener, and he or she takes any clue available to become clear on that. This cannot be controlled. It is a human ability to generate situational meaning. If the interviewer abstains from framing the answers, the active interviewee will tell her story to please or to frustrate the imagined expectations of the listener. The narration reflects the expectations of expectations in the present situation as well as an outcome of past events. Strategic story telling cannot be ruled out. Methodologically this is checked by surprising the interviewee, who should not have time to prepare a story beforehand. The story must be generated ad hoc. Witzel also points to **unrealistic role requirements** on the interviewer. Each interview requires that the interviewer presents himself ignorant, while her actual knowledge is increasing from interview to interview. The credibility of that attitude reaches its limits. The contradiction cannot always be hidden. Hermanns (1991) points to another points out that the way the interviewer initiates the interview codetermines the quality of the narration. For Aksham (1982) the **narration is an outcome of the way the interviewer behaves**. The initiation phase is difficult to standardize and relies heavily on the social skills of the interviewer. The

sensitivity of the method to the interviewer behaviour might make it difficult to apply the narrative interview in a research project with several interviewers (Hopf, 1978). The narrative interview often requires a **compromise** between the narrative and the questioning. The narrative opens the diverse perspectives of the respondents on events, the question is, however, required to standardize the information and to make comparisons across many interviews on the same issue (Muehlfeld et.al, 1981).

11.2.3.3 Narrative interviews at Raiffeisen

In the present study 34 narrative interviews over **60 hours** were conducted: 10 interviews with members of the task force, and 24 interviews with managers of 24 local banks. Interviews were conducted at the work place during working hours, and in local banks immediately before or after opening hours. All interviews are recorded and transcribed verbatim on consent of the interviewees. Interviews are held in French and Swiss dialect, and translated into German for transcription. One hour interview means on average six hours transcriptions. All interviews were conducted, transcribed and analyzed by one interviewer. Transcriptions are later coded with the category system, which is described below.

Initial explorations of the Raiffeisen project and theoretical interests have led to the following exmanent questions of focus the attention during the narration: Which are the main events of the project ? What are the problems encountered ? Hardware, software, orgware? What are the solutions? Is there resistance identified ? who identified resistance ? How is resistance identified? Who is resistant ? how is it explained? what are the incidents? what are the effects ? To support people's memory I present a graphic with events since 1983 on a sheet of paper, for each year mentioning two major events in a few words. All 34 interviews were initiated by explaining the official objective of the study, which is: 'evaluating the central data service from the users point of view'. I asked participants to tell me the story of the RBRZ as they have experienced from the beginning. The nature of the problem was not defined more precisely.

The quality of the narratives

Controlled methodological studies on the narrative interview do not exist to my knowledge. The present study allows to make a few observation. The extent to which a narrative is successful varies. The length of the narration in relation to the whole narrative interview is a quality indicator. A good story needs time to be told. For the present purpose of evaluating a computer system and assessing resistance a story that touches on many different issues is a good story. A minimal duration is a necessary but not sufficient condition for a good story. The length of the narrative interview (totnarr) correlates highly with the variety of content, i.e. the number of different codes categorized (totnarr with codes: r=.90, n=25:). Table 11.3 shows the time of different parts of the interviews and the number of different codes used to analyze the content. The duration of the interviews (Dur) including evaluation interviews varies between 30 minutes and 3.5 hours. Interviews with members of the task force are longer than interviews in the local banks. The length of the narrative interviews (totnarr), including narrative phase and questioning, varies between 1 min and 100 min. The average narrative interview lasts 28 minutes. The narrative phase varies strongly. The effective length of the uninterrupted narration is between 1 and 60 minutes with an average of 12 minutes (narr). The narrative phase takes between 1% and 50% of the whole interview time (Nt) around an average of 11% of time. In 9 interviews it was not possible to elicit a proper narrative (narr=0). In 11 interviews I managed to elicit a moderate narration (narr<7) with an average of 11 Minutes, or 5% of the total interview duration. In 14 interviews a good narrative (narr>=8) was elicited on average 60 minutes. In two cases the no narrative interview was taken. In 7 cases the interviewee did not start telling a story without me asking concrete questions.

Why these differences in the quality of the narrative interview ? The narrations of the task force are longer than those of the users in local banks in absolute (totnarr) and relative terms (narrat). The details of the RBRZ project is more salient and richer for the task force than it is for the branch bankers, therefore it may be difficult to report their experience in a story, because only few events reach attention of the users. Most users had only vague ideas about how the Association is conducting the project. Most users have a low stake in the project. It may have been a mistake to use the same initiation for all interviews.

Table 11.3: The duration of the narrative interviews

Bank	NARR	Nt	Tt	NARRAT	TOTNARR	CODES	Dur
Failures:							
Hottwil	.	.	.	.	.	66	120
Auditors	.	.	.	.	.	81	30
LaCdF	.	.	.02	.	1	27	60
Bettmer	.	.	.06	.	5	21	90
Filisur	.	.	.06	.	10	52	180
Tiefencast	.	.	.06	.	10	52	180
Hauptwil	.	.	.09	.	8	35	120
Rueschegg	.	.	.10	.	9	47	90
Erschmatt	.	.	.12	.	11	55	90
Moderate:							
Preles	1	.01	.04	.25	4	41	90
Villnach	2	.02	.08	.29	7	28	90
Spluegen	2	.02	.09	.25	8	53	90
LesHauts	3	.03	.07	.43	7	67	105
Ausserberg	4	.04	.06	.67	6	46	105
Waltensb	4	.03	.08	.40	10	56	120
Mervelier	4	.04	.12	.36	11	63	90
Ennenda	4	.04	.17	.27	15	54	90
Cumbel	5	.03	.09	.36	14	123	150
Br	6	.17	.71	.24	25	82	35
mk	6	.13	.67	.20	30	112	45
Good interview:							
Bitsch	8	.04	.05	.80	10	39	210
Gorgier	8	.09	.12	.73	11	90	90
Weisstann	8	.07	.17	.40	20	132	120
Schoehnh	9	.08	.10	.75	12	62	120
Ae	9	.15	.67	.23	40	133	60
Ap	10	.13	.53	.25	40	211	75
Isental	15	.10	.18	.56	27	145	150
Grub	15	.20	.21	.94	16	96	75
AS	16	.15	.76	.20	80	453	105
AR	22	.24	.89	.28	80	246	90
MO	27	.23	.75	.30	90	479	120
SJ	30	.17	.44	.38	80	385	180
PH	31	.26	.83	.31	100	500	120
KS	60	.50	.75	.67	90	451	120
Sum (min)	309	–	–	–	887	–	3575
Average	12	.11	.33	.42	28	26	105

Narr: uninterrupted narrative phase in minutes
Nt: narrative phase / duration (ratio)
Tt: total narrative interview / duration (ratio)
totnarr: duration of narrative interviews in minutes
narrat: narr / totnarr (ratio)
Dur: narrative + evaluative interview in minutes
Codes: number of different codes for each interview
Abreviations with two letters are members of the task force, others are local banks (see table 12.2)

As shown in table 11.3, the evaluative interview (1 - Tt) was mostly longer than the narrative interview, between 25% and 100% of the interview time. Users find it easier to answer a concrete question about the computer project and their practice, as the history of the project has no salience beyond the casual information at the annual

Raiffeisen Rally, from the newsletter and rumours. The history of the project is experientially poor for users, which is in contrast to members of the task force who had lots of interesting details to tell. Hence, salience and direct experience with events are crucial conditions for a successful narrative interview.

11.2.3.4 The evaluation interview

After each narrative interview a semi-standardized interview followed to evaluate the computer project on a set of issues. An interview schedule was used to elicit concrete statements about the positive and deficiencies of the computer project (see appendix). The interview schedule covered six issues: **data input, data processing, work organisation, data output, future expectations,** and personal data on the bank manager. For the questions on 'data input' I presented to the interviewee the forms that are used to collect information about clients and their transactions. The interviewee was intended each data forms: what is redundant or lacking, or how the design made more user-unfriendly. This information was important, because the interface of the PC solution was modelled on these input forms. Personal details included the age of the manager, his job age, gender, and opening hours of the bank. Evaluative interviews were recorded. Notes are taken during the interview. Immediately after the interview the notes are summarized on a coding sheet. The coding is later completed by listening to the recordings.

10.2.4 Documents

Documentary analysis is an unobtrusive measurement method. Documents are not produced by the research process, but by the process under study following an inherent logic. They are stored in some archival device. Documents originate in a 'natural' action context. Their analysis is ecologically more valid than the analysis of data from reactive methods like questionnaires or observations (Ballstaedt, 1982). Documents record the formal communication of the organisational action. A total of 134 documents

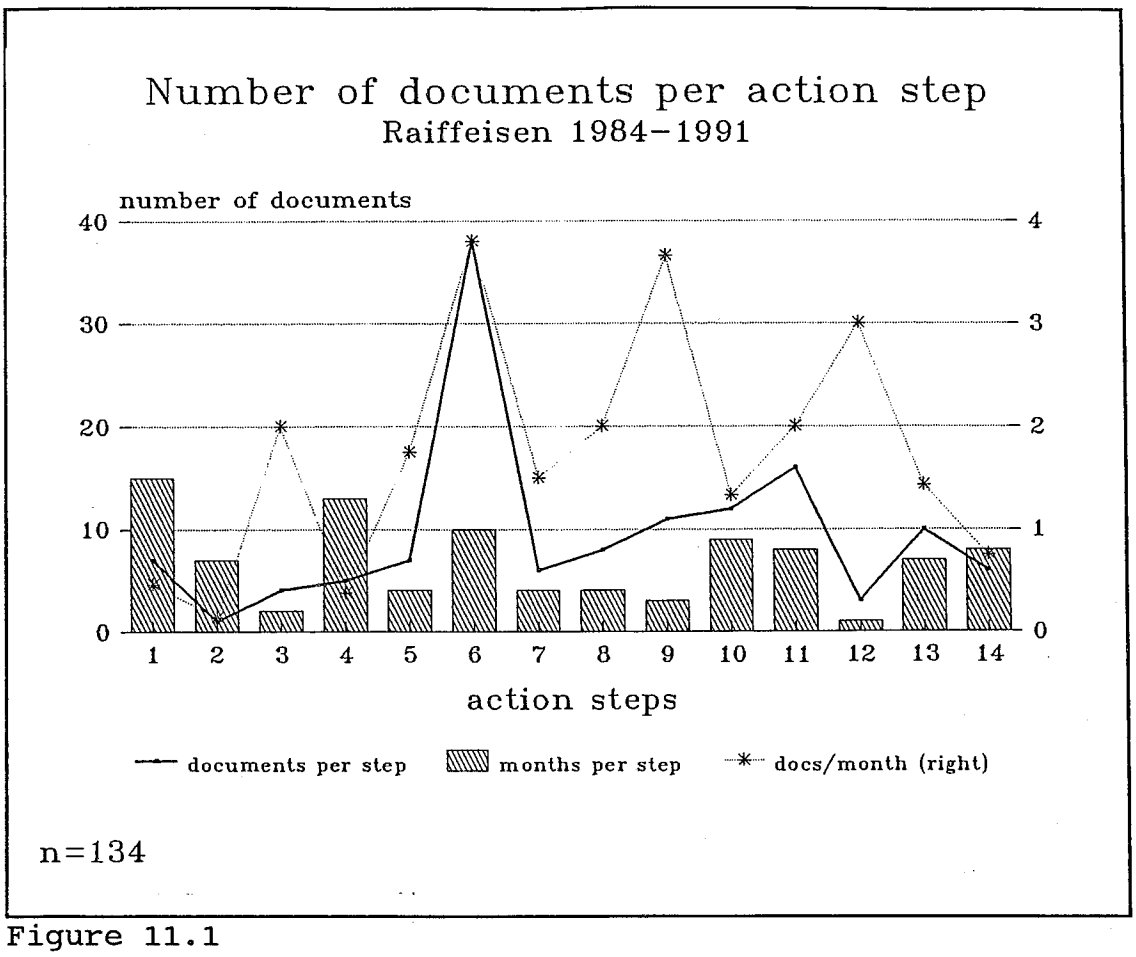


Figure 11.1

were content analyzed. Members of the task force gave me access to their files on the project, covering the period from 1983 to 1991. Documents are **internal or external** communication, and are **periodical or singular** items. Internal communication transfers messages within the task force and between the task force and the client system. External communication involves computer suppliers, consultants and competitor banks. Documents like work reports, meeting protocols, work schedules are issued periodically on a monthly or a yearly basis. Singular documents are non serial documents like task descriptions, memoranda, organisational charts, evaluation reports, reports to the board, user information. Most documents are internal (n=129). The bulk of the documents are minutes (n=44) and reports (n=44).

Figure 11.1 shows the distribution of documents over time by action steps together with the length of steps in months, and their ratio the number of documents per month[3]. Actions steps are defined by the logic of the project and are variably long. The figure shows that the number of documents does not depend on the length of the action step, other features of the project determine the production of written material. Step 1 is before January 1985, step 14 from January 1991 onwards. The intensity of formal communication is slightly increasing until step 11, when the programming for the PC solution starts at the end of 1989. On average there are 10 documents per action step. The peak of documents in step 6 in the first half of 1987. Step 6 is the period from February 1987 to March 1988, the take off period of the project: 'initiating, dithering and getting it going'. Also, the leadership style of the project manager at the time is rather bureaucratic. He enforces a **project management system** (IFA Pass) creating a lot of paper work for all members of the task force. All staff identify their subtask, report in writing every month on each subtask, and make summary reports as well. According to one informant 'one spent nearly more on writing these report than on actually doing the tasks'. This management approach changes in response to complaints about work load and inefficient paper work. It was later reduced to a monthly report on each work group rather than on each subtask. The intensity of communication drops back to a 'normal level' in step 7, when a new project manager takes over. This explains the peak of documentation in action step six. The ratio of documents per month for each action steps shows a characteristic cycle of 3 steps: the 3rd, 6th, 9th, and 12th step have peaks in formal communication; step 6 marks the start of the RBRZ project; steps 3, 9, and 12 mark major strategic changes to the project as will be shown later.

Documents are the formal communication in organisational actions. They summarize thoughts, discussions and informal exchanges. They are the outcome of information processing that involves simplification, condensation, accentuation and selection by an individual author which is dignified as official by formality. Documents are inputs into the organizational process and have to be understood by the motives of the authors in the particular context: why is that item reported or stressed and the other not ? This would amount to a historical critique of sources. As I did not analyzing the

[3] For the definition of action steps and their location on the time axis see chapter 12.4.2

documents quantitatively, as a series of piles, my source critique is limited. The documents are genuine, as they are copied from the files of members of the task force, as they were kept. The authors and the audience of the documents are identified by the formal markers. Although members of the task force were helpful in providing me with the files I requested, there is no guarantee that all relevant documents have been recovered. A major problem remains: how representative is the sample of documents for the total formal information processing about the project under investigation ? Some indications can be given: a) I had access to individual files of most of the members of the task force. I went back to these file at several stages of the field work to complete my selection with new material in the light of my changing relevance structures; b) I was given material which was confidential, and should not be shown to other members of Raiffeisen even several years after the conflict. This means that my informants have intrusted me material, which is not accessible to others; c) a more theoretical problem is the relation of formal and informal communication. Documents represent formal communication and are not representative to the total information processing during the project. Documentary analysis needs confirmation and the contrast of interviews and observations of the informal communication. The wide range of my data collection allows to do that.

Documents can be classified according to their origin and to their target. This is a characteristic of **organizational formalization.** Formal markers dignify documents as being organizational communication instead of mere individual notes (Tschan, 1990, 48ff; Cranach et al. 1987). Each document has its origin in one level of the hierarchy and has its target mostly in an other. Decisions from a management meeting are distributed among staff. Reports are sent by individuals or work teams on the task force level to the steering committee. Letters come from outside the system and reach individuals, the management, the steering committee, or even the board. Along the levels of analysis each document can be coded as **bottom up** (n=71), **top down** (n=56), or **horizontal** (n=7) information processing (see chapter 12.4.3.1 for the structure of communication).

The present study shows a dilemma of documentary analysis. When the documentation of the process is rich, the presented organizational process may be problematic. Rich documentation can be an indicator as well as a cause of problematic

organizational performance. The writing of reports takes time and interferes with the actual task, that it is supposed to report on, as reflection may interfere with individual actions. Bureaucratic record taking is interesting for historical analysis, but may be bad for performance. There may be an inverted relation between process documentation and processes efficiency. The documents will be analyzed with regards to organisational presentations of resistance and other problems during the implementation process. The method is content analysis. Paragraphs are the unit of counting, action steps the units of analysis.

11.2.5 Participant Observations

During 69 days of field work I created semi-standardized records of observations. I engaged in conversations with staff and made my observations in the way of **participant observations** (McCall Simmons, 1969, Lamnek, 1989). Informants knew about my role as research and evaluator of the computer project. I kept a log book on work activities, and focused on events, the accounts given, and contexts. After each field day I spent some time recollecting significant events, remembering the accounts given and my own observations. I added my interpretations on the basis of my up-to-date knowledge. Between March 1988 and October 1991 53 observational records were created. An observational record has three parts (see appendix): The **identification of the event**, includes the area of the project, a preliminary classification of events, the source of the information and the date of the record. The **details of the event** include the time of the event, actors involved, what was done, and accounts, intentions, reasons given by the source. My own **comments on the event** include relating the particular event to other events, making abstractions, and formulating hypotheses about why things happen the way they do and why accounts are given as they are. These records are not formally analyzed. They are an important source for the reconstructions of events during the research.

11.3 Different types of data

11.3.1 Diffusion data

Diffusion data describe cumulatively the number of units of a social system which adopt a certain product or idea over a period of time. In order to describe and interpret the Raiffeisen data set which is incomplete I apply the following elements of a simple diffusion model (see chapter 2 and 3):

- a **social system** within which the diffusion takes place. In the Raiffeisen case this refers to the local banks which adopt the one or the other computer solution.
- the **total number of potential adopters** at the certain time: N(t). In the Raiffeisen case this refers to an estimate of the potential users for any solution, be it a stand alone or central data service in its paper version or its PC version. It represents the 100% basis of the diffusion model at each time. The number of potential adopters is increasing or decreasing.
- an **initial number of adopters** $n(t_0)$. The diffusion of each technical solution starts with an initial number of pilots.
- **a starting point** in time t_0. At Raiffeisen different bank technologies come in waves that have different starting points. The start of the old data service is 1973.I estimate that the starting point for stand alone computer solutions is about 1978. The new data service starts in 1986.
- the **rate of diffusion:** g(t). This is the slope of the graph over at a given time. Diffusion follows a characteristic pattern of low rates at the beginning, high rates in the middle and low rates at the end of the process.

Diffusion data of different information processing techniques has been recovered at Raiffeisen: the old data service, stand alone solutions, the new data service, hand book keeping. The recent development of bank technology is revolutionary. The data is reconstructed from various sources: documents, interviews and specific inquiries. The data is incomplete, so that interpolations are used, particularly for the time before the 1981 (see appendix). Between 1970 and 1991 at least five different bank technical solutions appeared and disappeared at Raiffeisen Switzerland local bank level: magnetic

card storage systems; stand alone systems; the old data service; the new data service with two different versions; PCs; and automatic teller machines. For each of these technical devices some diffusion data was recovered. Combining the data on the central service old and new and the data on stand alone solutions allow to calculate the overall diffusion of computing at Raiffeisen. Swiss diffusion data of computers among business units is available since 1960. This allows to compare the diffusion of computers at Raiffeisen with Swiss business units in general and with other banks in particular. The comparison of the diffusion of computers among Raiffeisen banks and other Swiss banks allows a) to **measure the resistance** of Raiffeisen in contrast to other banks, and b) to **locate the period of greatest resistance** during the implementation process. This will be used as an external observer measure of resistance.

11.3.2 Performance data

For all 24 banks in the study performance data is available for 1985 and 1988: turnover, balance sheet total, pretax profits, size of membership, population size of the area, costs for personnel, percentage of employment, opening hours. These data are included in the data base. Five indices are calculated according to Schuster (1977), as he provides comparative data for Swiss and international banks on these indices:

balance	= balance sheet total per year
market share	= members / area population
rentability	= pretax profit / balance per year*100
productivity	= profit / weekly opening hrs*50 weeks
change	= (rentab88-rentab85)/rentab85

The market share is the ratio of the members of the local Raiffeisen associations divided by the number of inhabitants for the area. This is a very crude measure as it does not partition the market into more or less important segments. Each Raiffeisen bank has a geographical area allocated for recruiting members and gaining customers to avoid mutual competition. Rentability is the ratio of the yearly profit divided by the balance sheet total. In order to have the expression in percentages the factor 100 is added. Rentability of more than 1% is a very good results according to Schuster (1977, 39ff). Productivity is the ratio of the yearly profit divided by the total opening hours. The opening hours are the product of the weekly opening hours times 50 weeks. Because most of the small Raiffeisen banks are one person businesses, the index is not calculated to the basis of people, but opening hours. 'Change' is the rentability change from 1985 to 1988 as a fraction of the rentability 1985. A computer means higher fixed costs. Decreasing rentability indicates increased fix costs possibly due to computer investments. Higher fix costs reduce the profit if the balance sheet does not increase accordingly. Reduced profits means lower rentability. The performance data is used to classify local banks into good and bad performers, and to relate the evaluation and the resistance to the computer project to that condition.

11.3.3 Job characteristics (JDS, SJA)

Two instruments to characterize the job of the local banker, the client group, are used, the Job Diagnostic Survey and the Subjective Work Analysis. Both instruments are applied at the end of the interviews.

The Job Diagnostic Survey (JDS)

The Job diagnostic survey is a subjective work analysis instrument which measures the **motivational potential of jobs** (Hackman and Oldham, 1974). The instrument was developed to test the importance of the job content for work motivation in contrast to job context. Items are classified in four groups, the constituents of a **model of job motivation.** Effects of job content on motivation and satisfaction are mediated by critical psychological states and moderator variables. This model can be tested with each application of the instrument. The JDS job dimensions are widely seen as a useful descriptions of the subjective job content. Job analysis aims at differentiating different types of work within these core dimensions. The German adaptation of the JDS is used, which consists of 60 items arranged in 19 Likert type scales (Schmidt and Kleinbeck, 1979 and 1985). The five core dimensions variety, identity, significance, autonomy and feedback are used to calculate the Work Motivation Potential (MPS) according to the following formula giving higher weight to autonomy and feedback.

$$MPS = \frac{variety + identity + significance}{3} * autonomy * feedback$$

The JDS has been widely used in many working contexts. Mean scores are used to characterize different jobs. Norms are available for the core dimensions in different jobs. The reliability of the scales for the present study is on the levels that were reached by Schmidt et al (1985). Cronbach alpha is given in brackets for each scale (n=23). The consistency of 'variety' and 'significance' is lower than expected. Low alpha may reflect the small variance of the sample:

core job dimensions:	variety (.50), identity (.79), significance (.26), autonomy (.76) and feedback (.43)
critical states:	meaningfulness (.44), responsibility (.42), knowledge of results (.56)

criteria variables:	work satisfaction (.56), intrinsic motivation (.56), satisfaction with opportunities (.66)
moderator variables:	growth need strength (.82), specific work satisfaction, payment [.95], security [.94], climate [.45], leadership [.56]).

The dimensionality of job content is debated in work psychology. The evidence is contradictory. Some studies have replicated the 5-dimensional structure (Wall et.al., 1978; Birnbaum and Farh, 1986), others not (Dunham et al., 1977; Idaszak and Drasgow, 1987). Others have pointed to the problem of measuring task structures only by cognition without controlling objective conditions (Udris, 1981; Robert and Glick, 1981). Subjective measures alone give little guideline for job redesign, because the relation of objective task structures and perceived content remains unclear. This is reflected in low correlations between expert ratings of job and self-rating of jobs on the same dimensions. It is suggested that the perception of the job is an outcome of the task as well as it reflects a socially shared definition of the situation. The same task is perceived differently by different people, and different tasks are perceived similar by different people (Udris, 1981). The actual similarity of ratings of objectively different tasks suggests that self-ratings measure the socially shared perception of jobs, i.e. they rather measure the 'should be' rather than the 'is' of different work situations (Udris and Nibel, 1989). I make selective use of the JDS in the present study. The JDS is filled in by bank staff, main clerk or assistant (self-rating; n=23), and members of the task force. Members of the task force are asked not to rate their own job, but to rate how they see the job of the local banker (observer ratings; n=8). Because no French version of the JDS is available, only the German speakers filled in the JDS. Data is used a group data only. Taking the controversy on the JDS into account I use a second instrument, the Subjective Job Analysis (SJA), to complement the JDS scores.

Subjective Job Analysis (SJA)

The Subjective Job Analysis (SJA) was developed at the Swiss Federal Institute of Technology (Udris and Alioth, 1980) to measure the 'subjective redefinition of a work task by a group of people'. The instrument consists of 60 self-rating items grouped into 6 scales: **job scope, transparency, responsibility, qualification, social structure,** and **workload**. Swiss norm data are available. Comparable data is available from a study

in public administration (Ruch, 1985) and 22 different samples of industrial and office work (Udris and Nibel, 1989). The dimensionality of the SJA is well established. Intercorrelations depend on the work context, but are sufficiently small to support the dimensional structure (Udris and Nibel, 1989). In the present study intercorrelations vary between 0.59 and -0.55. Qualification and responsibility correlate positively (r=0.59), and social support structure and work load correlate negatively (-0.55). Other correlations are not significant. The instrument was applied in 20 German speaking banks, completed by the main clerk or his representative (self-ratings n=24), and by members of the task force. Members of the task force were asked to rate not their own job, but the job of the local banker, as they see it (observer ratings n=8). No French version of the SJA is available, hence there is no data for the French speaking part of the sample. Both JDS and SJA will be used to create a job profile and to characterize the local banker's job in comparison to other activities. Some scores will also be used as correlates to resistance and acceptance measures in the local banks to test particular hypotheses about job motivation, resistance to change and performance.

11.3.4 Attitudes to computers

Two sets of data were collected to measure the attitudes to computers at Raiffeisen. In November 1985 an in-house survey of opinions was conducted, which is subjected to secondary analysis. The standardized ADV scale is used to measure attitudes in local banks.

11.3.4.1 Two surveys of opinions in local banks (1985, 1991)

Raiffeisen had planned a new central data service for small banks for some time, but a final decision was delayed until October 1986. At the time 'small banks' were defined as banks with less than 20 million SFr (£ 8 Million) balance sheet. In 1984 this criterion included circa 900 branches or 74% of Raiffeisen banks, of which around 500 were already clients to the central data service. A survey of expectations of potential clients for a new central service was conducted in the banks in December 1985 to

justify the project. A questionnaire (10 questions) was mailed in three languages German, French and Italian (see the appendix 11). The small bankers were asked to give their opinion on ten issues.

1. general satisfaction with the service
2. suggestions to improve the service
3. reasons why they did not buy their own computer
4. motives which would make them buy a computer
5. acceptance of VDT work in general
6. acceptance of data input on site
7. willingness to invest for a new system
8. patience to wait for a new system
9. willingness to be a pilot for a new system
10. information about the performance of the branch
11. open remarks

The data is not in any computerized form, indicating that in-depth analysis beyond reporting the percentage of responses for each question was not intended. This gives hope that a secondary analysis of that data provides further insight into attitudes of local banks.

The quality of the data

The data is a stack of questionnaires, which were totally at my disposition. The quality of the data has two problems: how representative is the sample and how complete is the data? The survey was conducted without any sampling rationale. It is therefore necessary to check for any systematic bias in the data in relation to the potential clients for a new central service. The two page questionnaire was sent to the 514 branches that were already clients to the old central service at the time and which did not have their own computing facilities. This excludes branches that already had computing and branches that still did accounting by hand. The sample excluded circa 150 small banks who already had their own computers and 241 branches with hand accounting. 315 questionnaire were returned after a reminder in writing or by telephone, which gives a **response rate of 61%**. Taking the total population as 900 small branches, the **sampling fraction is .35** (N=900, n=315). Three criteria are used to check whether the sample is representative according to language region, bank total balance sheet 1984, and inhabitants of the banking district as shown in table 11.4. The number of inhabitants in the district reflects the market potential of the bank. The sample of 315

and the population do not significantly differ on any of the three control variables. Hence the sample represents the population adequately. The divergencies between sample and population indicate the core clientele of the data service. The small banks with a balance sheet of 5-10 Million SFr are 10% overrepresented. They are the **core clientele of the central service.** Hand accounting persists in small branches with small markets and is underrepresented by 7% for lower than 5 Million bank balance sheet, and 7% for districts with less that 500 inhabitants, as shown in table 11.4. It also shows the presence of Italian speaking banks (5%) in the central service. The **data is incomplete**. For question 3 (reasons) and 4 (motives) more than 50% of the data is missing. For the other questions 20-25% is missing. For cross-tabulations the sample size is reduced to a third, which renders analysis near to meaningless.

Table 11.4: the representativeness of the sample

language:	German	French	Italian
Population	54	33	12
Sample	52	30	17
difference:	**-2**	**-3**	**+5**

balance sheet:	lower 5 Moo	5-10 Moo	10-20 Moo
Population	37	35	27
Sample	30	45	25
difference:	-7	**+10**	**-2**

inhabitants:	lower 500	501-1000	1001-5000	over 5000
Population	31	33	30	5
Sample	24	37	33	5
difference:	**-7**	**+4**	**+3**	**0**

Population N = 900 / Sample n = 315 / figures in %
Chi-square=4.36, df=9, p=.86 (not significant)

There are various reasons for the missing data: Many respondents at Raiffeisen do not like to fill in questionnaires, or they are not familiar with it. They prefer direct face-to-face or telephone contacts; many branches refuse to answer questionnaires angry about the quality of service they get from the central service; respondents, who are satisfied with the service, answer the first question and do not bother to fill in the rest;

particularly bigger banks are planning for their own computer system and return the questionnaire empty or incomplete; many respondents answer only one or two questions and make open comments at the end of the questionnaire. To improve the quality of the data some of the missing data is restored using the open comments. From open comments it was sometimes possible to restore question 5 on VDT work. Non responses for question 5 and 6, accept and input, are restored. Missing values are coded as yes-answers on the assumption that those who did not want to deal with computers were stating it, while those who had no objection to computer work simply did not bother to answer. This procedure might introduce a bias restoring more yes-answers than there really would have been. Any index of resistance from the data will therefore be rather underestimating than overestimating the real state of affairs.

In summary, the **sample is representative of the small banks in 1985** with regards to language, balance sheet and market potential. However, branches with hand accounting are excluded from the sample. Assuming that hand accounting means refusing computing for the time being, and that some missing data was restored on the basis of 'no answer means yes' evidence of resistance to computing is rather underestimates than overestimates resistance among local banks.

Adding predictive variables to the survey

The original questionnaire contains only two background variables for the analysis: language (German, French or Italian) and the balance sheet for 1985 (average balance: 10 Million Sfr). I added six additional variables for the purposes of the secondary analysis. The open comments are analyzed to gain information about any computer **project** of their own: side remarks about their own plans were coded in '1=not mentioned' '2=evaluating at the moment' '3=computer bought already'. 303 out of all 315 questionnaires can be identified. This allows to draw upon the data basis of the Raiffeisen (Raiffeisen Statistics 1986) and to add additional variables. The following variables are added to the analysis: a) number of cooperative **members** of the bank: This figure reflects the total membership in each district. It ranges from 45 to 676 with an average of 195 members; b) **inhabitants** of the banking district: this figure reflects to total population of the district. It ranges from 130 to 32000 inhabitants with a median of 850; c) **age** of the bank is calculated number of years a balance sheet is recorded in

the central bank statistic; d) **market** share of the bank in the district: This is reflected by the quotient 'members per inhabitants'. The quotient ranges from 0.4 to 69.3% with an average of 21.9%. Market share is an interesting variable. it reflects the percentage of inhabitants being cooperative members. The lower the market share the higher is the competition and also the higher is the potential for gaining new clients (for details see appendix).

Constructing an acceptance scale post hoc

The more concrete the question for action, the less inclined are local banks to consent to the new project. 14% of small banks do not accept Video Display Work. 19% are not prepared to arrange for their own data input. 23% are not prepared to invest for computers. 61% of small branches do not volunteer as pilot project for a new computer system. 20% mention any running computer project of their own at the time. In order to extract the maximum information from the survey, a **single indicator of acceptance** is constructed post hoc, which reflects the inclination of local banks to opt for change in 1985, i.e. replacing the old central system with a new data system. The complementary definition of resistance is implied: the higher the acceptance of computing the lower is resistance and vice versa. The scale 'acceptance' is constructed by adding the individual scores on each variable. It reflects the willingness of small banks to invest, to input their own data, to use a VDT work place, to volunteer as a pilot in further developments, and to work upon their own projects. The scale is defined as: acceptance = acceptVDT + input + invest + proj + pilot

The internal consistency is not very high. A one-factor principle component analysis explains 37% of the total variance. Cronbach's alpha is .57. Hence the data contains a lot of noise. Table 11.5 shows the intercorrelations of the variables 'accept, input, invest, proj and pilot'[1]. The correlations are rather poor, albeit significant. The resultant index 'acceptance' is a 10-point scale. Its range is from 5 to 14. The median is 9.00 , the mean is 8.83 with a standard deviation of 2.11, the sample size is n=223 (see appendix 11 for the survey data).

[1] A number of different combinations of variables were tested trying **to optimize** the N, which is preserved from the sample, the internal consistency (Cronbach's alpha) of the scale, and the relation to the predictors.

Table 11.5: Intercorrelations between acceptance items

	acceptance	input	invest	pilot	proj
acceptVDT	**.44**	**.38**	**.19**	**.21**	-
input	**.58**		**.36**	-	**.19**
invest	**.90**			-	**.29**
pilot	**.40**				-
proj	**.46**				

n=223 confidence level 95%

The 1991 survey

In spring 1991 the Raiffeisen bank asked me to conduct a second survey to investigate the satisfaction of local banks with the central service and their future plans. 359 questionnaires were sent out to local banks in October 1991 (Bauer, 1992). This time banks were included that still ran on hand accounting. A response rate of 90% was realized (n=326). 99 items were arranged in 5 modules to suit paper users (n=172), PC users (n=77), or hand accounting banks (n=77). The items of the 1991 survey were not comparable with those from 1985[2].

11.3.4.2 The computer attitudes scale (ADV)

In order to measure resistance I used a well documented German attitude scale. Muller-Boling (1975) constructed a 28 item Likert scale with two subscales: **individual consequences** (e.g. 'computing alleviates the work of most employees') and **social consequences of computing** (e.g. 'computing deprives the employees from their tasks and jobs'). Both scales are combined into the total ADV score. The scales are based on factor analysis. The two factors explain 39% of the total variance (Muller-Boling et.al., 1984). The item of the two factors define the subscales. A few items are not part of a

[2] An initial attempt to make some of the items comparable with the 1985 survey and with my other data collection in 1989 was blocked by internal politics in the central bank. Thus I had to resort an index of resistance from that data that is not strictly comparable to the others.

subscale, but are part of the total ADV score. The instrument provides a single measure of computer attitude and two subscales with reliability r>.82. All scores are standardized with a mean of 100 and a standard deviation of 20. It is based on German data (N=1145) from 42 industrial and service companies, and students from Dortmund University. Standard scores allow to locate an individual or a group within the distribution of the norm population. Norms are provided for subgroups (students, men, women, age groups, computer experience in years, positions) and for 1974 and 1882. Each Likert score is transformed into a score on the standardized scale (Mueller-Boeling et al., 1984). Muller-Boeling acknowledges the limits of validity of his scale. The scale is not representative of all possible computer issues which can be expressed in items, and no cross-validations with other computer attitude scales have been done (Mueller Boeling et al., 1984). The ADV questionnaire is completed during interviews by 32 local banker and in some cases by their representatives (self-rating) and by 7 members of the task force (observer rating). The latter are asked not to mark their own attitudes, but to indicate what they think the local bankers' attitudes were. I produced a French translation of the ADV. The translation of the items was checked by a native French speaker.

11.3.5 The project evaluation

The project evaluation is commissioned by Raiffeisen and has two parts: first an testing of the PC software, and secondly the interviews with local bankers all over the country. The testing of the PC software is done with seven criteria of user-friendliness (Spinas et al, 1983). The software is mounted on a PC and in several hours of manipulations the various functions and criteria are checked. The results are reported in April 1989 (Bauer, 1989b). The evaluation interview, which follows on narrative interview and is recorded, and follows a prepared schedule. During the interview I make notes on the answers to each point. Immediately after the interview I transcribe my notes into a standard answer form. At a later stage I listened to the recordings and completed the notes on the answer form. In addition to noting the responses to questions I make **observer judgements** about the bank manager: His or her **computer experience** (yes or no); Is

the person familiar with the world of computers ?; **satisfaction with the computer system**: Is the person generally satisfied or dissatisfied with the project ? (yes, no, undecided); and the **basis of their critical attitude**: is the criticism past or future oriented. What is the basis of the major critique the manager utters? Is the old system, or is it an idea about how a computer system should work in the future ? By combining my judgement of the attitude and the satisfaction of the bank manager, I could **typify the local bank's orientation**: Satisfaction or dissatisfaction are relational concepts. Dissatisfaction is the outcome of an imbalance between 'is' and 'ought' in a certain situation. The standard of comparison, the 'ought' can either be defined in relation to the past or in relation to the future (variable=critatt). The explicit criticism of the local banker are classified into 17 categories, which are group into three clusters:

Data input (basically about data input forms)
redundancies, lack of fields, unfriendly design.

Data processing
complaints about the costs of the solution, points about the delivery of the data, security matters, matters of training and training material, comments on the documentation, system support, the 'too much paper' problem, three types of errors occurring (local, central processing, programming errors), wishes

Data output
redundancies on the print outs, lack of information, the deficiencies of the layout of the output

The evaluative interviews yielded data from 21 variables that are integrated into the research data base on the local banks, which is used to test the hypotheses about the relationship between resistance and criticisms of the computer project: H9.3 and 9.5a to d. A qualitative analysis of the interview is the basis of an immediate report, which was feed back to members of the task force two month after the data collection (Bauer, 1989c). The results of the evaluative interviews represent the evaluation of the RBRZ project at the time of investigation.

11.3.6 Media analysis of Raiffeisen Publications

Raiffeisen St Gallen publishes the quarterly **INFO**, an in house newsletter, and the monthly **PANORAMA**, a costumer magazine. INFO keeps the local banks up-to-date on **news from the centre** in St Gallen: new developments in computing, marketing, auditing etc. It is the internal expression of the bank. The PANORAMA is a **public relations medium** that gives a flashy self presentation of Raiffeisen, its ideas, its successes, and its development in the context of other worldly concerns. The presentation is mixed with articles of wider public interest like national economic policy, political comments, features, as well as regional news about Raiffeisen banks. The PANORAMA is the external expression of the bank. Both publications are scanned for articles on computing after 1984. The **coverage of computer issues** is measured in percentage of the total print surface, that is plotted against time. These **time series data** give a picture of the intensity and of the timing of computer publicity at Raiffeisen, much of which the was arranged for by task force during certain periods of the project. This coverage varies significantly over time. External communication and internal communication can be compared. Each articles is also coded according to the content. Between 1984 and 1991 the INFO published 83 articles on computing and related issues, or 13.4% of the total coverage measured in cmsq of surface. In the panorama 19 articles were published from 1984 to 1990, or 3.2% of the total coverage. The media analysis is part of the analysis of the organisational communication during the RBRZ project.

11.3.7 Content analysis of organisational communication

Content analysis is applicable to any product of communication and aims at making inferences from the content to the context of its origin (Holsti, 1967; Krippendorff, 1980; Merton, 1983). The core of the present study is the analysis of organisational communication for a computer project. I develop a content analysis coding frame that is applicable at the same time to documents as well as to interview data. Both types of data reflect the information process in the course of an organisational action.

Documentary analysis lends itself to the construction of time series data, interview data yields cross-sectional data. The reliability of the category system is tested. The major problem of a content analysis is to develop a category system that enables to reduce the information in a way which consistent with the material as well as with theoretical concepts. This must be done in an **objective way**, being **deductive, transparent** and **reproducible**. In the following, I explicate the **theoretical basis** of the coding frame and its internal structure.

11.3.7.1 Structure and definitions categories

The coding frame is **multi-dimensional** and has a combinatorial logic that produces in total 216 categories. Top-down (deductive) as well as bottom-up (inductive) reasoning is applied in developing the coding frame.

Top-down reasoning

The coding frame is informed by the theory of self-active systems as outlined earlier (see chapter 6). Any quantitative content analysis means a reduction of complexity, which in principle can be done in many ways that need justification. The justified reduction of complexity is theory guided and reflected. It has been postulated that action systems are sequential, active on multi-levels at the same time, and complex in the sense of parallel part activities. The corresponding information processing is sequential in time, occurs on and between several levels of the organisational hierarchy, and occurs parallel and simultaneously. Each document or interview is located in time (sequential), and is coded according to its source in the organisational hierarchy (multi level). This allows to classify organisational communication as horizontal, top-down or bottom-up. Different documents refer to different part actions (complex). Interviews are conducted retrospectively during action step 8 and 9, simultaneously with respect to the internal rhythm of action steps. They are coded for organisational hierarchy only (see appendix 11: the coding sheet). The content dimensions **functions** and **contexts** are based on the theoretical assumptions of self-active systems.

Bottom-up reasoning

The coding frame is also informed by the repeated reading of documents and listening to the interviews. Having conducted the interviews myself renders me familiar with the content as well as the context of the raw data. From interview transcripts themes are summaries, paraphrased, condensed and written on cards by a procedure proposed by Mayring (1983). These cards are rearranged many times until a logically satisfying structure of contents emerges. Together with previous research (Bauer, 1986) this leads to two additional dimensions, **issues and focus,** of the coding frame, as well as additional kinds of contexts within which self-monitoring may occur.

Categories of a content analysis have to be mutually exclusive and exhaustive. **Mutually exclusive** means that each counting unit is coded with only one code on the same level. **Exhaustive** means that every counting unit is coded in one category, beyond the categories used, there is no other content (Fassnacht, 1979). The coding frame is four-dimensional: function, issue, focus and contexts. Firstly, every text unit is coded in one of nine functions in the on going project. Secondly, each text unit deals with one of nine issues of the project. Thirdly, if communication is coded as being self-monitoring two additional codings will be applied, one of three foci of self-monitoring, and one of six contexts of self-monitoring (see appendix 11)[3].

Each unit of communication before, during or after an action serves one of the nine functions in that action: orientation, self monitoring, goal setting, planning, execution, control, evaluation, and consumption. A similar approach to the analysis of organisational communication has been taken by Tschan (1990). I give a brief definition for each category:

Orientation
Any information about the environment of the organisation, its suppliers of hardware or software, the market situation and competition, or any other external actor.

[3] A detailed code book for the analysis can be provided on request

Self monitoring
Any statement exploring the internal state of affairs with respect to needs and requirements. In interviews any statement expressing the opinion of the informant about how things ought to be.

Goal setting
Any reports on decisions that have been taken, collective or personnel, and their communication to other people.

Planning
Any outline of tasks to be done without allocating it explicitly to a person, yet.

Execution
Any statement about tasks to be done with the responsible person identified; statements about tasks in past tense; reports about activity.

Control
Any report referring to the progress of the software product with reference to preset plans; conclusions drawn from such control activities; necessary alterations, feedback about the status of parts of the project; examinations of parts of the project.

Stopping
Any report on tasks or parts of the project that are being completed; reports of tasks that are interrupted for some reason.

Evaluation
Any reports in which the project as a whole is evaluated; reports which comment pros or cons of the whole project; looking back type reflections.

Consumption
Any report about consuming or distributing the outcomes of the project; gains of prestige; change of positions; consequences of a successful completion of the project. (This category is logically part of the coding system. However, It was not applicable for coding, because the project is not finished and no consummatory consequences have been mentioned, yet.)

The second dimension are issues which are likely to arise during the computer project. A set of issue categories has been successfully used in an earlier study of office automation (Bauer, 1986 and 1991). They are based on the idea that the implementation of a computing system has at least five degrees of freedom: design of hardware and software, the design of individual and collective work structures, the training program, and the practice of information and participation (Spinas et.al, 1983). Preliminary

rereading of the material leads to the distinction between the organisation of the task force and the organisation of the local bank, and to add the categories 'finance' and 'personal motives'. To make the categories exhaustive a rest category is added. Each statement is coded for one of the following issues.

Hardware
Any mentioning of issues of hardware: visual display, keyboard, processor unit, printers, printer supplies, capacity problems, furniture, architecture of building, arrangements of rooms; hardware criteria.

Software
Any mentioning of software issues: program specifications, program testing, computer languages, software packages, user interface, software criteria, user-friendliness.

Training
Any mentioning of training and skill issues: content and form of courses, evaluation of courses, information about training, location of training, responsibilities, concept of training; levels of skill.

Organisation of the task force
Any statement which refers to the way the task force is organizing the project work: charts, work schedules, conflict descriptions, points of agreements, task force planning, project timing, leadership issues, errors occurring.

Organisation of local banks
Any statement which refers to how work is being done in the local bank: internal storage of output, arrangement of rooms, security, data transfer to the centre, working procedures.

Participation
Any reference to involvement of local banks in the planning of the project. Any mentioning of information which goes to local bank about the project: hearings, information days, annual conference presentation, letters to local banks, complaints about lack of information, secrecy, lack of transparency of the project.

Finance
Any mentioning of financial issues: complaints about costs of the project; budgeting information; regular budget reviews; costing of part of project; credit request.

Personal motives
Any statements which refers to motives of a particular person that is involved in the project: career ambitions, anxieties, pleasure, anger.

Others
Any statement which cannot be fitted in one of the above categories.

Here, the focus of the present thesis the analysis of self monitoring information processing during the project, is further specified by the **issue** of self-monitoring, its **focus**, and its **context**. An answer is given to the questions: In which **area of the organisational action** is the problem located, or what kind of problem is it ? Issues of self-monitoring represent the 'body image' of the organisation from the body and pain analogy. The body image is the frame of reference within which the perception of problems occurs. It gives direction and provides orientation. Each statement, which is coded functionally 'self-monitoring' is also coded for focus and context. **Focus** distinguishes whether the self-monitoring information identifies needs and requirements in relation to the input, the processing or the output of data. Input, processing and output of data are another way of classifying user problems with the data service. The three foci correspond to the coding system used for the evaluation interview (see above), linking the content analysis of communication with the analysis of the explicit criticism of the project. The three categories explicating the focus of self monitoring are:

Data Input
Any statements which refers to the input of data: filling in forms, format and content of forms, computer handling, user interface, display and screen issues.

Data Processing and work Procedures
Any statements which refers to the processing of data: errors in processing and programming, work procedures in local banks after the input is done and before the output is received, and after the output arrived.

Data Output
Any statements which refers to the data output: transfer of data, output errors, deficiencies of layout, printer issues.

Six categories have been used to specify the **context** in which self monitoring occurs in organisational information processing. The context codes classify the circumstances under which self monitoring most likely occurs because of its functions for emergency and transfer. The theory of self-active systems predicts that conflicts, interruptions of the actions, and uncertainties are the circumstances in which self-monitoring most likely

occurs. For the purpose of this thesis 'resistance' is added as a variety of conflict; added are also 'user reactions' and a rest category. The six categories are:

Conflict
Any reference to conflict during the project; conflict either between members of the task force, or between the task force and users in local banks, or between the task force and other groups in the central bank, or between the bank and the computer suppliers.

Technical interruption
Any reference to a technical interruption of the computer service: hardware breakdown, software incompatibilities, data transfer which did not work,

User reaction
Any statement made stressing the point of view of the user;
Uncertainty
Any statement referring to uncertainties about the course of the project, or about how to solve arising problems.

Other problems
Any statement which does not fit in any other context category.

Resistance, Delay, Acceptance
Any statement referring explicit to resistance among users or members of the task force; any statement about the delays in the project; any statement about acceptance of parts of or the whole project.

Each text unit is coded at least in two dimensions at the time, function and issue; in cases where self-monitoring applies, two further dimension are added, focus and context. This is represented by a two (WX) digit number in the former case, and with a four digit number (WXYZ) in the latter case. The first digit (W) refers to the function, the second (X) refers to the issues, the third (Y) refers to the focus, and the forth (Z) refers to the context, that has been identified. Some examples will illustrate that procedure. Example are translated from the original German text or transcript:

Example 1: external orientation for software:

Document 134 (August 1985): **'NCR is planning a new banking solution.** Although this project will not be done the most modern techniques, we give it the better changes on the market' (12)

This paragraph has been coded '12': '1' stands for external orientation. NCR is a computer supplier that is planning something relevant for the Raiffeisen project. '2' stands for software issue. A new banking solution is a piece of software, which the Raiffeisen task force starts developing.

Example 2: decision making on task force issues:

Document 107 (October 1987): 'The present support group provides at total of 1000 man-days towards the project. Only parts of that time and effort will be used for the implementation' (34)

'3' stands for goal-setting, decision making and decision communication. From the context of the documents it is clear that a decision has been made about the project time that is required from the support team. '4' stands for the organisation of the task force. Allocating project time among the different groups is a matter of internal organisation.

Example 3: self-monitoring of resistance to the project:

Interview ks 423-426 (Sept 1989): 'how great will the **acceptance** be ? How much will the **local banks** invest into something that they do not know, and something that they do not have already?' (2526)

The informant expresses the uncertainties that accompanied the RBRZ project from the very beginning. '2' stands for self-monitoring. Ks reflects the internal situation of the bank. The issue are local banks, which is coded with '5'. The focus of reflection is the new input device for bank data coded as '2' in the third digit. The context of the self-monitoring is the degree of acceptance that can be expected on the part of the local banks, which is coded as '6' on the fourth digit.

Example 4: double coding: evaluation and metaphor:

Interview as 500-504 (Sept 1989): 'speaking plainly one wanted a **balloon**, and lost the overview, one had no idea how the centre looked like any more; that is why I belief **the project failed.**' (meta, 84)

The informant refers to the first phase of the project when a gigantic computer project was envisaged with centralized data processing for all banks. He refers to that phase of the project with the metaphor 'balloon' coded as 'meta' that signifies the project out of proportion, and at the same time its weakness and intransparency. The same paragraph expresses evaluation of that early phase of the project. The oversized proportions explain its failure, coded as '84'; '8' stands for evaluation of the project, and '4' stands for an issue of the task force. The oversized planning was an error of the task force.

Table 11.6: The category system for the content analysis

VARIABLES		number of categories
function (8)x issues	(9)	= 72
self-moni(1)x issues	(9)	
x focus	(3)	
x contexts	(6)	= 162
total possible categories		= 234
total actualized categories		= 128
percentage of possible categories		= 54
level of communication		6
part action		4
communication: top-down, bottom-up, horizontal		3
timing: before and after intervention		2
MULTIPLE CODES		
metaphors used		66
ideological statements		113
DATA	units of analysis	units of counting
34 interviews		4409 codes, sentences
134 documents		2808 codes, paragraphs
Total		7210 codes, units

The four dimensional framework produces a theoretical total of 234 combined categories as shown in table 11.6. 128 of 54% of these categories have actually been applied. 4409 text units have been coded in the 34 interviews, and 2808 units in the 134 documents. This gives a total of 7133 coded units (N=7210). In the interviews two

further codes were used which proved to be useful for the content analysis. Units which have already been coded were coded a second time. **Metaphors** used in the interview will be analyzed separately as they are an indicator for the tools people use in their thinking about issues (Lakoff and Johnson, 1980). 66 metaphorical statements are identified. In a similar way general statements that have **ideological character** are double coded. Such statements reveal the particularities of the Raiffeisen culture. Ideological statements express the 'we are different' feelings and present the concepts of corporate identity that people use. 113 such ideological statements were identified.

11.3.7.2 Unit of analysis and unit of counting

Content analysis has to distinguish between the unit of counting and the unit of analysis. The unit of counting is the text unit which is coded by a single code. It reflects the level of analysis. The unit of analysis is the text unit within which codes accumulate and which is the unit upon which comparisons are based (Krippendorff, 1980). In documentary analysis the unit of counting is the **paragraph**. Many documents have the character of summaries: reports, protocols etc. Paragraphs are clearly marked by line spaces or numbers. In interviews transcriptions the units of counting are **propositions** normally demarcated by a full stop. In cases where several propositions are made within the same grammatical sentence, the single statement is the unit of coding. Interview transcriptions are imported into TEXTBASE ALPHA, a computer program to assist content analysis, that allows one to define the unit of counting flexibly[4]. The unit of analysis is the single interview and the single document. Interviews and documents are aggregated or analyzed separately depending on the question being asked.

[4] A special thank to Hamid 'Doctor' Rehman for his assistance in using the TEXTBASE ALPHA program.

11.3.7.3 Reliability of the coding frame

Each act of coding is an act of interpretation, identification and classification done by the coder. The coder takes into account his knowledge of the immediate as well as the wider context of each statement. The immediate context is given by the transcript; the wider context is given by recalling the situation of the interview. A **control of the objectivity** of these acts of coding is necessary. Reliability measures the quality of the interaction between coder and category system in relation to some text or imagery material. Based on the reliability-validity-dilemma and on the view that reliability reflects the state of a training process I argue that reliability is a process to be optimized rather than maximized. The rigid standards of quantitative measures are substituted by describing the gradual improvements of category system and by making the coding process transparent.

Reliability is a measure of the **quality of a content analysis.** It indicates the likelihood that results are reproducible if the same instrument is reapplied or if it is used by other people. Any measurement instrument produces errors. Even if objects were identical, they would map onto the instrument with some variance, that is due to the instrument rather than the objects. The smaller the instrument variance, the better the instrument will depict other sources of variance, which is the reason why it is constructed at all. Classically researchers aim at maximizing the reliability of the instruments used, because it set the upper limits of the validity of a measure.

In content analysis the instrument consists of a dual unit; a) of a **category system** and b) of a **person making judgements** on some material. Reliability of content analysis indicates the quality of that dual unit. A reliable coding goes beyond a idiosyncratic and momentary judgement. It is neither a attribute of the instrument, nor of the coders, but an attribute of their interaction. Bad reliability reflects either bad coders, problems with the category system or both. Hence the quality of a content analysis depends both on the coders and the category system. Improving the reliability of an instrument requires improving the coders and working on the category system. To improve a category system means to redefine categories and to make transparent the judgements which are necessary. Reliability becomes a process of **coder training** in order to 'streamline' the different frames of mind into a single one, and a process of

improving the instrument in **several cycles of testing**. For a given category system the problem of reliability is a **matter of time**. It takes time to stabilize coder behaviour onto the same frame of understanding. A stable and unified understanding of the category system is the outcome of coder training. The more complex the category system is the less reliable it will be from the start. It takes more effort to describe its logic, to define the categories, and to train the coders. The complexity of the category system depends on the research questions. Simple questions require simple category systems, complicated questions require more complex systems of analysis. Simple and complicated questions can be asked about the same material, although the material has itself complexity which sets an upper limit to the complexity of analysis which is possible. Matching the complexity of the material with the complexity of the analysis is called the **validity of the content analysis**. A valid category system measures what it is supposed to measure without undue oversimplification and distortion. This idea of validity also includes, that the category system should be useful for some purpose. Assuming complex material and complicated questions the content analyst is confronted with the **reliability-validity-dilemma** (Lisch & Kriz, 1978, 88). The more complex and valid the category system is, the more difficult it will be to establish high reliability; and the more simple and reliable a category system is, the less valid it may be. Reliability does not preclude validity. Reliability measures consensus, validity measures adequacy. A consensus can be inadequate and for an adequate measure can be difficult to reach consensus. Hence, because the construction of the perfect instrument is technically complicated, time consuming and costly, the aim is not to maximize but to **optimize the reliability** for any instrument. Complexity, training effort (time and money), and reliability are the variables involved in the validity equation. A good category system is therefore adequately complex, transparent and easy to learn, and allows to reach an acceptable level of reliability within suitable time. A conventional reliability index tells us that consensus can be established within reasonable time.

Two types of indices are commonly calculated. **Intra-coder reliability** measures the consistency of a single coder who is coding the same material twice with a time interval between the two codings. **Inter-coder reliability** measures the simultaneous agreement of several coders on the same material. For the present coding frame the intra-coder reliability has been calculated. The index is the number of consistent codings

in relation to the total number of codings. Two interviews were randomly selected and recoded one month after the first coding. In the second round of coding the reliability was calculated at .64. Krippendorff (1980) defines .63 as an acceptable level of reliability for cultural indicators, when no decisions of wide ranging impact are being made. The coding inconsistencies were analyzed and some alterations in the coding frame were made. All the problematic categories have been recoded for all interviews. In a third round of coding two more interviews were randomly selected and the consistency of the codings tested. The consistency index was calculated at .74. With that I completed the reliability testing of the coding frame. It has been shown that **intra-rater reliability of .74 can be progressively established in three rounds of coding.** The coding process has consistency, but requires considerable training. It can be raised to an acceptable level. To establish consensus for inter-coder reliability would probably need more time. This will be required, if the coding frame is put to general use as a standard instrument of communication analysis beyond the present purpose.

11.4 Methods of Data Analysis

The integration of different kinds of data is the central problem of the multi-method research design. For the integration of qualitative and quantitative data navigation metaphor **triangulation** has been proposed. The exact position of an object is validated with several points of reference; a hypothesis is tested with different kinds of data, be they qualitative or quantitative. In the present study the presence of resistance to change is triangulated by attitude scales, interview data and documentary analysis (Jick, 1981; Flick, 1992).

For the various data three methods of analysis will be used: **correlation,** descriptions of **frequencies,** and **cross-tabulations.** Data like performance data, job characteristics, attitudes and frequencies of single content categories are **scalar data** that are correlated to test hypotheses. In most cases I will deal with the correlation of small samples ($n < 25$). Small sample underestimate the real covariance (Sachs, 1970, 78), one can therefore expect slightly higher correlations than calculated. The significance test of correlations test the difference from 0. The probability of correctly

rejecting H0, the power of the test, is generally weak for small samples. Correlational results are to be taken as preliminary.

Transcriptions of interviews are implemented into TEXTBASE ALPHA, coded and exported as SPSS/PC DATA FILE. Data is analysis with SPSS/PC version 4.0.1 (Norusis, 1990). SPSS data output is transformed into figures with HARWARD GRAPHICS 2.12. Content analysis produces **categorical data.** The content of interviews and documents is treated differently. For each category the frequency is counted and depicted in frequency diagrams. Interviews are shown by **relative frequencies.** For each category the percentage of occurrence is given relative to the total of codings. Documents are used to create time series data. For each action step the **average occurrence of a category** over all documents is calculated. If in action step 1 a category is coded 17 times in one documents and 2 times in a second document, the average coding for that category in action step 1 is 17+/2=9.5. As for various action steps the number of documents is rather small, the large variance between the documents is averaged out. This reduction of complexity is necessary to gain the time series index. Averages are shown in HARVARD GRAPH figures and smoothed by the function 'curve', which shows moving averages. Moving averages are applied to show the larger trend over time for each category. Relative frequencies and averages allow to compare the various categories and to describe the structure of communication by content and over time. The focus of the present study is descriptive. In few cases statistical inference is applied. Cross-tabulations and Chi square statistics are used to examine the differences in frequency distributions for subsets of interviews. Oneway analysis of variance is used to test differences in the content of subsets of documents.

Graphical representation of organisational attention

The following data analysis is based on assumptions: a) the content structure is the attention structure of the project; b) that the importance of an issue is reflected frequency of communication or salience; and c) that the structure of organisational attention is represented in the **structure of contents.** This are problematic assumption as they disregard that the taken for granted and 'self-evident' problems and solutions, are not talked about, although they are most important in the ongoing activity, if not

crucial for the project. Every organisation is built on routines, and routines have the characteristic that they are not talked about. A disappearing issue of communication or an issue with low frequency is ambiguous. On the one hand the low frequency may indicate its disposal from the agenda; on the other hand it may indicate that a routine has been established. Once a problem solution has been routinized, it no longer needs the level of attention in organisational communication, that it has had before. A non-issue can either mean routinization, and there a problem solved, or internal moderation. This ambiguity will carry through my interpretations of the data. An indication for routinization may be if an issue has been salient at some point in time and then declined. In most cases internal moderation will be the main interpretation, unless there is good reason to assume otherwise.

In the following, two kinds of graphs will be used: **Frequency distributions** and **smoothed time series**. The frequencies show the occurrence of a content category in %. The data are documents or interviews or both combined. The 100% basis are all the codings in all documents or interviews. The graphs with time series show the average coding of a category per document for each period. On average I analyze 10 documents per action step, and coded 20 paragraphs in each document, which gives an average of 200 observations per action step with variation. The time series data are smoothed by default as offered by the Harvard Graphic package. This device flattens the fluctuations and makes trends more visible. I have argued in the previous chapter that the 14 action steps represent the systems own timing, which does not map linearly into the objective time of the years. The time frame of reference is not months or years, but the pace of the project. All data is basically descriptive. Most of the time no statistical argument can be made, because the numbers of observations are too small. Differences in the structure of content between interview data and documentary analysis are expected. I have formulated three hypotheses H9.10 to H9.12 in relation to communication on resistance. Inherent differences of the two kinds of data may partly explain the different structures: a) documentation is formal communication, narrative interviews are not; different functions often result in different structures; b) documents cover the whole period from 1983 to 1991, while interviews are only snapshots of the project in taken in 1988 and 1989. The attention structure in the interview may reflect the concerns of that time only; and c) documentation of internal communication and interviews with an

outsider have different functions, which are expressed in the different structure of the contents. Documents present decisions, problem definitions and solutions as to guide future actions. Interview texts may be exploring the problem definitions and are evaluating the course of action.

11.5. Summary

Discussing the methodology of a study amounts to observing of the second degree: observing the observer observing. The empirical study is conceived as a single case study (N=1) of interrupted time series and post-hoc design. Five different methods of data collection produce eight kinds of data: job characteristics, computer attitudes, project evaluation, content analysis of informal and formal communication, diffusion data, performance data, and media analysis. Two in-house surveys (1985 n=314; 1991 326) are analyzed to assess computer attitudes of local banks. 34 interviews were conducted with members of the task force and local banks, and 134 documents were content analysis. Interviews are of the narrative kind that invite informants to tell the story of the computer project in their own words. The interviews and documents were subject to content analysis with a coding frame of 128 categories. The frame is four dimensional measuring communication content with function, issue, focus and context with a coder reliability r=.74. Function and contexts are theoretical-deductive categories; focus and issues are basically inductive categories. The analysis yields 7210 codings that are analyzed in frequency diagrams and times series between 1983 and 1991. Frequencies and time series depict the structure and dynamics of organisational communication during the RBRZ project. Performance data, computer attitudes, frequency of single categories, and job characteristics are used to test specific hypothesis about resistance as dependent and independent variable. The study is mainly descriptive rather than statistically inferential, and demonstrates the feasibility of a method to analyze resistance in the context of organisational communication.

12. The organizational action and its context

I now describe the context of the case study and the organisational action itself. Raiffeisen Switzerland, a major association of Swiss banks, is introduced; some studies on the impact of information technology in banking in general are mentioned; and I then characterize the diffusion of various generations of banking technology since the early 1970s and the structure of the current computer system at Raiffeisen. The organisational action is described by the task, the process, the social structure, and indicators of performance. A brief history groups the events between 1983 and 1991. The period 1983-1991 defines an organizational action with an identifiable start and as yet with an open end. Four parallel actions are differentiated: strategic planning, the deployment of computer infrastructure, the paper solution and the PC solution. Each of these parallel action is divided into a number of sequential action steps that are separated by significant events. The sequence of all action steps divides the time axes since 1984 into 14 action steps of variable duration, which are the units for the time series analysis. The social structure of the action comprises the task force and the client system, the local bank managers. The job characteristics of local bank managers are given in comparison to other jobs of that kind.

The description of an action freezes the ongoing process like a series of snapshots. Care is taken to catch the dynamics by having several 'photographic appointments'. Simplification is unavoidable. Many characteristics of the process are no longer accurate as soon as they are described, because the description takes time, and the process has already gone its own way meanwhile. By its very nature a process description is outdated by the time of its completion. However, the description is the frame within which some general remarks can be made post hoc about the dynamics of such organisational actions. This is done with the hope of informing future actions of a similar kind.

12.1 Raiffeisen Switzerland: the bank context

Raiffeisen Banking Switzerland is a cooperative of middle-sized and many very small banks. They provide a limited range of bank services, and cultivate a corporate ideology which expresses past and informs future developments. Raiffeisen Switzerland is the sixth largest Swiss bank of a total of 350 banks (SHZ, 1987). The network combines 1200 banks of variable sizes, 25% of all Swiss bank branches, and a consolidated balance sheet of 27900 Million SFr in 1989 (about 11,000 Million £). The 1980s were prosperous years for the bank: the balance sheet doubled and its market strength in rural areas was consolidated. Raiffeisen is an association of cooperatives, legally autonomous banks with local membership. The total membership is around 350'000, with an average of 280 per cooperative, and a range between 27 and 2100 members (Zollinger, 1987). Local banks are profit centres making their own decisions within centrally set guidelines. Recent attempts to foster central influence has encountered strong opposition. Local banks form 21 regional associations and the Swiss Association of Raiffeisen Banks (SVRB), which covers the central banking, marketing, and audit functions, and is located in St Gallen. A nation wide general assembly used to meet once a year in a festival like rally to elect or confirm the board of directors and the supervisory board. This has been reduced to a yearly conference of delegates in a constitutional change called 'Raiffeisen 2000' (Panorama, 2-1992, 9).

Raiffeisen banks are wide ranging in size, varying between 0.5 Million SFr balance sheet with a part-time banker and 180 Million SFr balance sheet with 12 bank staff. In 1984 72% of the banks were in small towns with less than 2000 inhabitants, and 40% or about 500 branches had less than 10 Million SFr balance sheet. In contrast to Germany where concentration halved the number of Raiffeisen banks between 1950 and 1972 (Schuster, 1977), concentration did not affect Raiffeisen Switzerland with the number of banks still rising until 1989. However, the future may be different in that respect.

Raiffeisen ideology is expressed by six business principles: limited area of business, loans only to members, joint and several liability of the members, the board of directors and the supervisory board, work on an honourary basis, no dividends, co-operation in the 'Swiss National Association of Raiffeisen Banks'. Raiffeisen offers a

limited range of bank services, compared with international high street banks. It abstains from international businesses and from stock market activities, and concentrates on small savings, mortgages, bonds, local business credits, and services for tourists. With only 3% share of the total Swiss banking balance sheet, Raiffeisen secured 8% of total saving deposits and 8% of all mortgages (Zollinger, 1987). The main clientele and potential members are traditionally farmers, more recent local businesses, private locals, local clubs and cooperatives, local councils, tourists, and young families. In principle local savings are transformed into local credits with central backing. The money stays where it comes from, that is the idea. Raiffeisen people cultivate a particular corporate identity. Active Raiffeisen people have strong feelings of local self-determination, federalistic control, and strong opposition against centralization. **Autonomy** was a guideline for the computer project in 1983 (document 121). Raiffeisen is a bank as well as a **social movement** with a local, national, and international component. Its origin lays in the financial difficulties of rural areas in the mid of the 19th century giving rise to a movement which took similar forms in different countries. In Switzerland the ideology of this movement is based in 'christian solidarity' and the idea of 'self-help' which is concretized in collecting and lending local capital, and sharing the risks in a wider cooperative[1]. Some of that spirit still informs the activities of the International Raiffeisen Union in the developing world. The degree to which Raiffeisen still has such a developing function in industrialized countries is debated (Schuster, 1977). The 'honourary basis' of much work and control on all levels together with 'no dividends' allows to work with smaller profit margins than other banks, which gives a good position on the savings, credit and mortgage market. Interest rates for savings are generally above average, credit condition are very competitive.

Strategic planning is done by the Swiss Association of Raiffeisen Banks (SVRB) that located in St Gallen with about 450 staff. It works as central clearing bank, central administration, central auditing, information technology centre, and guarantee society. It supports local banks in matters of personnel, marketing, controlling, bank training, computing, legal matters and public relations. The latest brief is 'to guide and guarantee an efficient and up-to-date banking service to clients' within the statutory boundaries

[1] The principle of 'joint liability' it is under pressure at present. The project 'Raiffeisen 2000' has urged its abolishment, to which the delegates have consented in 1991 (Panorama, 2-1992).

given wide ranging autonomy to local cooperatives (Raiffeisen 2000, 1988). A major challenge in recent years was, and still is, the implementation of new technology together with an tougher competition in the local banking market. New technology means higher fix costs, which means higher prices for services or smaller profit margins. This jeopardizes the better position that many Raiffeisen banks enjoyed in the past among bank clients. This challenge has been taken in various ways since the early 1970s. Before I go into details, let me briefly make a few comments on the impacts that recent information technology had on banking in general, as it is part of the wider context of Raiffeisen computing.

12.2 Banking and information technology

I briefly summarize the results of some impact studies of information technology in banking. Five impacts have been identified: the suboptimal use of computing because of conservatism; problems arising with the spread of plastic money; product diversification and increased productivity; job specialization and changes in career structure; and the failure of centralized banking automation in the 1970s. Child et al.(1987) point to the conservative organisational culture of many banks. When such a culture is confronted with new technology, it will be used to foster old ways, instead of going new ways. The potential for organisational innovations, particular the potential for decentralization, is underused. Certain professional groups may not conceive the significance of new technology for their work. One effect of such a culture is that computer technology is concentrated in a new department, which becomes new centre of power with a life of its own. The automatic cash dispenser through the wall is immediately visible for the customer. Several consumer concerns have been voiced (Mitchell, 1988): The bank's decision to give or to withhold a plastic card brings about new forms of social discrimination. Not having a credit card, means not being credited in more and more life situations. The plastic money displaces cash as means of payment. The choice of payment is confined to the cards that are accepted. Cash may not be accepted at all. Cash costumers are not interesting. The electronic storage of minute money transfers traces the consumer's consumer history to an extent that

threatens his or her privacy. Finer and finer consumption profiles are discovered and fed back into the marketing process to manipulate consumer behaviour. Rajan (1984) modelled the diversification of products of the banking sector in the future. Many new services emerge, increase the labour productivity without creating nor losing many jobs. Banking in the 1980s is a good example for using new technology not to save labour, but to increase the output to increase productivity. Changing career patterns were diagnosed for the banking sector. The diverse products and services mean functional specializations. Hierarchical structure transforms into functional differentiation. More people are only partially trained in banking. Part-time banking jobs may increase. The old system of training, where a banker is socialized into all possible functions of the business is replaced by special training like for Retail banking, stock market, commercial credit, or portfolio management. The **'old schoolers'**, craftsman banker, universally trained and experienced on the job, gives way to the **'new schoolers'**, the financial engineer with formal training and specialization. Recruitment of personnel is split into low level for non career jobs and into high level recruiting for career jobs.

Computing in banking took off to centralize in the 1970s. The hierarchical nature of traditional banks and the state of computer technology have favoured centralized computer architecture in the 1970s and 1980s. Many projects failed with big losses and demonstrated the limits of that approach (Smith, 1987). For the British case it was shown how initial strategies of job division and central control have been reversed to a broad training and staff flexibility[2].

12.3 Information Technology at Raiffeisen

The diffusion of banking technology at Raiffeisen Switzerland shows the continuous replacement of old systems by new ones. Old technologies persist when new ones come in. The result is a variety of different technologies at any point in time. Figure 12.1 shows the diffusion of personal computers (PC), on-site computer systems (stand alone), of the old (RBRZ old) and the new central service (RBRZ new), and book keeping by

[2] The early failure of the computing system with Swiss Bankers Corporation is only available as a rumour. The story of that misguided development still needs to be reconstructed. I am not aware of any systematic study.

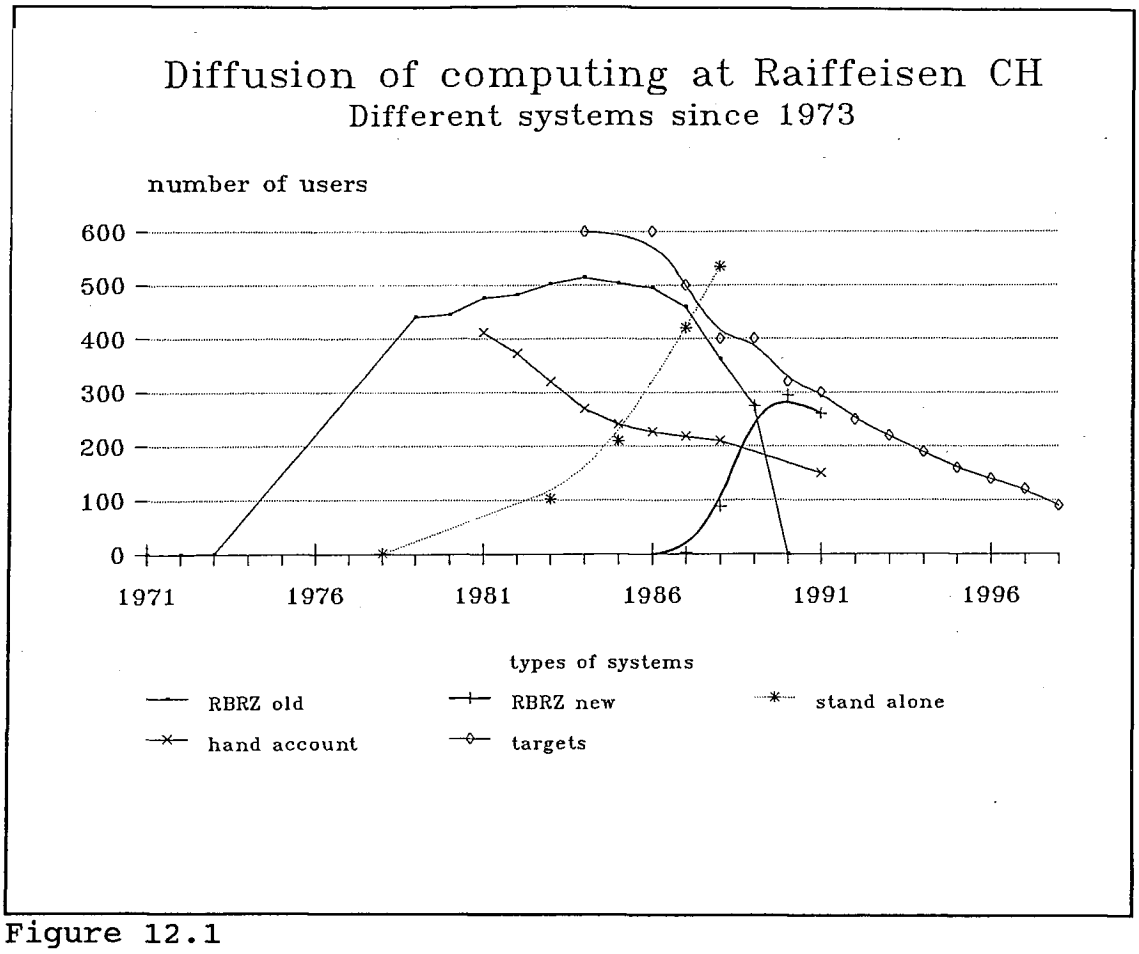
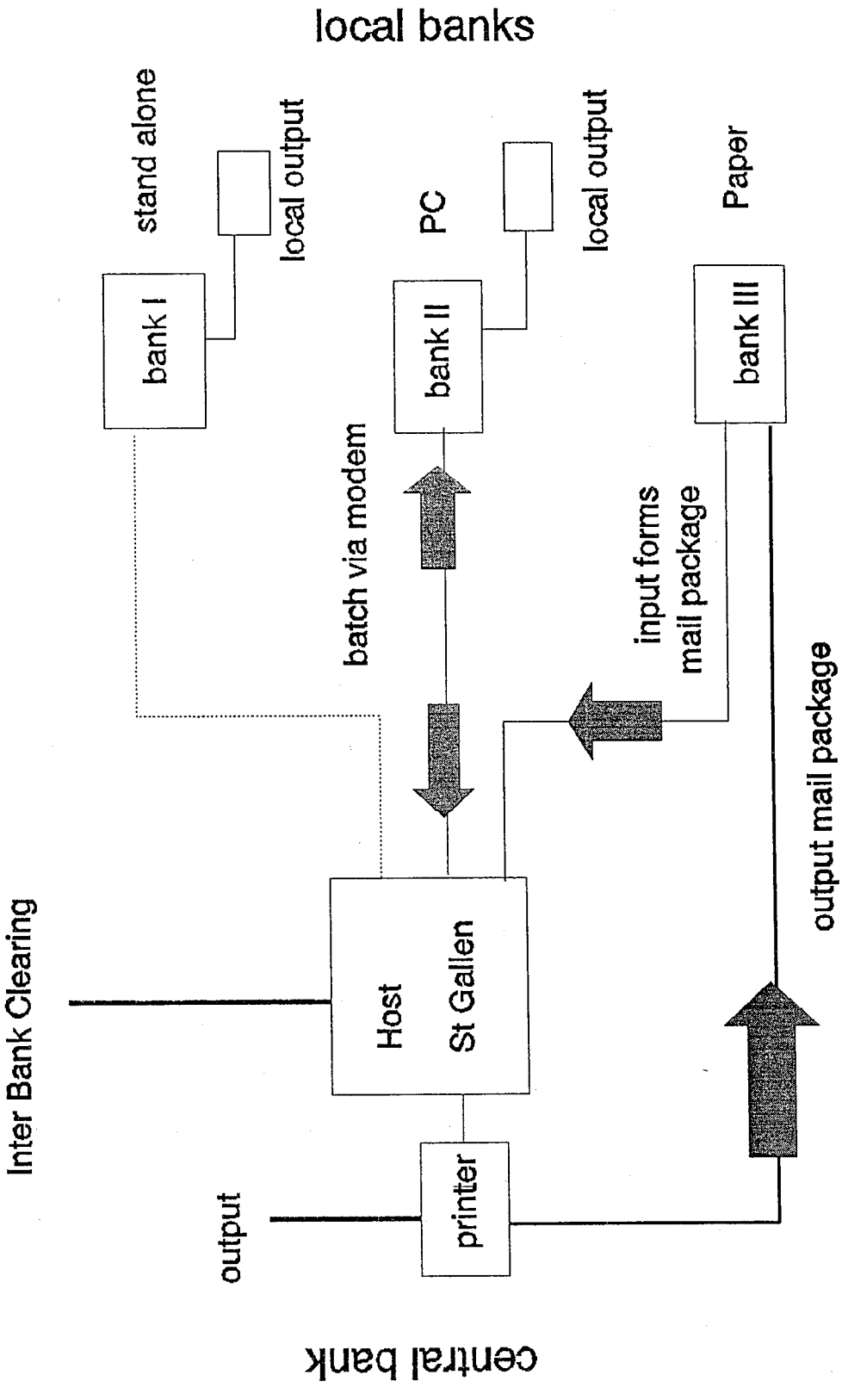


Figure 12.1

hand (hand account) between 1971 and 1991, as well as target figures for the project until 1998. The graphs are reconstructed from various documents, are inevitably incomplete, and interpolated where possible (see appendix for the raw data). Book keeping by hand coexists with handling a magnetic card systems, using a stand alone system or using the central data service. This traditional state of the art for many local banks steadily declined. However, 150 banks still worked in that manner by 1991. In the early 1970 **magnetic cards** are introduced reaching its peak of distribution in 1985. Magnetic card systems and on-site systems are combined as 'stand alone system' in figure 12.1. From 1977 onwards the stand along solutions on micro computers appear. Larger banks buy their own computer systems to process their data. By 1988 about 535 or 44% of all Raiffeisen banks run their own system. Since 1973 the Swiss Association provides a central data service, the **old data service**. Data and outputs are sent by mail. The old data Service reaches its peak in 1984 with 514 customers.

Figure 12.2: the Raiffeisen computer architecture



After 1985 the Personal Computer appears at Raiffeisen mostly used for word processing or spread sheets, because proper banking software was not at the time available for PC. Some banks rely on computer enthusiasts to program their needs for PC, much to the discontent of the central bank[3]. From 1990 PCs are used for the new central data service. Raiffeisen banks are free to chose their technology. Local managers consult with the local board and with the people at the central bank, who will check the financial power of the bank and may grant an investment credit.

In 1980 a task force is formed to replace the old data service with a new version of it. After explorations, decisions are taken and work on the project starts in 1985. The configuration of whole central computer system by 1990 is shown in figure 12.2. Raiffeisen computing moved to a new site in 1985 and caters for two groups of clients, the central bank and the local banks. Both services underwent major alterations in recent years, under the label 'Challenger' for the central bank, under the label RBRZ Project for local banks. I will concern myself exclusively with the RBRZ project. The core structure are two computer systems, the IBM machine for the data service, and the NCR computer for the central bank. The central bank does the interbank clearing. The data service is run in two versions reflecting the double strategy of the project. This threefold configuration is shown in figure 12.2. First, the majority of banks have autonomous computer systems, that are linked to the central computer and periodically transmit their data for reasons of security, interbank clearing and record keeping. Second, small banks may opt for the **PC solution**. A PC work station runs the banking software that is linked to the host by telephone. Data is transmitted via modem every night. Data input and printing is done locally. Third, small banks, unable to afford a PC work station, chose the **paper solution**. Daily transactions are recorded on paper forms. Forms are mailed to the central data service, where they are entered into the computer by typists in the typing pool. The data is processed daily and printouts are returned in form of lists to the local banks. Data lists are stored in the local banks to give information to customers as requested, and to audit the accounts at the end of the

[3] A good example of Raiffeisen autonomy is demonstrated by that event: in one case the son of a local banker, a computer freak, programmed the needs of his father for PC. Once the solution worked, they started selling it to other banks with considerable success. The central bank bought the software, analyzed and banned it, because of its shortcomings for security and auditing, and because this 'wild software development' undermined the computer strategy of the bank, which tries to keep the variety of hardware and software as narrow as possible.

year. A considerable amount of paper is flooding the banks every day, which turned out to be one of the problems of the project.

12.4 The organisational action: the Raiffeisen project RBRZ

The theory of self-active systems, as outlined in chapter 6, postulates that actions and related information processing need to be analyzed on three dimensions: the hierarchical order of events, the sequence of events, and the complex net of parallel events. The complexity of the action is given by four partial actions of the project that run parallel: strategic planning, deployment of the hardware and software infrastructure, the paper solution and the PC solution. Each of these partial actions comprises a sequence of action steps. Each step has a different duration. Each sequence of actions involves different but overlapping groups of people. Each action is conducted on all levels of the hierarchy. The hierarchical order of action reflects the constraining and enabling processes that work top-down as well as bottom up. Collective actions cannot be done without group level and individual contributions, and lower level processes gain momentum and coordination into a more or less efficient flow by higher processes. In principle each action step could be analyzed into partial operations down to actions as fine as the muscular activity of an individual (Hacker,1986,73; Ulich,1991,139). For the purpose of this analysis a molar level of analysis is more conducive. The unit of analysis is the action on the level of the organisation. It is worthwhile noticing that the level of analysis is arbitrary and related to the purpose of the study.

The structure of communication is related to the action. A partial action is located within the hierarchy by looking at the kind of communication related to it. The role structure maps onto the hierarchical order of actions. Members of the task force are expected to do and talk about things as part of their particular position. We would expect that strategic planning mainly involves higher management communication, other actions may spread their communication more widely, also to lower levels of communication. I will apply this approach to my analysis of the computer project 'Raiffeisen Bank Rechenzentrum' (RBRZ) between 1984 and 1991. The analysis of the task structure, the history, and the organisational structure of the project will be

discussed.

12.4.1 Task structure: the changing strategy of the project

Every social action is characterized by a network of interrelated tasks, the task structure. A task covaries with the setting and the available resources. A system will define a task that is manageable with the constraints of the available resources. In the case of mismatch either the resources or the task will have to change for a given setting. For the present purposes I define the organisational task by the project strategy which is adopted. Project strategies tend to change while the actions unfold. Raiffeisen RBRZ makes no difference. Between 1980 and 1985 a number of versions and visions to provide computer facilities for the future of the bank are explored. An external consultant looks at it, too. As a first step a decision is taken to reduce the number of computer suppliers in the early 1980s. The idea is to reduce the complexity of the computer hardware and software to a manageable level. Too wide a range of hardware and software cannot be supported by the limited resources of the Association. As each bank is free to decide what kind of computer to buy, 12 different suppliers sold as many as 30 different systems to Raiffeisen banks over the years. Gradually the number of suppliers is reduced from 12 to 9 and from 9 to 3 by 1988. Banks are urged to buy computers from one of the three contract partners Nixdorf, IBM or NCR. With each supplier favourable conditions are negotiated. This strategic move reduces considerably the prices for hardware, software and support, and improves the support that the Association itself is capable of providing. Decentralizing computing is the trend in the 1980s. So does Raiffeisen, albeit with delay. The advantage of the late comer is, that he does not have to repeat the expensive errors of the early innovators. Raiffeisen went straight into decentralized computing without the costly detour via forced centralization in the 1970s. This is the outcome of much hesitation in decision making, resistance of users, internal conflicts, and general delays of the project. The initial vision to centralize computing for all Raiffeisen banks changes into the double strategy in

September 1985: decentralized and centralized computing (part actions 10 and 11)[4]. Decentralization means that local banks buy their own onsite, intelligent micro computer. However, many of the local banks are too small to afford that. Hence, a mixed strategy is adopted: decentralization for the bigger units, centralization of computing for the small banks. The centralized service is at the same time a way of subsidizing small banks into the computer age. Later the double strategy is altered again. It is envisaged to drop the centralized service totally until 1998 (part action 12 and 13). Doubts about the viability of a combined strategy on the long run have been repeatedly voiced by the marketing and support people. From April 1990 the double strategy is officially presented as a temporary solution for three reasons: (a) computer equipment is becoming cheaper year by year; (b) adequate banking software on PC was not available at the time of decision making, but will be available in the future; (c) for small banks the central service has an important educating function: it gradually leads local banks into the computer age, without a great shock. This is important because of the structure of the local bankers, who, on a one-man or one-woman basis, mostly work on a part-time basis with minimum training in banking. Many of them are women over 45 or even retired men with not much computer experience, and often not much enthusiasm to learn new things. To strengthen the position of small banks, a central computer service must be provided by the National Association. In 1985 an internal task force is formed to modernize that service, which existed in an unsatisfactory form since 1973, namely because for savings accounts and for current account two independent data basis were used. The new system should integrate all accounts in the same system. At the same time the NCR host is replaced an IBM after much internal politics. An IBM banking package is implemented, which needed adaptations module by module to the requirements of the central service. This is a time consuming, risky and costly process, but no other option seems to be available at the time. The project is budgeted on 3 Million SFr initial investment, and 2.5 Million Sfr yearly running costs. The software development required additional investment, and the running costs accumulate about 0.5 Million each year until 1998. On the whole the project is an investment of about 20 Million SFr (£ 8 Million) over 10 years. Plans, budgets and arrangements are

[4] The board of directors decides not to go ahead with a unified computer solution for Raiffeisen Switzerland.

made to reduce the central service gradually until it becomes obsolete by the end 1990s.

12.4.2 Process structure: history of the project RBRZ

The history of the project RBRZ defines the organisational action. I distinguish parallel actions, partial actions and action steps to describe that action. Between 1984 and 1991 the stream of the organisational action can be partitioned in four parallel actions, each of which is a sequence of three or four partial actions. Each partition is defined by two criteria: the time period and a significant event at the beginning. Partial actions are linked logically and structurally. Logically one action can be a necessary condition for the other. For example, a host computer is necessary (partial action 21) before the paper solution can be piloted (partial action 32). Structurally the strategic planning involves people, that are also active in the PC solution. Parallel actions overlap by involving the same people. Finally **project steps** are defined by projecting all partial actions onto the time axis. Project steps are the unit of analysis. This procedure partitions the time between 1984 and 1991 into 14 project steps.

First I briefly characterize the partial actions. The strategic planning (parallel action 1) is divided in four partial actions, pa10 to pa13. The number in brackets refers to the partial action. The dates for each action are given:

'The grandiose vision and conflicts'(pa10) 1980 - July 1985

The task force develops a number of grandiose visions about computing at Raiffeisen. Some people travelled to the US to explore new developments. Visions included a videotext system for communication, two or more regional computer centres, an independent Raiffeisen computer company, Unix as universal software. Various hearings with Raiffeisen banks are held.

'Return to modesty' (pa11) Aug 1985 - Jul 1988

The total solution was rejected. A decision was taken to follow a double strategy of autonomous computing for middle and big banks and a central computer service for small banks.

'Internal settlement' (pa12) Aug 1988 - Mar 1990

In response to an internal conflict the central computer service was split into two solutions: the paper solution and the PC solution. At the same time the proposal for a new cooperative constitution 'Raiffeisen 2000' goes into hearings.

'Challenge and revision' (pa13) April 1990 - present

Certain members of the task force start casting doubt on the viability of the central computer service. Plans are set to make the computer centre virtually disappear by 1998.

The deployment of infrastructure, parallel action 2, is divided into three partial action, pa20 to pa22. The task is to provide the necessary infrastructure in software and hardware to run the data service:

'Getting the partners' (pa20) Jan 1985 - Oct 1986

Different candidates for the host computer are evaluated. At the same time the contract partners of Raiffeisen are reduced from 12 and more suppliers to three: IBM, NIXDORF and NCR. Individual banks are supposed to buy only from these contractors.

'Replace NCR by IBM' (pa21) Nov 1986 - Oct 1988

After long and intense internal conflicts a decision is taken to replace the NCR system with a more suitable IBM system, hardware and software. An IBM 38/600 is purchased. The IBM banking software is available and usable for the Raiffeisen purposes.

'Let it run' (pa22) Nov 1988 - present

The IBM 38/600 is replaced by the stronger AS/400 system. Additional periphery is added to make the production smoothly.

The **paper solution**, parallel action 3, is divided into four partial actions, pa30 to pa33:

'Orientation and planning' (pa30) Oct 1985 - Jan 1987

The task force for the central computing system is formed and starts the work. People from marketing are asked to participate. A survey of the requirements and wishes 500 potential customer banks is conducted. No more banks are accepted into the old central service.

'Getting it going and dithering' (pa31) Feb 1987 - March 1988

The kick-off meeting takes place on 27 Feb 1987. The project management tool IFA PASS is introduced. The project manager is replaced in August 1987, because of work overload and leadership problems.

'Find a viable way of proceeding' (pa32) April 1988 - Nov 1990

The project is publicly advertised at various meetings. Pilot banks are links to the central computer. The system is tested in the first two modules. The project is split into a paper and PC solution. The task force is restructured several times until a viable way of collaboration is found.

'Consolidating and freezing' (pa33) Dec 1990 - present

The paper solution is set to work. Costumers keep on being linked to it. A decision is taken to freeze the paper solution on the two first modules, and to concentrate the efforts on the PC solution. By July 1991 260 banks use central service on the paper solution.

The PC solution, parallel action four, combines four partial actions, pa40 to pa43:

'A new man' (pa40) Dec 1987 - March 1988

A new person joins the task force to take responsibility for the development of the PC solution. An internal conflict is solved by members withdrawing from the team.

'The long start' (pa41) April 1988 - July 1989

Going public for the first time with the PC solution at the Lugano General Assembly. The system analysis takes time, and the project gets behind the schedule.

'Getting it going' (pa42) Aug 1989 - April 1990

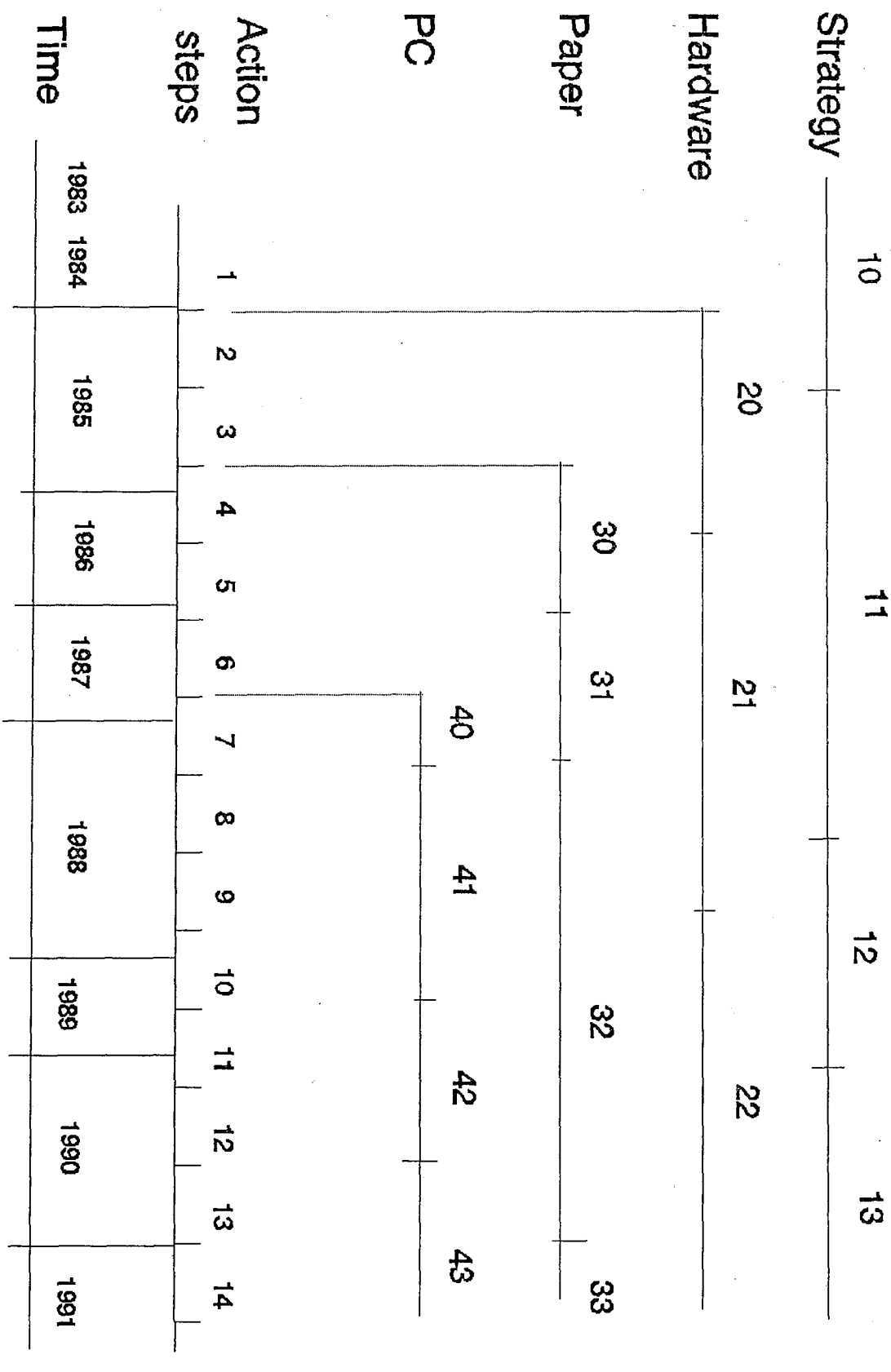
The software specification comes to an end and programming work starts. 'The new man' is getting sacked. The manager of the paper solution is taking responsibility for both parts of the project.

'It works, let it run' (pa43) May 1990 - present

Applications for the PC solution are sent out. The pilot project starts in June. Demand for the PC solution is higher than the service can cope with. Because of the delay many banks go for their own computer solution. By July 1991 100 PC solutions are working.

This complexity of four parallel action sequences is simplified by collapsing the four them into a single stream of action for purposes of description. By projecting the starting and end point of each partial action onto the time axis, I construct a stream of **14 project steps** as shown in figure 12.3. These action steps are the units of analysis. The project unfolds along that stream of action steps. The logical structure is preserved. Each action step starts with a significant event and is a precondition of the following ones. Action steps vary in duration. My graph represents the steps with equal lengths, which is the internal **rhythm or pulse of action**. Internal timing is an essential part of any living systems (Miller, 1990). One of the interviewees expressed a similar point: 'Raiffeisen has its own pace of action'.

Figure 12.3: The sequential structure of the action and its pace



The internal rhythm varies in comparison to the metrum of objective time as shown in figure 12.3. Musically speaking the action plays in rubati and accellandi, an interplay of slowing and speeding up. Several action steps within a single year mark periods of acceleration. One single step over one year marks a rubato of the organisational action. Breathtaking periods of 'acceleration' are 1985, 1988 and 1991. More relaxing periods of 'rubato' are 1986, 1987, 1989. The 14 steps of the project are the time units for the serial analysis of the information processing.

12.4.3 Organisational structures

In January 1989 a new structure is introduced to the Swiss Raiffeisen Association. The functional division has six departments: general directorate, credit, finance, logistics, and auditing. Each department is divided into sections. Computing is part of logistics together with five other sections: personal, training, IT marketing, controlling, and regional representations. The computing department is called 'informatics' and integrates two formerly separate sections, the one serving the central bank, the other serving the local banks. The restructuring reflects the transition from a historical structure with imbalances and parallel developments to a functional structure. The RBRZ project is located within the informatics and logistics department. I simplify the formal structure of the project into two sets of organisational roles: the task force and the client system. This draws upon the distinction of change agency and client system, which is used in the analysis of planned organisational change (Ottaway, 1983). The task force is a temporary substructure cutting across the organisational hierarchy. Members from different departments take temporary responsibility for a particular project. The structure will dissolve once the project is accomplished. However it may, as it often happens, institutionalize the task and become a more permanent substructure, even a new department. In this way it contributes to the differentiation of the organisation over time and to bureaucratic growth. The client system are local banks, not banks customers. I call them 'clients', because local banks decide autonomously whether they buy central services or not. Members are differentiated by the criteria age, gender and resistance of the banker as a person, and the performance of the bank as a unit.

12.4.3.1 Communication structure

Communication in the project is either internal or external. Internal communication is further differentiated into bottom-up and top-down. I distinguish six levels of analysis that map onto the organisational hierarchy as shown in table 12.1. The task force has four layers of hierarchy covering four of six levels of analysis. Communication between the task force and the client system is internal communication. Communication between the task force, the client system and externals defines external communication.

Table 12.1: the RBRZ project and levels and analysis

Hierarchy	Department	Level of analysis
Task force		
Board	Association	level I
Steering committee	Logistics	level II
Management	Informatics	level III
Individual members	Informatics	level IV
client system		
Client system	local banks	level V
environment		
Externals	suppliers consultants competitor banks	

Communication along the levels of analysis is bottom-up if it goes from a higher roman number to a lower one, and top-down if it goes from a lower number to a higher one. The client system and the externals are the partners of the task force. The client system (level V) is an internal part of the project. Hence, communication with the client system is internal communication. The system environment is represented by the externals (external), consultants, suppliers and competitor banks. The internal-external distinction is necessary to demonstrate the bi-directional adaptation as is theoretically postulated for self-active systems. Adaptation to computer suppliers and to the banking competitors is external adaptation, adaptation to the requirements of the board, the work team or the client system is internal adaptation. Internal and external adaptation are not

independent. External adaptation is often achieved by internal adaptation. Internal actors may represent the external requirements. My analysis will focus on the effects that communication a) from the client system to the task force, and b) within the rest of the task force has on the course of the project. The structure of communication that is revealed by documentary analysis is given in table 12.2.

Table 12.2: The structure of formal communication

levels of analysis			top-down n=56			
	I	II	III	IV	V	VI	Σ
I					1	1	2
II	9	5	11	3		1	29
III	1	44	2	36	3		86
IV			11				11
V			3				3
VI		1	2				3
	bottom-up n=71		**horizontal n=7**				134
number of documents							

The upper part of the matrix shows the top-down communication, the lower part shows the bottom-up communication, the diagonal, which is enhanced, shows the horizontal communication.

12.4.3.2 The task force

Any organizational structure is the outcome of past and present objectives and related conflicts. The latest state of affairs in the task force reflects several changes. The task force RBRZ (Raiffeisenbanken Rechenzentrum) exists since the decision has been taken to go ahead with the project in August 1985. It underwent several changes over the years. Staff turnover is high - computer programmers are difficult to get, and even

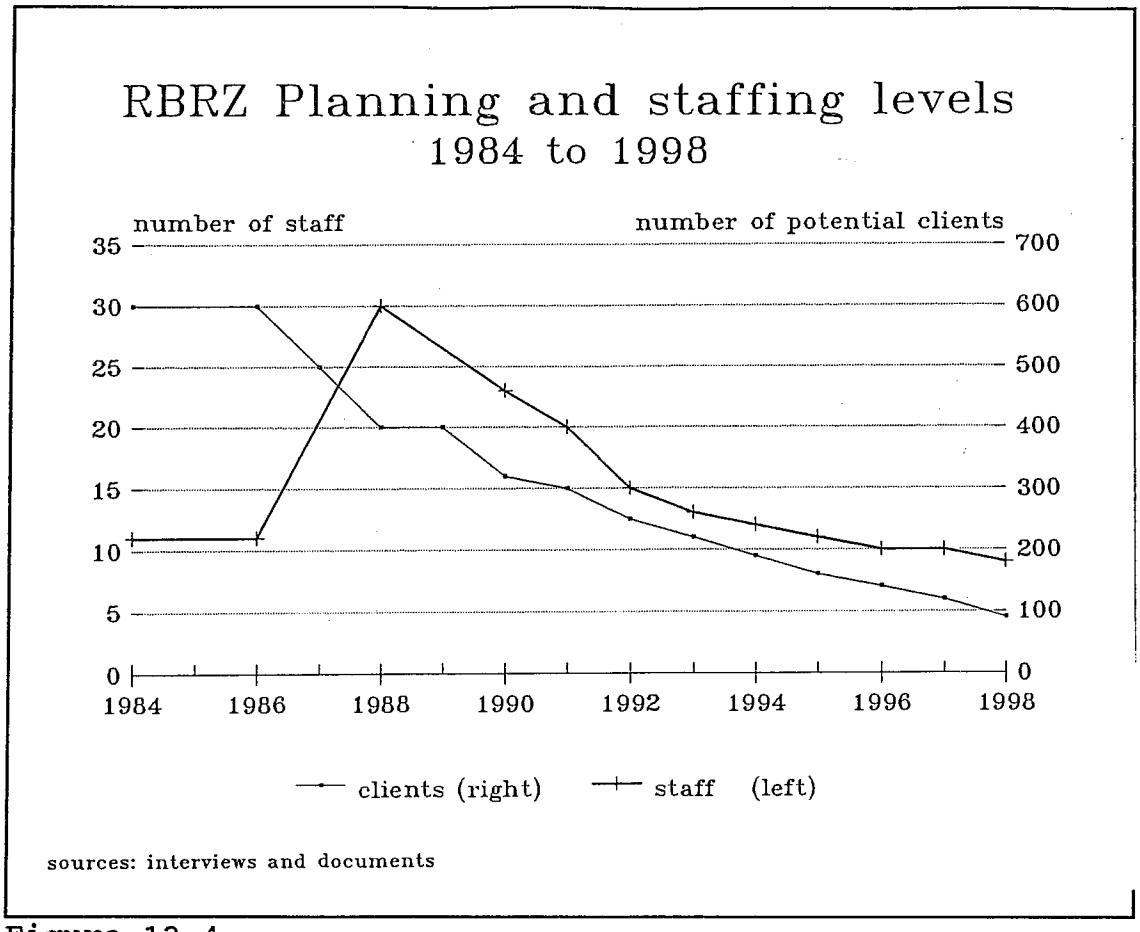


Figure 12.4

more difficult to keep - and the management changes twice; the staffing level changes from 11 members in 1986 to 30 at the end of 1988, 23 in 1990, and a projected 9 people by 1998 as shown in figure 12.4. The fluctuation is mainly due to the increase and decrease of the typing pool. The paper solution requires many people processing the data which is sent daily from all the banks. As soon as the PC solution substitutes the paper solution, the typing pool can be reduced.

The task force has four layers of hierarchy as shown above in table 12.1. The board of directors makes the strategic and large financial decisions. A mixed group of people from auditing, marketing, finance, IT marketing and information technology form the steering committee. The steering committee coordinates activities and keeps

the link to other projects like 'Challenger'[5] by reporting to the board and by supervising progress from the point of view of the diverse departmental interests.

Changes of management occur in 1985, in 1987, and in early 1988, when in each case the responsibility for the project is taken over by another person. Responsibilities for parts of the project are shifted forth and back under personal and technical conflicts until a stable solution is found. The task force is split up into two groups according to the mixed strategy, the 'paper solution' and the 'PC solution'. Both project groups work to the IBM host. Initially an external consultant has been part of the task force. This post is later incorporated into the task force, when the person is fully employed for the project in 1988 to take responsibility for the software development. The person is temporarily on lease from an other company.

One function of the task force is to represent the users. A variable group of three or four people meet regularly to explore the user requirements and define the system specifications. Along these specifications the programming would be done. They are people who supposedly know more about the needs of the potential users. User representation proves to be a major source of conflict from the beginning. Two different groups and philosophies compete to represent the 'needs' of the users: the IT marketing group and the service and support group. The clash is about how to satisfy best the user needs. The IT marketing group follows a strategy of standardization and simplification. They argue with the low level of expertise of the bank managers. In contrast the service and support group follows the strategy of diversity. They want to keep possibilities open for the future and want to offer a wide range of options in the program to cater for variable user expertise. Personal animosities play into that conflict of ideology.

10 of about 20 members of the task force are interviewed. With five of them I entertain regular contacts during my field work. All task force members are German speaking; nine are man and one is a women. The average age on the job is 5 years with a range from 1 to 12 in 1989. Four are less than 40 years old; 6 are between 41 and 60 years old. Each member of the task force is at the same time a) an active individual, and b) represents qua his or her position a second level of analysis. Depending on

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[5] The informatics department works on several computer projects in parallel. 'Challenger' is the name of another computer project of Raiffeisen Switzerland, that serves the needs of the central bank. Another parallel project is SIC (Swiss Interbank Clearing). Although some staff of the task force is involved in these projects as well, I will not concern myself with them here.

whether a person communicates individually or from his or her organisational position, communication is either informal or formal. Formal communication marks the hierarchical position of the sender and the receiver. The hierarchical position defines the highest level of action an individual can represent. The distribution of members of the task force across the levels of analysis is shown in table 12.3. For each level the number of members interviewed is given. Whether a person speaks formally or informally and the level of formal analysis are inferred from contextual markers. Each position can represent any lower position. Each member of the task force can act and communicate on different levels, according to his or her role: as an individual, as manager, or as member of the steering committee, depending on the context. Each documents is characterized by the link between receiver and sender. It is either horizontal, bottom-up or top-down communication. 62 documents make top-down communications, 71 make bottom-up communications. The 10 interviews with the task force are allocated to a level of analysis according to the persons main position.

Table 12.3: task force Interviews and the levels of analysis

level of analysis	hierarchy	interviews	members
I	board	-	-
II	steering committee	3	mk, ap, ks
III	management	4	sj, ph, ae, as
IV	individual members	3	mo, br, ar

Nobody with board function is interviewed. Three of the ten interviewees have management functions and are members of the steering committee; four have management functions, but are not in the steering committee; and three have no management function. Interviews to not cover all members of the steering committee and not all individual members of the task group. Management functions within the task force are all interviewed.

12.4.3.3 The client system

The client system is defined by those local banks which cannot afford their own computer solution, and therefore are **clients of the central computer service** (RBRZ). As legally autonomous units, local banks cannot be forced to use the central service. They can opt for alternative solutions at any time if it so pleases. As a matter of fact, this happens increasingly after 1990. The survey of 1985 defines all banks with less than 20 Mio SFr or around **900 banks** as potential clients. This estimate is later revised several times: By 1988 about 600 banks were targeted as potential clients, 300 in 1991 and only 90 are anticipated for 1998 (Document no 6). The client system is shrinking, as shown in figure 12.4, for several reasons: computer hardware becomes cheaper, software becomes finally available even for the PC, the banks prosper in their business, and the RBRZ project is unacceptably delayed. The performance of the 24 banks of which I interviewed the managers, is shown in table 12.4. The average balance sheet is 8.82 Mio SFr in 1988, the average market share is 24%, the average productivity is 26 Sfr per hour, the average rentability is 1.9%. The rentability is decreasing from 1985 to 1988 on an average of 26%. The computer means higher fixed costs and lower profits, which puts pressure on the rentability of the branches. The starting position to enter the computer age is better for good performers than it is for bad performers. The median of performance splits the 24 banks into two groups as shown in table 12.3. 'Good performers' have a higher productivity and rentability, a better market position and a smaller change in rentability from 1985 to 1988 than 'bad performers'. However, a good market position is not sufficient for the rentability. Banks Filsur and Bettmeralp perform badly despite their good market position. On the whole the correlation of market position and rentability is not significant. The bigger is not necessarily the better (Schuster, 1977, 13ff). You need the right customers, not only a big number. The rentability of some of the small banks at Raiffeisen is exceptionally high compared with banking standards, which according to Schuster (1977, 44) are at maximum 2.49 %. The good performers are above Raiffeisen standards. Good performers are in a good position to take up the new central Data Service, for the bad performers this means a problematic additional costing factor.

Table 12.4: The performance of the 24 banks

town	balance	market	product	rentab	change
Good performers					
Isenthal	15.82	.21	94.56	5.97	-.05
Mervelier	6.15	.34	33.22	5.40	-.03
Hottwil	7.53	.44	78.60	4.70	-.13
Grub	10.29	.34	43.17	4.19	.07
Erschmatt	11.67	.30	96.31	3.30	-.32
Schoenh	14.25	.21	47.40	3.32	-.18
Weisstan	10.63	.50	20.38	3.07	.19
Hauptwil	12.22	.20	26.85	2.20	.03
Waltens	5.55	.32	24.69	1.78	-.35
Preles	7.09	.27	22.93	1.45	-.11
Tiefencast	5.70	.28	13.13	1.27	.05
Ausserberg	11.38	.34	71.13	1.25	-.08
Bad performers					
Rueschegg	2.99	.10	4.94	1.15	-.72
Lenzerheid	12.53	.12	5.55	.84	-.53
Ennenda	6.43	.02	11.87	.83	-.24
Cumbel	2.63	.17	3.09	.82	-.70
Bitsch	8.42	.27	5.08	.81	-.34
LaCdF	14.53	.01	6.90	.76	-.74
Filsur	8.13	.35	12.78	.71	.13
Bettmer	8.75	.39	3.13	.64	-.38
Gorgier	9.82	.14	3.14	.59	-.54
LesHaut	3.33	.09	5.61	.51	-.20
Villnach	9.62	.12	7.84	.45	-.12
Spluegen	5.19	.16	2.06	.44	-.30
mean:	8.82	.24	25.99	1.90	-.26

balance: Mio SFr in 1988
market: percentage of population cooperative members
product: SFr per person and opening hour
rentab: in %
change: rentability change from 1985 to 1988

12.4.3.4 Bank job characteristics

The JDS profile shows that Raiffeisen bank jobs are above average in all job dimensions. Variety, autonomy and feedback are characteristically high. Figure 12.6 compares the job profiles of Raiffeisen with German and American data of other jobs: office clerks, farmers, tool fitting, machine handling, general administrators (Hackman and Oldham, 1974; Schmitt et al., 1985). The German farmer and the small Raiffeisen banker have similar profiles. Their job is highly variable, allows for autonomy, and gives sufficient feedback from customers and others. Clerical and industrial work is markedly different from the Raiffeisen jobs. The job motivation potential of Raiffeisen bankers is shown in figure 12.6. The average MPS score is higher than the norm. The bankers are motivated on a medium level similar to administrators and professionals,

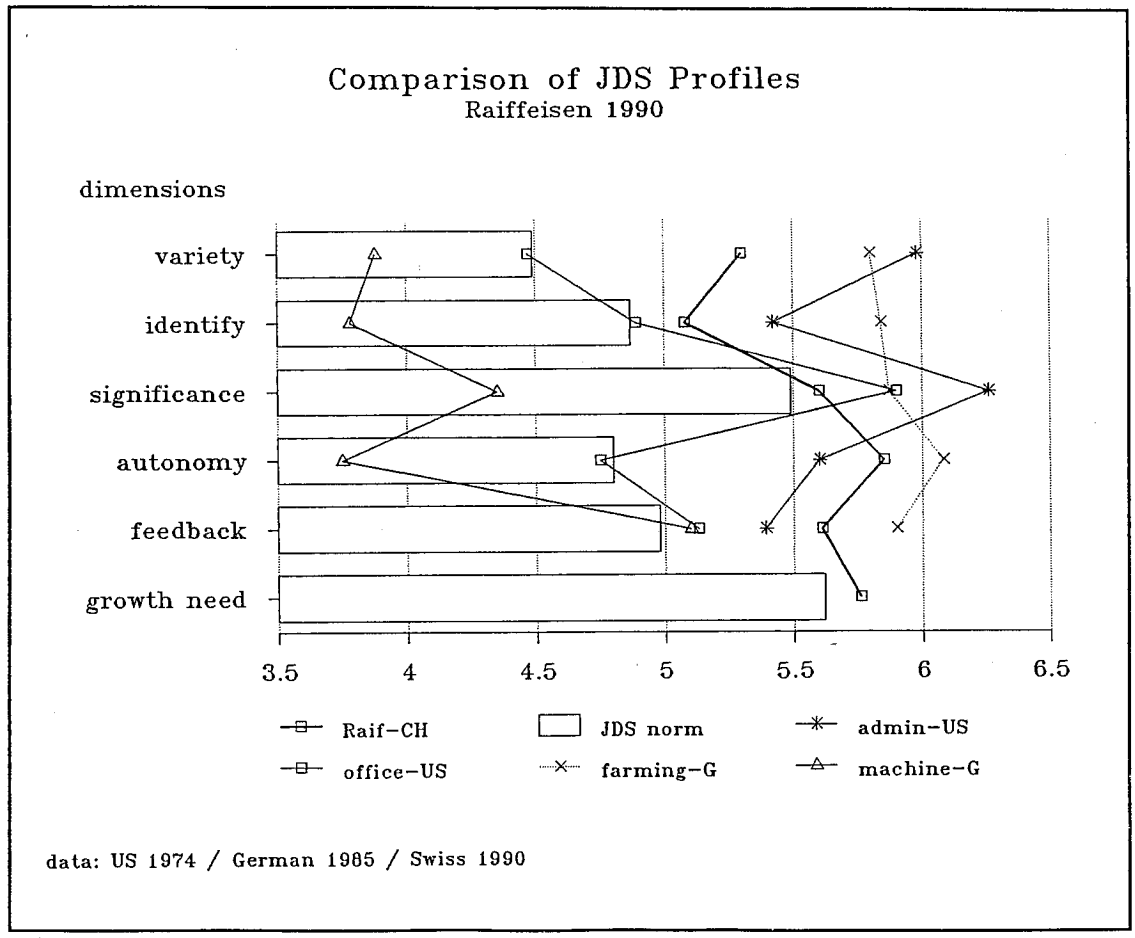
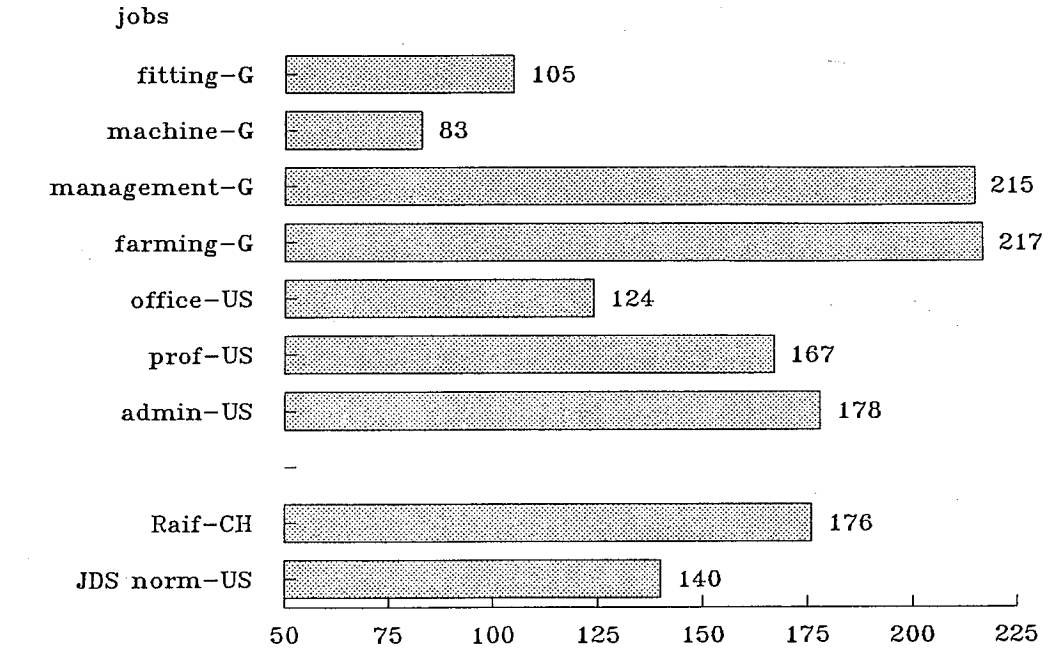


Figure 12.5

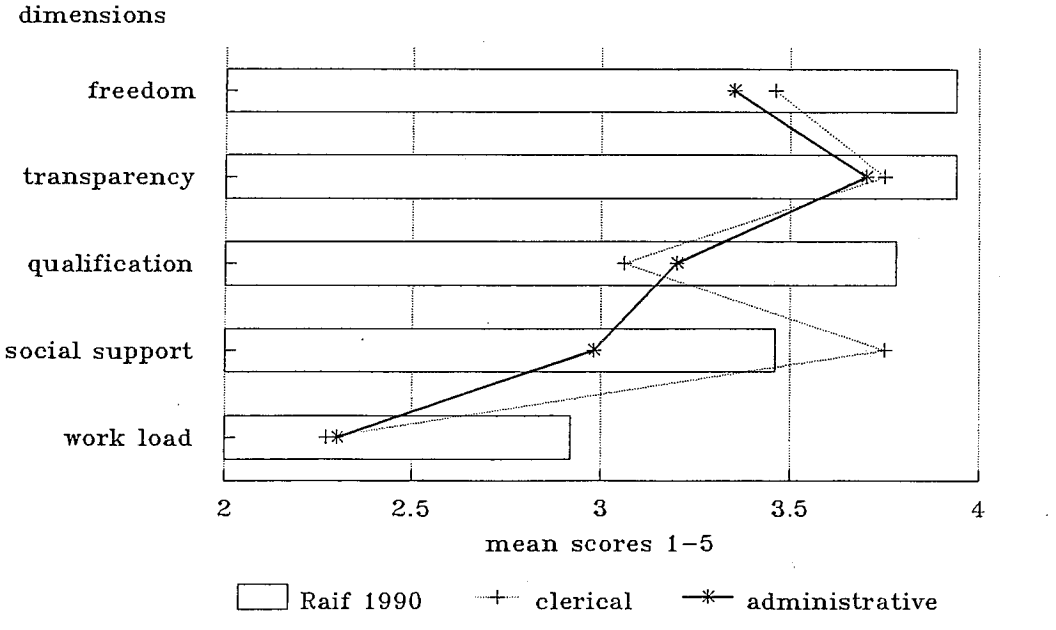
however lower than farmers and executive managers.

Figure 12.6: JDS job motivation potentials in comparison



data: US 1974 / German 1985 / Swiss 1990

Figure 12.7: Comparison of SJA job profiles



data: Ruch (1985); Udris&Nibel (1989)

The SJA data adds to this picture. Figure 12.7 shows the Raiffeisen data compared to the data collected by Ruch (1985) for secretarial work in the Swiss civil service. Raiffeisen banking offers more freedom, requires and makes use of higher qualification, and sets are higher work load than clerical work. Most of the banks interviewed are single person businesses. When problems arise the people mostly have nobody at the side to ask. They have to call St Gallen, ask the spouse, or get in touch with a colleague from another bank. This is reflected in the profile. The social support from coworkers and supervisors is lower. Raiffeisen bankers are somewhat isolated in their daily work. On the whole the profile is well within the range of what Udris and Nibel (1989) call 'our socially constructed world of jobs'. One would expect that high work motivation (JDS scores) correlates with the rentability of the bank. None of the individually measured job dimensions correlates with the rentability of the banks when combining the levels of measurement. Other factors than individual characteristics of the banker are more important. A high balance sheet makes people feel like having an important jobs (r=.55), having a lot of elbow room (r=.54), having a lot of responsibility (r=.80), and having a high demand in qualification and abilities (r=.55) (see appendix 12 for the complete data set).

Summary

Raiffeisen Switzerland is an association of nearly 1200 cooperative banks of middle or small size. Their range of business is limited to mortgages, small business credits and retail banking, and the traditional market is rural rather than urban. Information technology in general poses several challenges to banking: it is a opportunity for organisational innovations; electronic money may bring new forms of social discrimination; computers allow banks to diversify their range of services; the traditional career structure for bankers is altered by increased specialization; in the 1970s computing in banking meant centralization. Raiffeisen Switzerland faces the challenge of banking information technology during the 1980s with a project to provide computer services to all of their banks: RBRZ (Raiffeisenbanken Rechenzentrum). In the 1980s many banks make the transition from record-keeping on magnet card systems to stand-alone solutions; smaller banks make the transition from the old central service to the new RBRZ service, which may include buying a PC station. Raiffeisen follows

a double strategy: decentralized stand alone solutions for larger banks, centralized services for small banks. The central service will be a temporary solution to guide small banks into the computer age, until they are able to afford their own system in the years to come. The project of setting up the new central service is analyzed as organisational action in three dimensions: complexity, sequence, and hierarchy. Demarcated by significant events, the period from 1983 to 1991 is divided into 14 project steps of unequal duration, which represents the 'inner time' of the action. Complexity refers to four parallel actions: strategy, hardware infrastructure, paper solution, and the PC solution. The communication structure is divided into six levels: four within the task force, level five the local banks as the client system, level six the externals like suppliers or consultants. The hierarchical structure allow me to classify documented communication as bottom-up, top-down, or horizontal. Members of the task force act either as the board, as the steering committee, as the management, or as individuals, depending on the context. The local small banks with mostly one or two employees are grouped into good and bad performers. The JDS and SJA profiles of local banks show high levels of variety, autonomy and feedback, and a motivation potential of middle level similar to administrators. The work load is higher than for straight forward clerical work and social support is lower, as most bankers in Raiffeisen banks work alone, even on a part-time basis. Action steps, level of hierarchy, performance and job characteristics will be used as variables in the analysis.

After having characterized the context and the structure of the organisational action, I proceed to the analysis of the communication during the project, in particular the communication of resistance to the project: observing resistance.

13. Observing 'Resistance to Change'

Resistance to change in an organisation is observed either from within or from outside. The external observer reconstruct the events according to his own criteria and concepts. Observations from within, organisational self-observations, are done by members of staff, have a more or less official character, and are part of the communication system. Self-observation and external observation do not necessarily match; and this divergence of internal and external observations is a vital source of information for any system. Differing observations are the outcome of different perspectives which are often mutually exclusive but complementary. Self-observations are often external observations which have been formally accepted. Several self-observations on most issues will coexist in a pluralistic social system. The recording of self-observations enhances the external understanding of an organisational culture; direct external observation can point to possible blind spots of that organisational culture. Both kinds of observations are collected in the Raiffeisen bank case: external observations of resistance include diffusion data, acceptance measures from 1985 and attitude measures from 1989; the self-observation of resistance includes resistance ratings and the resistance talk during the project. First I present the external evidence of resistance to technical change at Raiffeisen since the mid-1980s; secondly, I analyze the formal and informal communication during the RBRZ project in order to put the presentation of resistance in the context of other issues; thirdly, I analyze the way members of staff talk about resistance among users of the new computer system and provide evidence for a number of hypotheses that were formulated in chapter 9 based on the pain analogy.

13.1 External Observation of Resistance to Change

In the following chapters I analyze two kinds of evidence for resistance to change as seen by the outside observer, therefore external evidence of resistance: the rate of diffusion of computing system and the attitudes of the branch staff towards computers. For the methodological discussion of the data I refer to chapter 10, and for the documentation of the data and the data analysis to the appendix 13.

13.1.1 The diffusion of computing at Raiffeisen 1970-1991

Assuming equal functions two systems of diffusion may differ (a) in the starting point of the diffusion, and (b) in the speed of the diffusion in a comparable time period. Both are indicators of resistance by which two diffusion systems are comparable. The system of diffusion is the Raiffeisen Bank Switzerland. The unit of diffusion is a bank branch. The total number of branches was 1228 in 1988. Two subsystems of banks are involved in the diffusion process: Larger branches with more than 20 Million Swiss Francs balance sheet in 1985, and smaller branches with less than 20 Million SFr balance sheet. Adopters move between these different technical system, as they change their technological policy. Smaller adopters generally move from hand accounting, or from a magnetic device of account handling, to the old central service, from there either to the new central service or the a stand-alone solution. From the new central service they are expected to move to a stand-alone solution at some point in the future. Their diffusion process is basically a two step process: the hand accounting to the central service, and from the central service clients to a stand alone solutions. This takes place when the branches grow in their activity and their resistance declines. Larger adopters either move from a magnetic device of handling accounts to a stand alone solution, or they had adopted such a solution already some time ago. The data from the large and the small branches is integrated in the mainframe of the Raiffeisen Central Bank in St Gallen for purposes of inter-bank clearing and the keeping of central records.

Evidence for resistance in the diffusion process

The diffusion of data processing devices at Raiffeisen, which is indicated by the 'Raif computing' data, is compared with the diffusion of computers in the Swiss Banking sector (Luthi et al., 1988; see appendix 13). Several observations can be made to gain evidence for hypothesis H9.18 which specifies the alterations function of resistance:

> H9.18: Effective resistance slows the speed of project compared to the planned schedule, or compared to similar projects.

Firstly, the diffusion of electronic data processing is much further developed in banking than it is in the rest of the economy. By 1987 90% of all Bank business units use computers compared with 26% of all business units of the Swiss economy together.

Figure 13.1: the lagging diffusion of computers at Raiffeisen

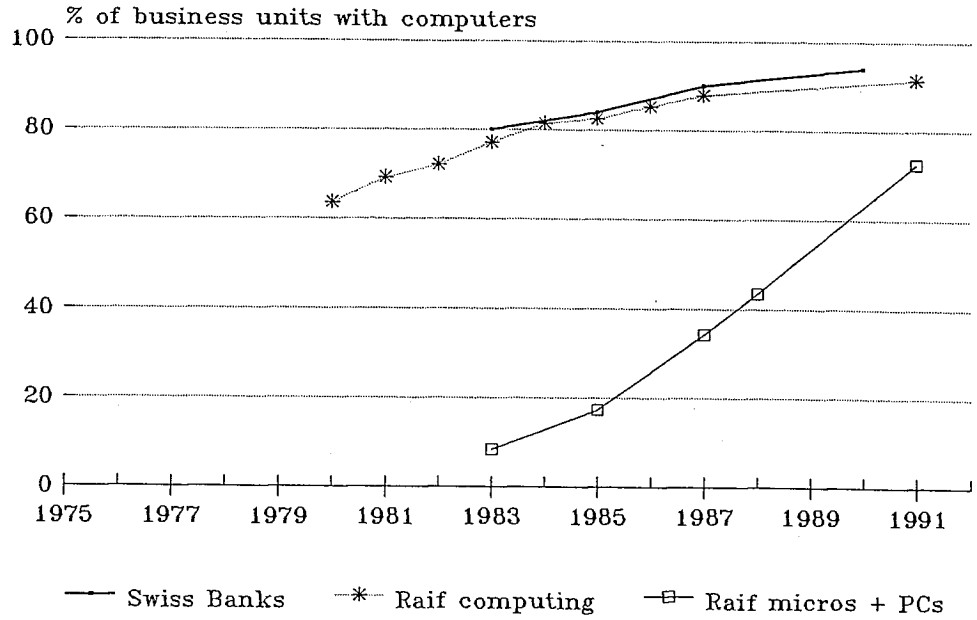
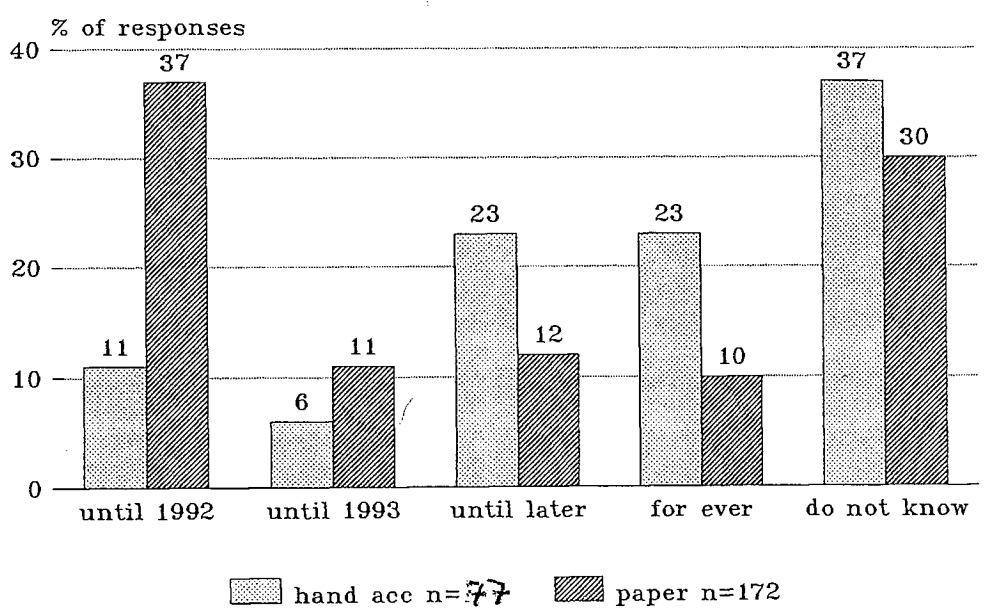


Figure 13.1a: postponing technological change (Raiffeisen survey Oct 1991)



'How long do you want to wait'? Oct 1991

Secondly, the diffusion of Raiffeisen computing lags behind the diffusion in Swiss banking as shown in figure 13.1. Raif computing includes devices such as stand-alone micros, PCs, magnetic card systems, and central computing services. At all times the Raiffeisen rate of diffusion of computing devices is below the general rate: in 1983 74% versus 80%; in 1985 82% versus 84%; in 1987 87% versus 90%; in 1991: 90% versus 94%. The difference in 1991 is significant on 95%; the error margin for the national estimate is 2.22%, hence the true percentage is between 91.78 and 96.22%; the Raiffeisen data is not an estimate. I distinguish a quantitative and a qualitative lag. The lag represents the resistance of the system. Quantity takes into account the number of units that have any kind of computer access, be it stand-alone, terminal or PC; quality measures the percentage of 'high tech' represented by stand-alone solutions and PC units. The quantitative lag of Raiffeisen is about 2 to 4 years behind the other banks. The qualitative lag is much greater: 8% versus 74% in 1983, and 72% versus 90% in 1990. According to statements of the change agency during interviews this time lag is up to 10 years. Thirdly, up to 1985 the quantitative gap is closing from 6% (1983) to 2% (1985); between 1985 and 1987 the diffusion of computing at Raiffeisen is slowing, and the gap to the other banks widens again to 4% (1991). Figure 13.1 shows the diffusion of computers among Swiss banks, and for Raiffeisen banks the diffusion of computer in general and the diffusion of 'high tech' equipment. The statistically significant forking of the Swiss and Raiffeisen general graphs can be recognized after 1985. Fourthly, the trend for Raiffeisen reaches a plateau in 1986 and 1987, while the general trend for computing in banks is upwards with the same rate. Fifthly, the qualitative lag in the diffusion of computing is progressively closing between 1983 and 1990 with the rapid diffusion of stand-alone micros and PCs. 1985 is a turning point for the diffusion of computing at Raiffeisen. In the years 1985 to 1987 the process slows down and the gap to the other banks widens. One part of hypothesis H9.18, the slowing down of the process, can be confirmed. The diffusion process indicates resistance, but further evidence is needed. The lag in the diffusion process has to be related to processes within the project after 1985 to explain this resistance. After 1985 the restructuring of the central service begins. Figure 12.1 in the previous chapter shows the diffusion of different data processing devices at Raiffeisen Switzerland. By 1985 a stop for the old system (SK) was decided. From 1985 onwards no more clients

were accepted for the old service, with some exceptions. The old central service reaches the upper limit of 514 customers in 1985. From 1987 onwards the new service (RBRZ) is taking on the branches from the old service in a fast rate of 26% a year. By 1989 52% are linked up to it. 1986 the diffusion of PC's takes off very steeply and reaches 25% by 1989, after 3 years. This rate is in step with the diffusion of PCs in Switzerland after 1981, although the lag is about 5 years. 1985 to 1987 is the waiting period when the transition from the old to the new service is prepared but not yet working. This transition slows down the overall diffusion of computing into the rest of potential adopters at Raiffeisen as shown above in figure 13.1. The linking of hand accounting branches slows from 1985 onwards: from 1981 to 1985 the hand accounting is reduced with a yearly rate of 3.73%; from 34.1% in 1981 to 19.7%. From 1985 to 1987 this rate is down to 1%. The transition of the old to the new service has priority over the linking of the new customer banks to the new service. The internal restructuring of data processing and its social dynamics of resistances slow down the diffusion of computing at Raiffeisen. The diffusion of stand-alone micros follows a linear trend of 6.1% new adopters per year from 1981 through to 1988, with a tendency of speeding in 1987 (6.4%) and 1988 (9.9%). After 1986 an increasing number of old service clients opt for a stand alone solution during the waiting period for the new central service. This migration from the central service to the stand alone system explains the decrease of the estimated number of potential adopters for the new service from 544 to 400. This development also shows a trend away from the central service to decentralized computing.

Postponing the changes

In the two opinion and attitude surveys from November 1985 (n=314) and in September 1991 (n=326) local banks were asked how long they will postpone any changes to their data processing system: This meant in 1985 a change from hand accounting or the old central service to the new central service, and in 1991 from the hand accounting to the paper solution or PC solution or from the paper solution to the PC solution. The results are in both cases further indicators of resistance among local banks. In 1985 38% wanted to wait up to one year, and 29% preferred to wait more than two years. Figure 13.1a shows the results from 1991. 48% of banks with the paper

solution, and 17% of hand accounting banks will change the system within the next two years; 10% and 23% respectively want to wait for ever, hence do not want any change at all; and more than 30% do not know what to do. More than 50% of local banks, hand accounting banks more so than banks with paper solutions, postpone any change without specification of time. Up to the 1990s the urge for change is rather weak among local Raiffeisen banks (Bauer, 1992c).

To summarize one can say that the diffusion of computing at Raiffeisen proceeds at a slower rate than in the Swiss banking section as a whole. The quantitative lag is about 4 years, the qualitative lag is about 10 years; the former is slightly widening, the latter is rapidly getting smaller. The period from 1985 to 1988 is a the period of resistance of the diffusion system. The diffusion of stand-alone micro and PC solutions continues in a linear trend with a tendency to speed up pointing to the trend to decentralized computing. It is shown that a period of resistance in the diffusion of computing is associated with a trend for decentralization of the computing. Computing at Raiffeisen is restructured by shifting from central and decentral data processing. The centralized data service is substituted by decentralized computing on micro solutions. Albeit these changes on the supply side, a constituency of more than 50% of local banks with Paper solution or hand accounting do not see any need for technological changes into the 1990s.

13.1.2 The attitudes towards the use of computers at Raiffeisen

In the chapters on acceptance research attitude studies have been introduced as a special case of acceptance research. This is the background against which the new technology climate in Switzerland in the mid 1980s has been is described based on a number of studies. On that background of the climate for computing in Switzerland I will analyze a survey of attitudes towards a new computing system, which was conducted by Raiffeisen in 1985. This data is reanalysed to define an index of the level of resistance at Raiffeisen at the time. The survey was conducted when the new Raiffeisen computer project was about to be launched. The secondary analysis involves an examination of the quality of the data, data reconstruction, the introduction of additional archival data. An index of 'acceptance' is partly explained by a multiple regression model.

13.1.2.1 The opinion survey of 1985

The diffusion of computers has been described as external observations of resistance. The second source of external observation of resistance to change is a survey conducted by the Raiffeisen task force in December 1985. The results of the survey were used to back up the proposal for the new computer service with the board at Raiffeisen in October 1986. The results were published in the 'Raiffeisen Info' in spring 1986 (Raiffeisen Info, spring 1986). The publication of the original survey results constitutes internal observation of resistance. I will come back to that later. Here I report the results of the secondary analysis of the data from 1985 in form of an external observation.

13.1.2.2 Predicting the acceptance of computing

The survey data from 1985 is used to test four hypotheses about the acceptance of computing at Raiffeisen in relation to its size, its market position, its age, and its cultural background (see chapter 10 for details of the survey). The first hypothesis is based on Hagerstrand's (1967) claim that acceptance of an innovation is proportional to the size of an adopting unit; the hypothesis is:

> **H13.1**: The larger the bank the more likely it is that it will accept a new computing solution.

This will be expressed in a positive correlation of balance sheet and acceptance. The second hypothesis relates acceptance to the market position. The market position reflects the competition which a branch is facing in its district. A high market share means a quasi monopoly position. There is no pressure to opt for an innovation which potentially improves the costumer service the branch is able to provide in order to attract new costumers. A negative attitude, complacency or disinterest will be prevalent. Hence, we can expect a negative relationship between market share and acceptance of the new computing solution; the hypothesis is:

> **H13.2**: The smaller the market share the higher the acceptance of the new computing solution.

This will be expressed by a negative correlation between market and acceptance. The third hypothesis relates acceptance to the age of a branch. It is assumed that the age of a branch reflects the accumulated experience about how to run the branch. The more experience there is the more likely there will be satisfaction with the traditional way of doing things. We would therefore expect that the inclination to adopt new things is reduced with the age of the branch. The hypothesis is:

H13.3: The older the branch the lower the acceptance of the new solution.

This will be expressed in a negative correlation between age and acceptance. The fourth hypothesis relates acceptance to the cultural context of the branch, its language environment. In general as above (see chapter 3) the Swiss language communities differ in their attitudes towards new technologies: the Romands and the Italians are generally more in favour of new technology than the Swiss Germans. We would expect that these differences are reflected in the acceptance of a new computing solution at Raiffeisen; the hypothesis is:

H13.4: The Romand banks are more likely to accept the new computer solution than the Swiss German and Swiss Italian banks.

This will be expressed in a positive correlation of acceptance and the dummy variable 'language', Swiss German being 0, and the minority 'latin' banks, Romands and Italian speaking, being 1.

Table 13.1: Correlations: variables with predictors

	balan	market	bank age	language
AcceptVDT	-	-	-	-
Input	.17	-	-	-
Invest	.35	-.15	.17	.19
Pilot	-	-.11	-	-
Proj	.43	-.13	.25	-
Acceptance	.33	-.19	.19	.06(n.s.)
Partial correlation	.27	-.17	.16	.05(n.s.)
beta	.27	-.20	.16	.05(n.s.)

correlations significant on 5% level

For the results I refer to table 13.1. The relation among the variables is generally weak. The coefficients are between .11 and .43, albeit significant on the 5% level. Two hypotheses, H13.1 and H13.2, are supported. The direction of the relationship is as predicted. The larger the branch (partial r=0.27) and the smaller the market share (partial r=-0.20) of the branch, the higher is the acceptance of computing. H13.3 is partially falsified. Age affects the acceptance of computing, but not in the predicted directions; the older the bank the more likely they accept the new service even when we control for the size of the bank (partialized correlation=0.16). Paradoxically, the forces of tradition are stronger in younger than in older banks. H13.4 on language and acceptance is falsified. Partialled out for all other variables, the relationship is not significant for the different languages. Table 13.1 shows the differential effects of size, market share, age and language of the banks. The size of the bank affects the preparedness to input the data, the investment, and the likelihood that a stand-alone micro is planned or already running. The market share influences the likelihood of data input, of volunteering as a pilot and of planning for a stand-alone micro. The age of the branch influences the investment and likelihood of running an in-house project. Language only influences the preparedness to invest for a computer system. It can be said, that the acceptance of a new computing solution at Raiffeisen depends significantly on the size of the branch, its market share. However, the relationship is weak. The relationship between acceptance and the four variables is modelled with a regression model.

Fitting a multiple regression model of acceptance

A linear regression can significantly be fitted (R=.402; R-square(adj)=0.14; F=10.41; p=.0000; see the appendix 13). The model explains 15% of the total variance in the data. As stated before, there is much noise in the data. The best predictor for the acceptance of the new computer solution is the size (beta=.27) of the branch expressed by its balance sheet total in 1985, the next best is the market position (beta=-.20), followed by age (beta=.16); language is not significantly contributing.

13.2. Self-monitoring of Resistance

External evidence comes from external observers using categories like diffusion rates and measures of attitudes to computers; internal observations are done by formal members of the organisation. Hence, by definition internal observation constitutes organisational self-observation. The categories used in both kinds of observations can be the same, but mostly they differ. Organisational Self-observations are solicited or unobtrusively obtained. By asking people about the occurrence of resistance organisational self-observation is solicited. By analyzing documents evidence of self-observation of resistance is obtained unobtrusively. Three kinds of data collection are followed here (see chapter 11). External evidence (diffusion data, attitudes measures), and solicited (resistance ratings, interviews) and unobtrusively self-observations (documents) may be contradicting each other which needs to be accounted for by the kinds of processes that the pain analogy suggests: internal moderation or even censorship. External evidence is the baseline for the existence of resistance.

First, internal evidence of resistance to change in form of staff ratings is analyzed. Secondly, I present the results of the documentary analysis from 1983 to 1991, and of the content analysis of the narrative interviews conducted in 1988 and 1989. This will give the extent within which resistance emerges in organisational communication in the implementation process over the years. Thirdly, I assess the extent and analyze representations of resistance within the organisational communication of the computer project. These results are the produced with a particular method for analyzing organisational communication that is based on the concept of self-active systems (see Cranach et al., 1987). The aim is twofold: a) to characterize the emergence of resistance to change as an issues in organisational communication, and b) to develop a rigorous method of description of organisational action and related communication which allows to **compare different actions** and to **test hypothesis within that framework**.

13.2.1 Staff ratings of resistance and their correlates

Organisational self-observation is solicited in staff ratings of the resistance to change for local banks. Before conducting the interviews I ask the support staff at the central bank, who are in daily telephone contact with many banks, to rate the 'resistance' of banks towards the central data service. Five members of staff, who are working in all three language, produce a list of 'resistant', 'neutral', and 'accepting' customers to their service. I assume that the more the bank needs support, and in requesting it, they make critical remarks, the more resistant the bank is judged from the point of view of the support staff. These five lists add up to 40 bank, from which 25 bank are selected for interview. The selection represents the spectrum of attitudes, and depends on the availability of the banker for interviewing at the time. Table 13.2 shows the economic performance in relation to rated resistance the sample of 25 banks:
The distribution of banks is balanced by resistance and performance. Bad performers are as resistant as good performers and vice versa in the light of staff ratings. I use staff ratings of resistance as dependent and independent variable to analyze the interview data and the various criticism of the central computer system and related services.

Table 13.2: Staff ratings of resistance by economic performance

Performance	rated resistance			
	low	neutral	high	Total
bad*	4	3	5	12
good	6	1	6	13
Total	10	4	11	25

*The criteria for 'good' or 'bad' is above or below the median rentability of the bank in 1988

Correlates of Staff ratings of Resistance

Some correlates to the resistance are explored to test hypotheses that were formulated in chapter 9. The covariances are statistically week, but conceptually interesting,

pointing to possible relationships which may be worth further investigations. No claim is made here about the direction of the influence. I would assume circular causality in most cases.

Attitudes, acceptance and staff ratings of resistance

A rating of the resistance of local banks as a whole was obtained from the staff at the central bank. These ratings are correlated with the computer attitude of local banks. Two attitude measures are used: the **acceptance** index constructed from the 1985 survey, and the standardized **ADV**-indices collected during the interviews in June/July 1989. Both are individual measures. The correlations validate the self-ratings and observer ratings. Internal and external measures of resistance show a remarkable consistency. Resistance in 1989 and acceptance in 1985 correlate negatively and relatively high ($r=-.59$; $n=18$[1]; $p=.005$). Banks which did not accept the changes in 1985 are likely to resist it still 4 years later.

The staff rating of resistance correlates negatively with computer attitudes (ADV). The more positive the overall attitude to the computer technology the less likely the bank is resistant ($r=-.33$; $n=24$; $p=.06$). The correlation to the subscale 'societal impacts' (ADV-soc) is slightly stronger ($r=-.47$; $n=24$; $p=.01$); the subscale 'personal impacts' (ADV-pers) does not covary with resistance ratings. The societal concerns determine the resistance of the local banks more than personal concerns. A counter-intuitive result emerges when one looks at the relation of personal and to societal impacts and takes that as a new measure. A '**lucky person**,' experiences more personal gains than negative societal impacts for the others [criterion: ADVPers - ADVSoc > 0]. The data shows that the luckier the person the more likely he or she resists the new computer solution ($r=.33$; $n=24$; $p=.06$). They express their positive experience with the present solution; and any other solution could jeopardize that positive experience. They may see themselves as temporary winners amongst the many losers, and do not want to become losers themselves.

[1] Variations in the n of later results are due to missing values. Some variables are not available for all interview partners due to language; or in the case of the 1985 survey, some cases did not take part in it.

Job characteristics, ratings of resistance and resistance talk

The perception of job characteristics plays a role in resistance to technical change. Several job characteristics covary with staff rated resistance of local banks: the more **significant** a job is perceived by the banker, the less likely he is rated resistant (r=-0.42; n=20; p=.03). This result is corroborated by the results of the Subjective Job Analysis (SJA). **Responsibility** of the job is negatively related to resistance (r=-0.37; n=20; p=.05). The more important the job, the less likely the employee is resisting the new technology in the bank. Age of the bank, job years, age and gender do not covary with rated resistance. **Satisfaction with the organisational climate** is associated with resistance (0.38; n=20; p=.05). Those who like the working environment seem not inclined to give room for changes. **Job security** relates negatively to resistance (-0.43; n=20; p=.02). Bankers who are dissatisfied with their job security are likely to resist the changes. Those who feel their job in danger are not in favour of technical changes.

Hypothesis H9.5c specifies the linear relationship between **intrinsic work motivation** and resistance. Work motivation does not covary significantly. It has been shown above that Raiffeisen banker are highly motivated, only comparable to farming and professional activities (see chapter 12). Interesting may be to note the direction of the insignificant relationship: motivational potential of the job content tends to be negatively (MPS: r=-0.32; n=20; p=.08) related to resistance, intrinsic work motivation tends to be positively related to resistance (work motivation: r=0.33; n=20; p=.09). Hypothesis H9.5c cannot be supported. However, the results suggest that motivational potential and experienced work motivation affect resistance in the opposite direction. Hypothesis H9.5c may be reformulated in two versions for further investigation: 'the higher the motivational potential of a job, the lower will be resistance to technical changes', and 'the higher the experienced work motivation, the higher will be resistance to technical change'.

H9.2b postulates an statistical association between additional workload and resistance to change without specifying the direction. The resistance talk of local banks correlates negatively with the reported work load measured with the Job Diagnostic Survey (JDS) (r= -0.58; p<.05; n= 23). The smaller the work load the more bankers talk about resistance to the changes. This suggests two interpretations: a) local bankers

fear an increase of work load in the future and therefore resist the new solution, of b) that local bankers do not have a work load, for which they would expect help from a new computer service. The participant observations show that both interpretations are the case; resistance means avoiding work load in the future as well as low pressure at present.

To summarize, one can say that the rating of resistance in 1988 is validated by acceptance of computing in 1985 and with computer attitudes in 1989. Internal and external observations of resistance are moderately consistent. 'Lucky' people, who see themselves as temporarily exempt from the negative impacts of computing, are more likely to resist changes in the outfit. Jobs structures that give rise to feelings of importance, responsibility and job security are less likely to be associated with resistance to change. The more satisfied bankers are with the general working climate, the more they are inclined to resist changes. Work motivation is not related to resistance. However, the results suggest a differential effect of motivational potential and experienced work motivation in relation to resistance. Sex and age of the bankers do not matter in relation to resistance. Workload is negatively related to resistance, expressed by talking, because people avoid additional workload in the future, and because there jobs are so easy that they feel no need for a computer.

Computer attitudes and resistance talk

The codings of resistance in the interviews can be related with computer attitude measures, both from 1985 and from 1989, to test the hypothesis that people with negative attitudes to computers express more resistance in informal talking. The results are as follows: The better the general attitudes to computers, the more resistance talk (ADVG $r=0.37$; ADVP $r=0.30$; ADR $=0.50$; $n=23$). Resistance to the Raiffeisen project goes along with positive attitudes to computers, which indicates that the concrete features of the project and not the generalized 'computer' is the target of resistance. Local bankers who were satisfied with the old computer service in 1985, tend to be more resistance to the new solution ($r=0.31$; $n=15$). Part of the resistance to the new service stems from preference of the old one. Furthermore, the higher the acceptance of the new data service in 1985 the less resistance can be found in 1989. Supporters of the new service in 1985 tend to be happy with it in 1989.

13.2.2 The structure and dynamics of organisational attention: 1984-1991

Documents are unobtrusively obtained data. They are not produced and selected for this study, but purposively analyzed for this study. Interview data is obtrusively obtained data. The kind of answers people give to the questions asked are influenced by the very nature of what people perceive as the purpose of my investigation. The content of 134 documents and 34 interviews is analyzed with 234 categories (see chapter). Categories define the function, the issues, the focus and the context of a particular textual unit of communication. To that I will add the analysis of the coverage of computer issues in the in-house media over the whole period. 7210 coded units fall into a anyone combination of content categories. The results are presented in relative frequency distributions. Frequencies are analyzed over the whole period and as time series. The breakdown includes action steps, before and after the evaluation, and different directions of the flow: bottom-up or top-down communication. A underlying assumption is that the amount of documentation reflects the amount of organisational activity allocated to a certain problem. The continuous records between 1983 and 1991 allow me to do time series analysis. The time units are the action step as defined in chapter 12. The whole organisational action from 1983 to 1991 is divided into 14 action steps. Depicting the intensity of communication for each step allows me a) to characterize each action step by its particular mix of communication, b) to divide the stream of action into stages, where certain functions, issues, foci and contexts dominate or are absent, and c) to relate changes in communication one kind to changes of another kind. All are ways of testing empirical hypothesis. For the present purposes only a limited selection of data will be presented, to demonstrate the potential of the method.

13.2.2.1 Communication by Functions

Units of communication can be classified according to their hypothetical function for the action of implementing the computer system. The nine functions - orientation, self-monitoring, goal-setting and decision making, planning, execution, control, stopping, evaluation, and consumption - are deduced from the theory of self-active systems as

shown in chapter 6. The functional categories refer to information processes which steer the organisational action through time and space. Self-monitoring is the most frequent function. 46% of over 7000 codes are related to self-monitoring. Execution of concrete tasks is the second most frequent function (17%) of communication. Figure 13.2 shows the nine functions broken down by documents and interviews. Self-monitoring is more predominant in interviews (55%) than in documents (46%). Most of the activities referred to in interviews are exploring the internal milieu and the requirements of the organisation. References to decision making (9% and 17%) and planning (5% and 16%) are less frequent in interviews than they are in documents. References to the termination of actions are more frequent in interviews than in documents (stopping: 3% and 7%). Evaluation and consumption are rare categories, because the action is not completed as at 1991. No final benefits can be distributed, evaluated or consumed. One would expect that after completion of the project these categories become prevalent, but not during the project.

Comparing and evaluating different actions

The distribution of communication can be used to compare different kinds of organisational actions. The study of Tschan (1990) is the only comparable study and serves as a standard of comparison. Tschan analyzed the development of the Bernese foundation 'CONTACT' which is dealing with drug abuse between 1979 and 1983 in Switzerland[2]. She used the same theoretical framework and categories, albeit a different procedure of analysis[3].

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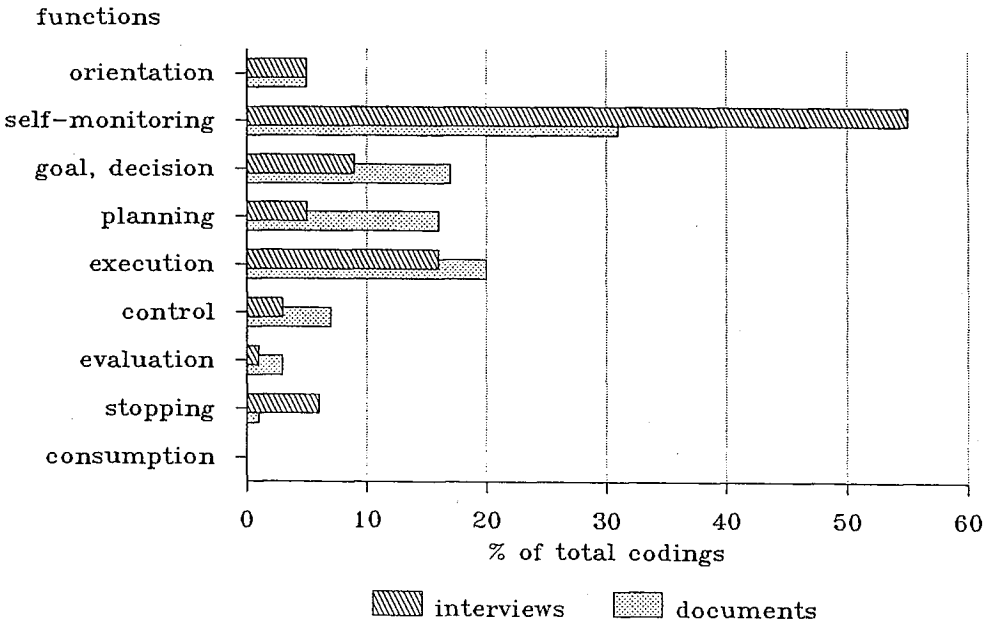
[2] The organisational action describes the structure of activities involved in changing the legal status from a public service to a private foundation over a period of several years.

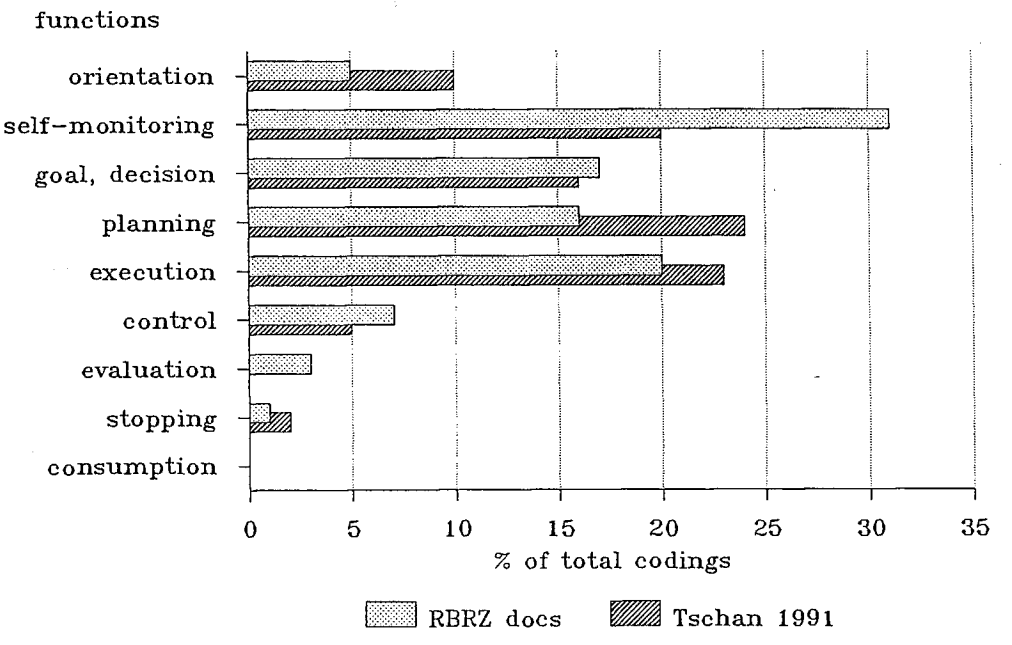
[3] The two studies differ in the unit of analysis. Tschan takes the document (n=307) as unit of analysis and conducts a multiple coding on each document. In the present study the unit of analysis is the single paragraph of a document (N=134) which is coding only once (n=2808). This may jeopardize the direct comparison. However, lacking any other standard of comparison, I use the data to demonstrate the potentials of present the approach.

Figure 13.2: Functions in interviews and documents



Int=34 n=4402 / docs=134 n=2808

Figure 13.3: comparing foundation act and computer implementation



RBRZ n=2808 / Tschan n=307

Figure 13.3 shows the structure of functional communication of the two actions: the implementation of a computer system and the setting up of a foundation. The structure of communication for the founding act is more balanced than for implementing a computer system. Self-monitoring, planning and the execution of tasks are about equally prominent with about 20% of the codings. External orientation (5% and 10%) and planning (17% and 24%) is more frequent for the founding of an institution. The self-monitoring is more frequent in the implementation action (31% and 20%). The profile characterizes the particular action. The founding act is balanced with regard to self-monitoring, decision making, planning and execution of tasks, the implementation of computing is dominated by self-monitoring. Self-observation, exploring the internal requirements is of greater concern at Raiffeisen than it was at 'Contact'. This may reflect one or several of the following evaluative propositions: First, the people at contact had a much clearer idea of what they need than at Raiffeisen. Secondly, Raiffeisen had a much bigger problem of adopting to internal requirements than had contact. Thirdly, Raiffeisen must have been lost in self-observations over long periods of the action without actually pushing the project forward. Further studies and norms of efficiency are needed to validate these interpretation. Although this is not the purpose of the present study, it shows the potential of the approach and the kinds of question which can be asked.

Functional communication over time

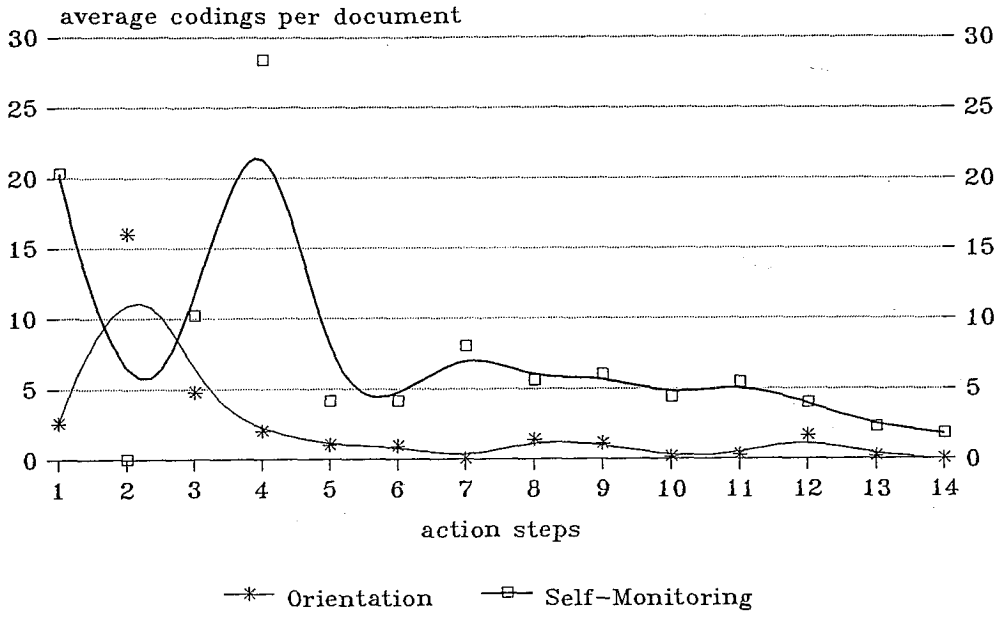
Time series data of the functions are shown in figures 13.4 and 13.5. The graphs show the average coding for each document by 14 action steps. The scales are adjusted in order to maximize the image of variability over time. Orientation and self-monitoring are always necessary, albeit to variable degree. The overall function of communication for steering lets us expect, that orientation and self-monitoring are forms of information processing which dominate the early stages of an action. Figure 13.4 shows that this is the case. External orientation is most frequent in the second action step, self-monitoring activity is most intense in the first and third action step, with another peak in step 7. Both activities decline from the fourth step onwards. The level of self-monitoring stays with 5% at a continuously high level compared with the other functions. External orientation is quasi irrelevant. Decision making comes in four

waves, which mark significant transitions for the project: In the first step the prime decision about the project is taken. In the third step the take off for the paper solution is given, in the fourth the decision about replacing the NCR with an IBM system is taken, and in the 14th step the decisions about the future strategy of the project are taken: freezing the paper solution, forcing the PC solution and dismantling of the service by the end of the century. Similarly planning comes in waves in the first, the third, the sixth and the 14th step. The communication about concrete activities is clearly clustered in the middle of the whole action, between action step 6 and 10.

Time patterns of attention and sequential models of action

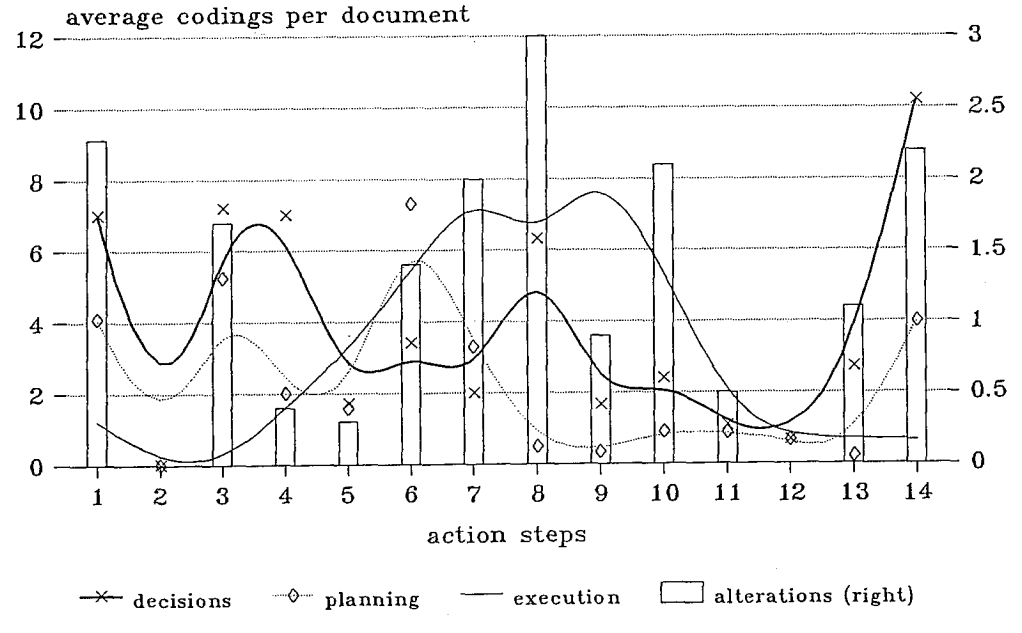
Looking at the sequence of peaks for different activities allows to test the validity of a sequential, flow-chart model of action: orientation is followed by decision making, decision making leads to planning, than concrete tasks are executed. The time series data on organisational communication allows me to qualify this sequence and to falsify the assumption of a simple linearity of steps. Planning is supposed to put decisions into concrete activities. Hence decisions about the direction of action are a preconditions of planning. Most flow chart models of action assume that decision making precedes planning activity. Such an assumption can be put to empirical test in the present approach, for example the lag in the peaks of decision making and planning activity. Figure 13.5 shows that such a linear assumption is highly unrealistic. At least in the first three steps decision making and planning activities covary. However, lagging of decision taking and planning occurs later on. The peak in planning activity in step 6 follows after the decision making in steps 3 and 4, and the increase in planning in step 14 follows the increase in decision making in step 13. Decision making and planning may go in parallel, in sequence or in reversed sequence. The method of analysis has the potential for addressing empirical questions beyond the normative model of a linear sequence of part action.

Figure 13.4: orientation and self-monitoring by action steps (Raiffeisen 1983-1991)



docs=134 n=2808

Figure 13.5: decisions, planning, executions, alterations by action steps (1983-1991)



docs=134 n=2808

13.2.2.2 Issues of communication

Communication is further analyzed by issues. Software (25%) and organisational topics, like the organisation of the project (25%) and of local banks (19%), dominate the distribution of communication.

Structures of content and the designer-user distance

Hardware and software are more prevalent in documents than in interviews; the organisation of local banks, personal issues, and issues of user information and participation are more frequent in interviews than they are in documents. Finance (5%) and training (9%) are equally frequent in both situations. Table 13.3 ranks the issues of communication in documents and in interviews.

Table 13.3: Ranking of issues by data type: documents and interviews

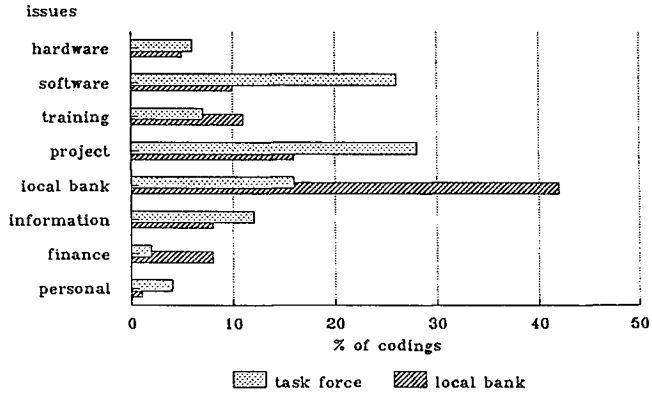
Rank	documents	(%)	interviews	(%)
1.	**software**	(32)	**local bank**	(25)
2.	**central org**	(27)	**central org**	(24)
3.	training	(10)	**software**	(21)
4.	hardware	(10)	information	(10)
5.	local bank	(9)	training	(8)
6.	finance	(6)	hardware	(5)
7.	information	(5)	finance	(4)
8.	personal	(1)	personal	(3)
Total codings		n=2808		n=4403

The central issue in documents are software and the organisation of the project team. In the interviews the most salient issues are the organisation of the local banks and the centre, and software. Hardware is more salient in documents than in interviews. Documented communication is more technical, hardware and software take 42% of the coverage, while only 30% in the interviews. The prevalence of the organisation of local banks in interview reflects the dominant concern of the local banks. They express their own problems, which naturally tend to be different from those of the central bank. People tend to thinks along the lines of their own activities. The low salience of local organisation and information in formal communication may point to a weakness of the

project. If the project team thinks along the lines of their own activity, that may put the concerns of local banks out of focus. The 9% coverage of local banks and 5% for information and participation may indicate the psychological distance between the designers of the project and the users. These two issues take 35% of the coverage in the interviews.

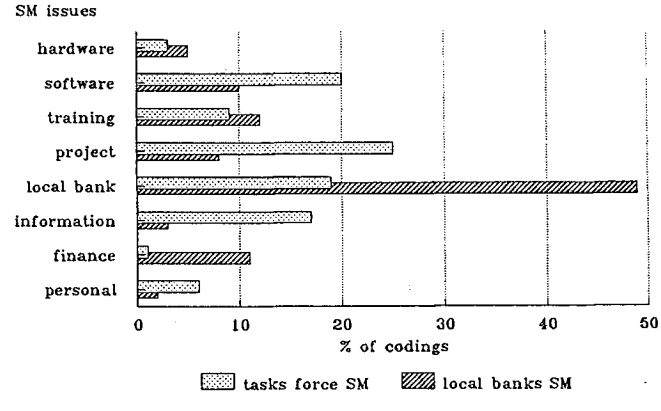
The interviews with members of the task force and local bankers have different structures of content as shown. Figure 13.6 shows that the task force is mainly concerned with issues of software - 26% of codings for the task force versus 10% for the local banks - and the RBRZ project per se (28% versus 16%). Local banks are concerned with training, their local organisation and the finance of the project. Figure 13.7 shown the discrepancies of concerns between the designers and the users when exploring internal needs and requirements. The task force is mainly exploring software requirements, their own project needs, and the information need of the users. The users explore their organisational needs and finance. Discrepancies also arise in the context of self-monitoring as shown in figure 13.8. The task force reflects basically in the context of conflicts, the local banks monitor needs under uncertainty, and considering their own reaction to the project. The discrepancies between interviews and documents on the one side, and between interviews with the task force and local users on the other side reveal significant differences in the way the two parties involved perceive the project. The wider the discrepancies the wider is the distance between designer and user. The longer the distance the more likely is a failure of the project, because the demands of the users are not met.

Figure 13.6: Discrepancies: Issues



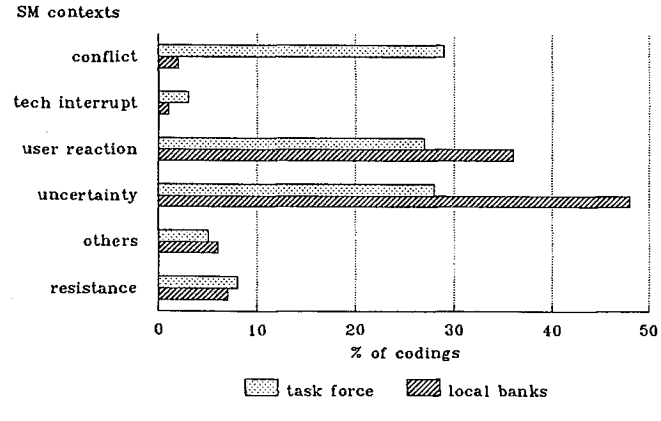
34 interviews: task-n=2991, local-n=1412

Figure 13.7: Discrepancies: Self-monitoring issues



34 interviews: task-n=1678, local-n=784

Figure 13.8: Discrepancies: Contexts of self-monitoring



34 interviews; task=1676; local=784

Issues over time

The times series data of figure 13.9 shows software and hardware by action steps. Software concerns fluctuate with three peaks: the first peak in the beginning (step 1 and 2) reaching an average of 7 codings per document. This was the time when various candidate host systems were evaluated. The second peak extends from step 6 to 8 reaching an average of 9 codings; the main concern was the adaptation of the IBM package to the requirements of the paper solution. The third peak fall on step 14 reaching an average of 10 codings; the remaining modules of the package are reprogrammed and prepared for the PC solution. On such a level of concern, software is the top concern through the project. Hardware concerns start lower at an average of 4 codings, then stay constant at about 2 codings, to drop and stabilize to 1 coding on average after step 8. We will see in the next chapter, that the issue profile of general communication is different from the issue profile under self-monitoring. The share of self-monitoring of all communication changes during the project. Figure 13.10 shows the profile of the issues training, central organisation and branch organisation, which are combined in the generic term 'orgware'.

The distribution of orgware issues indicates what one can call the **self-preoccupation of the project**: From step 3 through to step 11 the project organisation itself attracts most of the attention, fluctuating between 3 and 8 average codings per documents. This relative high level of persistent attention is only matched by software issues. Organisational issues concerning the central as well as the local banks, are given equal weight in step 1 and 2 and in step 13 and 14. The organisational attention focuses on local banks in the beginning (on average 5 codings) and towards the end (2 codings). In between local issues are below 1 average coding. Training is only an issue in step 2 and 3, and later in step 6 and 8, reaching 2 or 3 codings. The attention to user information and participation as well as to financial issues are declining as the project ages as shown in figure 13.11, being relatively low from the beginning (1 to 2 codings on average) and becoming even more marginal to the whole project communication. At the major transition points of the project an effort is made to keep the users informed. User information and financial issues come in three waves: in step 4 and 5, when the paper solution is launched, in step 8 and 9, when the PC solution is published, and in step 12 and 13, when it is decided to freeze the paper solution at its present status, and

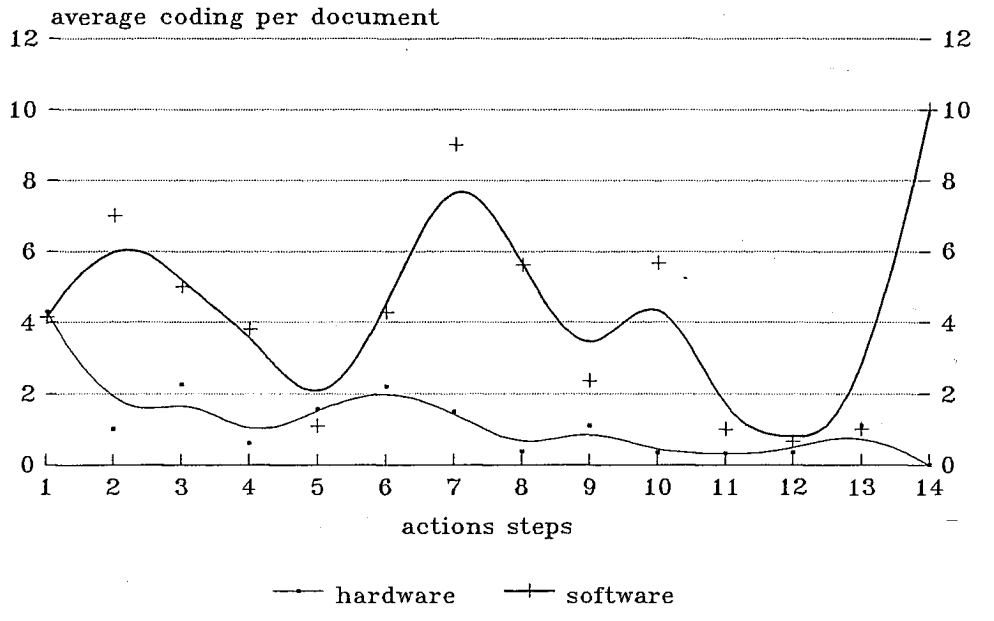
to give priority to the PC solution. Internal financial information processing precedes user information. Information about the financial side of the project is a major part of the information given to the users. That information had to be prepared before it could be published, which would explain the lagged covariance of the two issues.

13.2.2.3 Issues of self-monitoring

Issues are coded whether they are mentioned with the function of self-monitoring or not. 46% of the formal communication concerned issues of self-monitoring. Exploring what are the internal needs and requirements as a guideline for the project is clearly an important function of communication. What are the major issues of internal exploration and how did they shift during the course of the project ?

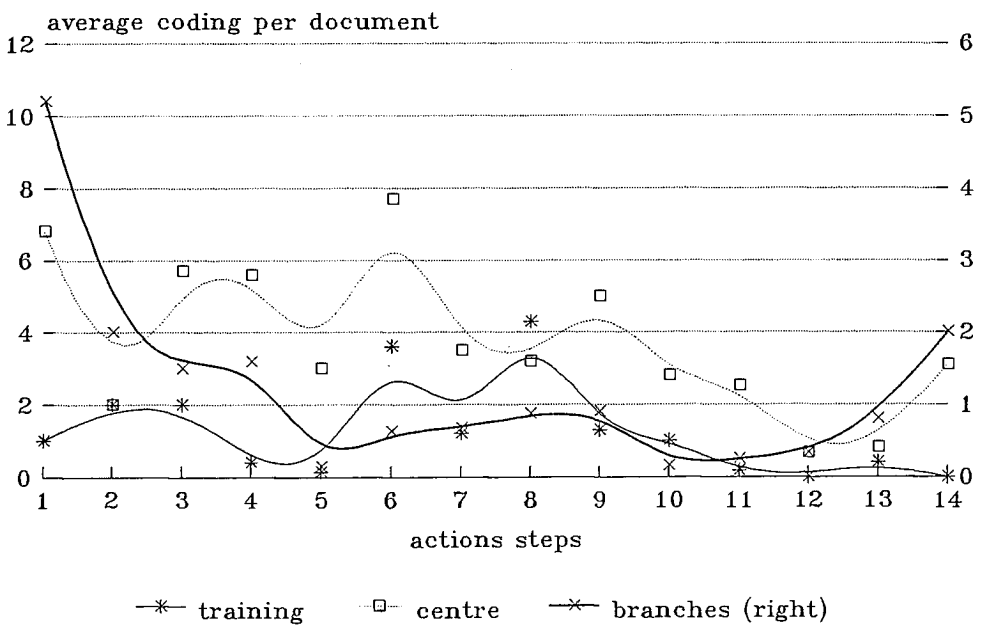
The needs of local banks, of the project team, and issues of software requirements take up 66% of the attention that is allocated to internal exploration. Issues of user information and participation, hardware issues, financial and personal matters are less salient. The structure of self-monitoring is similar to the general structure of attention, that has been described above. Only the local organisational needs (25%) and the issue of user information (11%) is more often attended as internal needs than as any other function.

Figure 13.9: Communication by issue: Software and hardware (Raiffeisen 1983-1991)



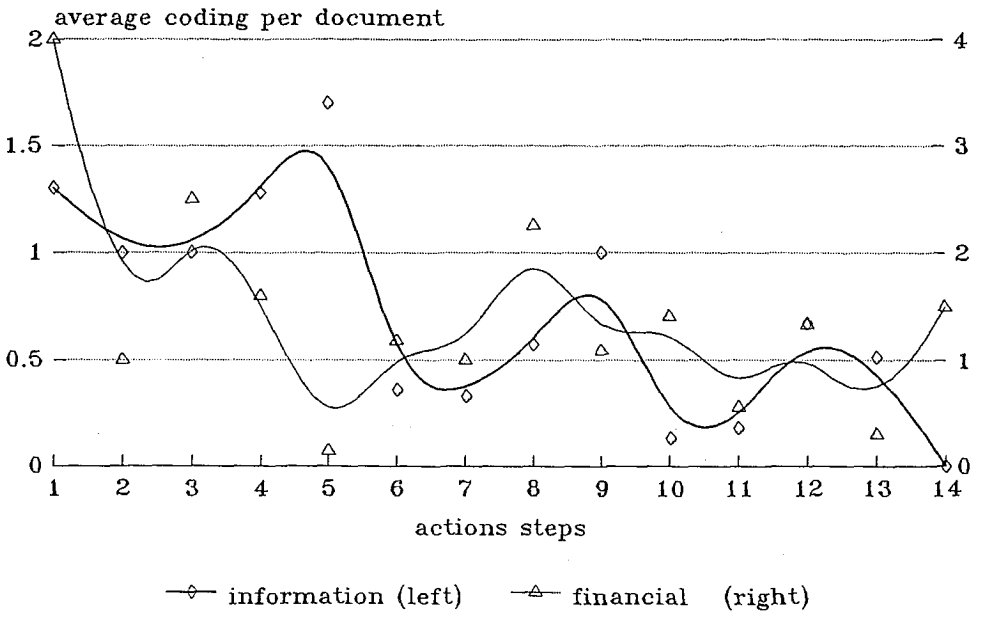
134 docs n=2808

Figure 13.10: Communication by issue: Training, central, branches (1983-1991)



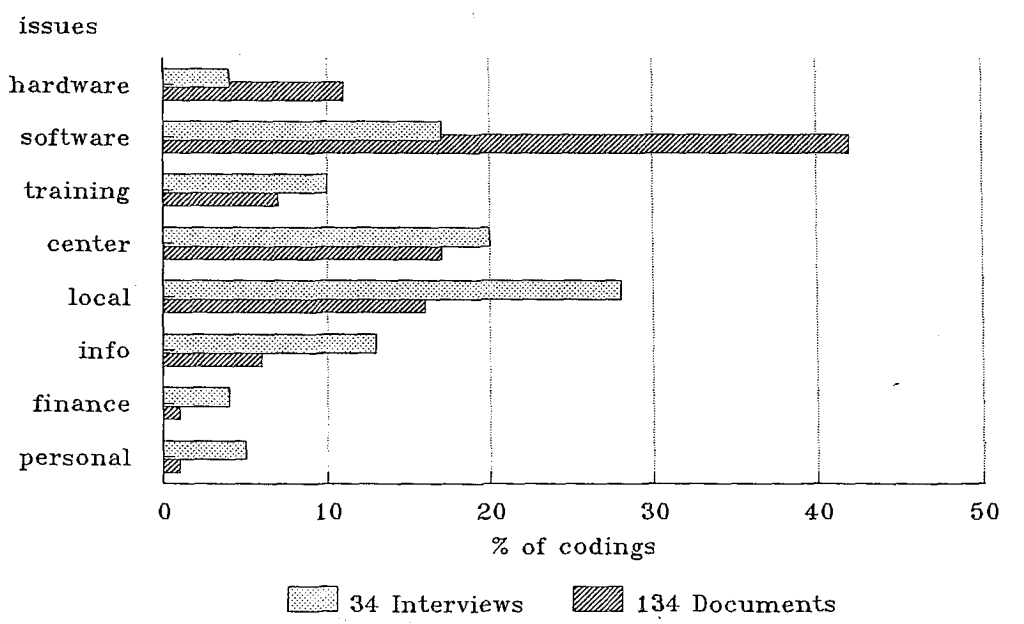
134 docs n=2808

Figure 13.11: Communication by issue: User information and finance (1993-1991)



134 docs n=2808

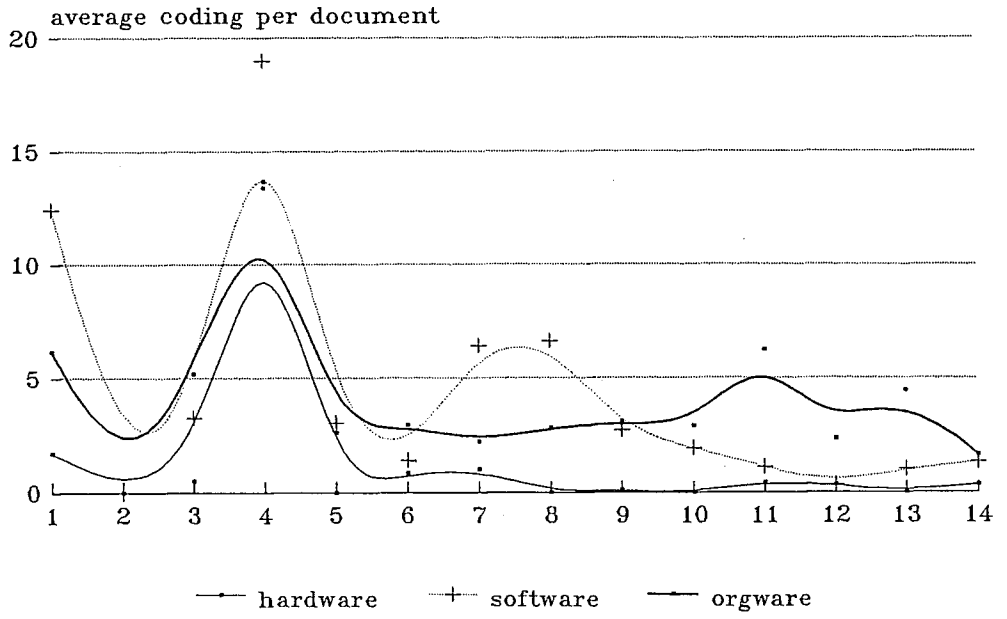
Figure 13.12: Issues of Self-monitoring



n-int=2462; n-doc=858

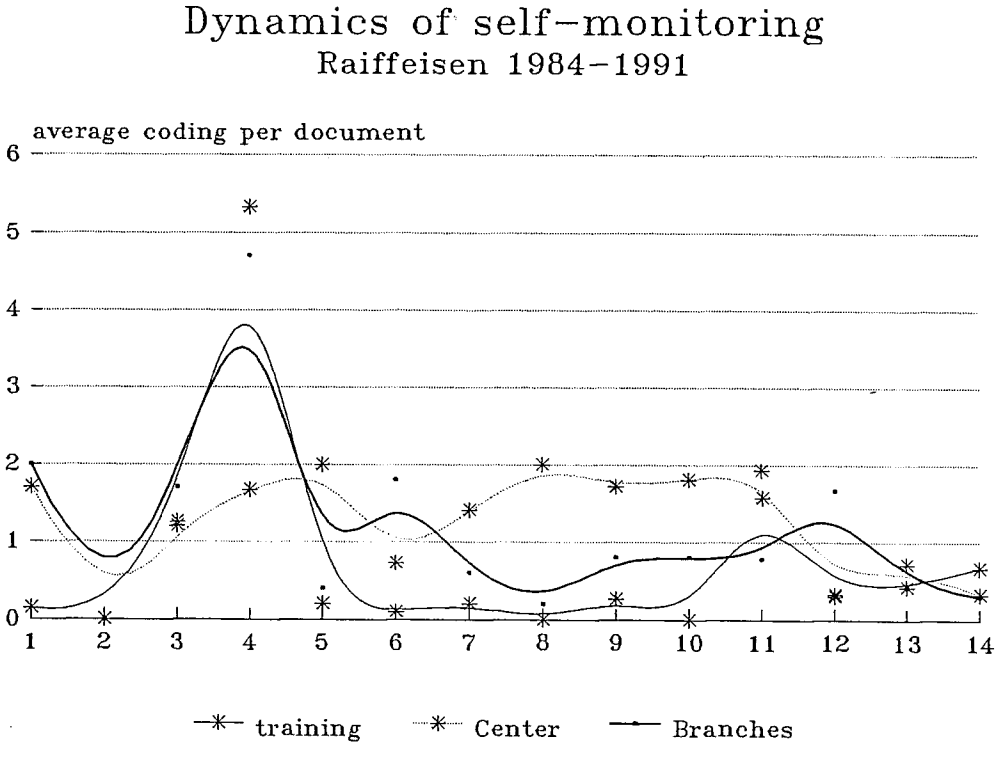
Figure 13.12 shows how the interviews and the documents differ in the structure of self-monitoring. Documents mainly specify the requirements for software - 42% in documents versus 17% in interviews - and hardware (11% versus 5%). In Interviews more concern is given to the managerial needs of the project team (17% versus 20%), to the organisation of local banks (16% versus 28%), and to the information and participation needs of users (6% versus 13%) than in documents. The structure of attention to internal needs changes significantly during the project as shown in figure 13.13. The projects starts up with intensive internal exploration of needs for software, hardware and orgware. The peak in all three concerns is in action step 4 with about 15 codings per documents on average of each issue. Later the monitoring of hardware needs disappears. Software needs come up again in action step 7 and 8, which marks the start of the PC project. The most significant change takes place after step 9. The exploration of organisational needs overtakes the concerns for software and hardware. It shows the **changing order of priority**: Software, hardware and orgware are all prominent in the beginning; then software takes priority over orgware and hardware; then orgware takes priority over software and hardware in the end; hardware receives the least preoccupation over the whole project. The fact that orgware received such a large amount of attention so early in the project is remarkable. In other reported studies the organisational needs are often not reflected until hardware and software are in place; not so at Raiffeisen. In that respect a good job was done. A closer look at the orgware over time shows its changing structure in figure 13.14. The awareness of training needs and reflections on the organisation of local banks is prevalent in the early stages of the project, mainly in step 4. After that training needs are non-issue until step 11. The monitoring of needs of the local banks declines until step 8 to rise after that to a second peak in step 12. This means that the **general user orientation**, prominent at the very beginning, declined only to regain importance towards the end of the project. The middle period, step 7 to step 11, is dominated by monitoring the requirements of the central project team. Here again the self-preoccupation of the project becomes evident. Metaphorically speaking the project had a long 'autistic' or 'self-centred' phase in the middle, where the project members were mainly concerned with their own needs and requirements.

Figure 13.13: Self-monitoring: Hardware, software and orgware by action steps



134 documents / n=2808

Figure 13.14: Self-monitoring: Training and organisation by action steps (1983-1991)



134 documents / n=2808

13.2.2.4 Focus and Contexts of self-monitoring

Communication that explores the internal needs and requirements is also analyzed for its focus and its context. The focus refers to stage in the data process, whether reference is made to data input, data processing, or data output. Figure 13.15 shows the three foci of self-monitoring by data type. The major focus is information processing with about 60% of codings. Information processing includes the handling and storage of bank data once it is entered into the computer. It includes the design of work at the centre bank and in local banks. The input of data receives more attention than the output of data, particulary so in documents. Context refers to five conditions under which the theory predicts that self-monitoring is likely to occur: conflict, technical interruptions, user reactions, uncertainty, resistances. Self-monitoring occurs most frequently in situations of uncertainty (38%) as shown in figure 13.16, particularly so in documents (45%). Internal needs and requirements are explored, when the situation is uncertain and unpredictable. Records as well as anticipations of user reactions are the second most frequent context of self-monitoring (30%). Conflicts set the context for self-monitoring in 21% of the cases. Quantitatively resistance is a marginal context of self-monitoring. It is more salient in interviews than in documents. 8% of self-monitoring in interviews and about 3% in documents is related to the perception of resistance of one kind or an other. I will say more about the representation of resistance in these rare occasions later. Technical interruptions of the project are also rare contexts, with 5% in documents and 2% in interviews.

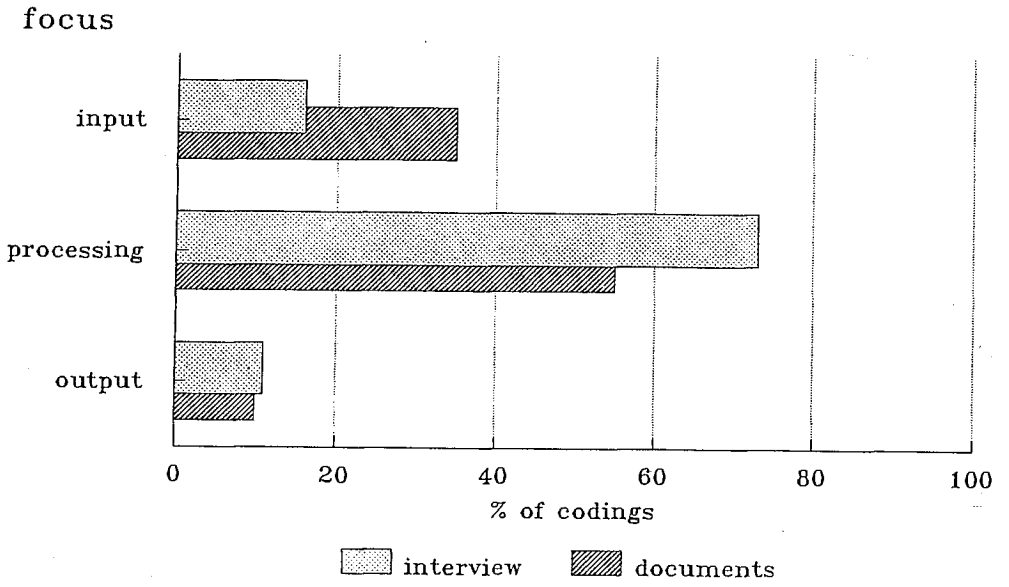
13.2.2.5 In-house media coverage of 'computing'

To explore the 'computer culture' at Raiffeisen I collected and analyzed articles which were written by and for Raiffeisen members or customers during the project period. Raiffeisen regularly publishes two newsletters: the internal quarterly 'INFO' for local banks, and the monthly 'PANORAMA' for external public relations. I have measured the coverage of computing since 1984. 19 articles in the Panorama covered computer issues for the customer public: articles on technological innovation and international competition; on inter-bank-clearing and new customer services; automatic bank tellers;

plastic money; computer shopping; trends in banking computing; new technology at Raiffeisen in particular; new computer installations in local banks. The image of the **technological challenge and imperative** for Raiffeisen, which is successfully taken up, is presented. Headlines exemplify that: 'the challenge of computing', 'a step into the future', 'the factory of the future already outdated'. More **cautious comments** about the technological development can also be found. Cartoons show the problem ridden experience of human-computer-interactions. The headline 'computers do not laugh' reminds us of the essential difference between humans and machines. An articles on 'children and the computer' expresses concerns about children spending too much time on the screen in analogy to the debate on TV habits of school children. The duality of imperative and caution indicates that Panorama is targeting a public who is rather cautious than right-on enthusiastic about technological developments.

The internal publication 'INFO' presents 83 articles on computing between 1984 and 1991. I classify them in five categories: **Orgware** (39%) is the most frequent: articles describe, offer advice in, or assess organisational issues of local banks; such articles help to run the daily business: feedback of the results of bank surveys (Dec 1986), how to buy a computer, efficiency issues, specific modules of organisational support, training, material supplies etc.. **Client services** take 20% of the computer coverage: all articles referring to new services for clients offered by Raiffeisen like plastic money, inter-bank clearing, cash tills. 16% of the articles refer to the **RBRZ** computer project: articles refer to the central computer project for small banks, which are not strategic issues: financial guidelines, project information, application information, survey feedback (July 1986). **Strategy** takes 7% of the computer coverage: all articles refer to basic decisions that were taken which affect the computing in local banks: computing policy, central service, decentralized service, contracted suppliers, freezing of the paper solution. **Others** take 18% of the total articles: all articles which do not fit into one of above categories. About 20% of the all articles, all direct references RBRZ and some of the strategic articles, cover the computer project per se. The issue of computing is wider than that particular project at Raiffeisen, which only serves about 30-40% of all banks associated in Raiffeisen Switzerland.

Figure 13.15: The focus of self-monitoring



34 int n=2462 / 134 docs n=858

Figure 13.16: The context of self-monitoring

int n=2462/ doc n=858

The dynamics of media coverage of information technology

Figure 13.17 shows the coverage of computing for both publications diachronically in percentages of the total print surface per issue. The external 'PANORAMA' gives on the whole little coverage of Information Technology. The largest coverage coincides with the beginning of the central computing project, around 4% in step 1 and 2. It looks as if the public is to be informed about the 'new things' coming up at Raiffeisen at the time. It may reflect a concerted action in initiating the computer project and making public relations at the beginning when confidence is highest. However, evidence for a coordinated action was not found. IT coverage vanishes in step 3 in order to reappear between step 7 and 12. The coverage of computing in the internal 'INFO' develops differently as shown in figure 13.14. First, the coverage rises from 6.5% in 1984 to 30% in 1991. This may indicate the gradual transition to a banking culture that is based on Information Technology during the project period. The coverage of IT increases five fold between 1984 and 1991. Second, the increase in IT coverage comes in four waves which coincide with important alterations in the RBRZ project. In steps 3-5 the RBRZ is initiated and launched; in step 7-8 the PC solution is commenced; in step 12 an alteration in the PC solution is made and announced; in step 14 the change of the computing strategy is announced, which brought the freezing of the paper solution, and giving priority to the PC solution. These waves of coverage indicate that the information of users is coordinated to the course of action; the INFO is a management tool and an integrated part of the communication structure of the action. This can be further explored by juxtaposing the media coverage in the INFO and the communication activity that is related the steering of the project. Figure 13.18 compares the IT coverage with the allocation of attention to exploring the needs and issues of user information and participation. Media coverage is partly the product of information activity of the change agency.

The intensity of formal communication reflects the level of attention that is allocated to explore, decide, plan and monitor that user information activity. Four points can be observed: First, the RBRZ project starts (step 1-5) with a high level of attention given to user information, assessing the information needs, deciding, planning, and evaluating information that is given to the local banks.

Figure 13.17: Computer coverage in Raiffeisen newsletters (1984-1991)

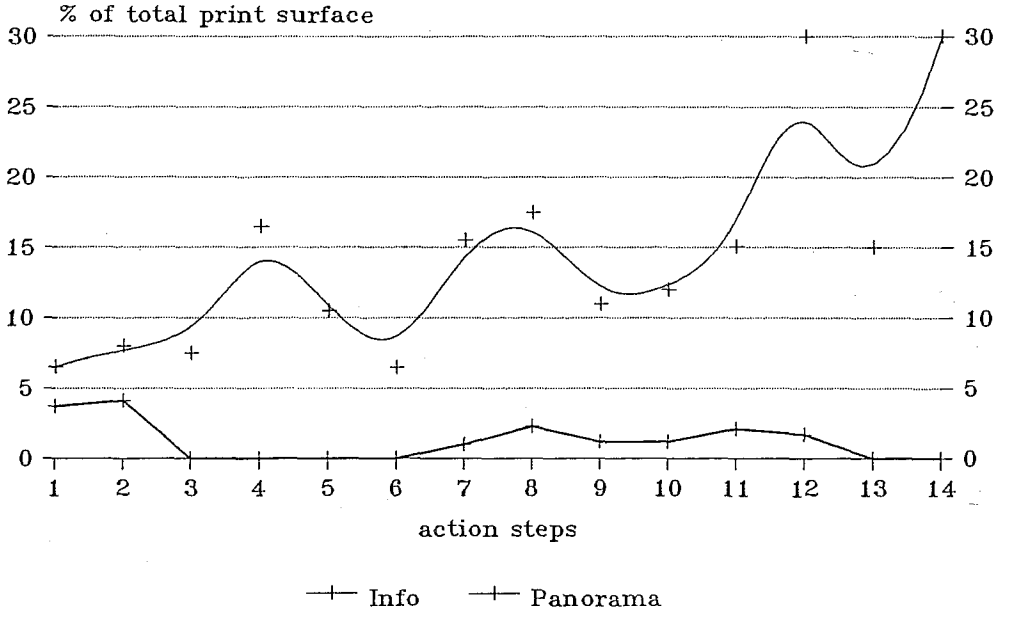
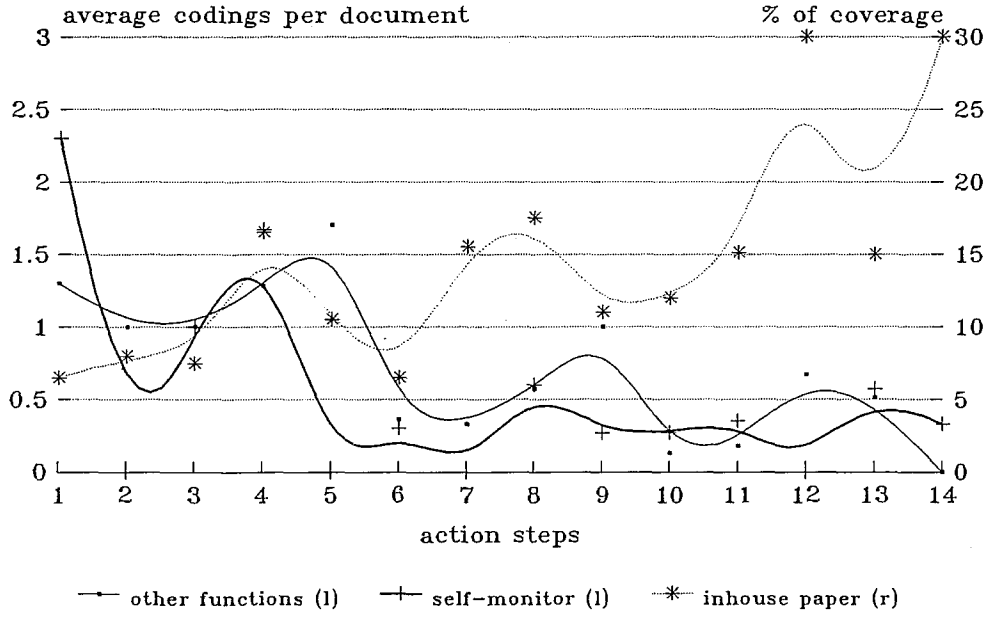


Figure 13.18: Computer coverage and attention to user information (1983-1991)



Raiffeisen 1984-1991

Secondly, attention given to and the monitoring of information needs is declining, while the actual information activity is increasing. Once a certain routine is established less monitoring of the activity is necessary. More action, less talk about it is the result. Thirdly, the cycles of attention are coordinated with the cycles of media coverage: peaks are in steps 3-5, in steps 7-9, and in steps 12-14. Fourthly, a flow chart model of action would predict that self-monitoring comes before decision making and planning, decision making and planning before execution of user information activity. One would expect that the time series have a stable difference in phase. Such a pattern seems to fit the first information cycle in step 3-5. Later the publishing goes parallel or even precedes the monitoring of information needs. The story is more complex than a flow chart model of action can possibly suggest. On the other side, the small number of observations per unit of that analysis may masks the real pattern of communication activities.

13.2.3 Organisational communication of resistance

Previously organisational communication has been characterized, both in its thematic structure and in its time structure. In the following I explore the relative salience of resistance in organisational communication during the computer project. Resistance is defined as one of five contexts of organisational self-monitoring. Self-monitoring is the process that focuses attention on the internal needs and requirements of the organisation. I measure the intensity of self-monitoring under the condition of resistance, its time structure and its thematic structure, and finally I demonstrate the filtering and modulation of resistance in formal and informal communication by denial, being vague, simplification, assimilation and contextualization.

13.2.3.1 The salience of resistance

Content analysis of organisational communication, 134 documents and 34 interviews between 1984 and 1991, shows that resistance is not a salient issue; it is rather a

marginal context of self-monitoring. The salience of resistance is measured by the number of relevant items, either interviews or documents, and the number of codings of resistance as shown in table 13.4. Resistance is identified as reference in 3% of all codings, 1% in documents and about 4% in interviews. This is a low percentage in comparison to an earlier study of office automation in 1986 in which I identified 19% resistance with a similar method (Bauer, 1991, 186). The data was collected in 1988 and 1989; a decrease of resistance among computer users is in trend with Swiss public opinion after 1986, when attitudes normalized with a shift from negative to positive as shown in chapter 3. The expression 'resistance' is used only four times by members of the task force, and never by local bankers. Resistance is a relevant in 7 or 5% of all documents, and in 28 or 1% of all codings; it is more salient in interviews than in documents: In 23 out of 34 interviews resistance is a context of self-monitoring. All members of the task force, that are interviewed, are aware of resistance, albeit in different ways; 13 local banks thematize resistance to the new computer system, either by mentioning their own reluctance or that of their colleagues. Two thirds of resistance talk is from the task force.

Table 13.4: Salience of resistance in documents and interviews

	organisational communication			
	formal documents	informal interviews		Total
		task force	local banks	
relevant	7	11	13	31
total	134	11	24	168
in %	5.2	100.0	54.2	18.4
Relative to all communication				
coding units	28	134	57	219
total	2808	2990	1412	7210
in %	1.0	4.5	4.0	3.0
Relative to self-monitoring on needs and requirements				
total	858	1678	784	3320
in %	3.2	8.0	7.2	6.6

total of 34 interviews including a incomplete procedure with bank auditors

Controlling for the length of the interviews and the number of codings, the difference disappears, around 4% of all informal communication is resistance related, which is four times more than in formal communication. 8% of interview, and 3% of documentary self-monitoring is done with reference to resistance among the users. I summarize the results on the salience of resistance in four points: a) the salience of resistance is comparably low; b) resistance is more salient in informal than in formal communication; c) all members of the task force are aware of resistance among users, and d) more than half of the local banks refer explicitly to their own or to the resistance of colleagues. The divergence between formal and informal communication is the first indicator for the workings of a filtering process. The extent to which members of the task force are aware of the user resistance is not matched by the presentation of resistance in formal communication about the project.

13.2.3.2 The timing of attention to resistance

The main hypothesis on the time structure of organisational attention to resistance can be tested with documentary evidence:

> H9.8: The frequency of presentations of resistance fluctuates characteristically over time: higher at the beginning, lower after that, and higher again later, declining again or remaining on a high level after that.

Seven documents, or 5%, refer to resistance: in July 1983 (doc 120), May 1984 (docs 01 and 02), August 1985 (doc 131), Oct 1986 (133), August 1989 (doc 86), and in February 1990 (doc 12). Figure 13.19 indexes the organisational experience of resistance. The number of documents are given as bar chart, the total number of references to resistance as straight line, and the average coding of resistance as smoothed graph. The number of observations is very small, results are therefore tentative; only 28 out of 2732 codings refer to resistance in some kind (see appendix 13.5). In step 1 three documents refer to resistance with five references, on average 1.7. The intensity of resistance communication is highest in step 3: one document out of 4 with 10 paragraphs on resistance, on average 2.5 codings; in step 4 brings one document out of 10 referring 4 times to resistance. In step 11 another two documents refer to resistance with each 1 reference to resistance only, on average 0.2 paragraphs

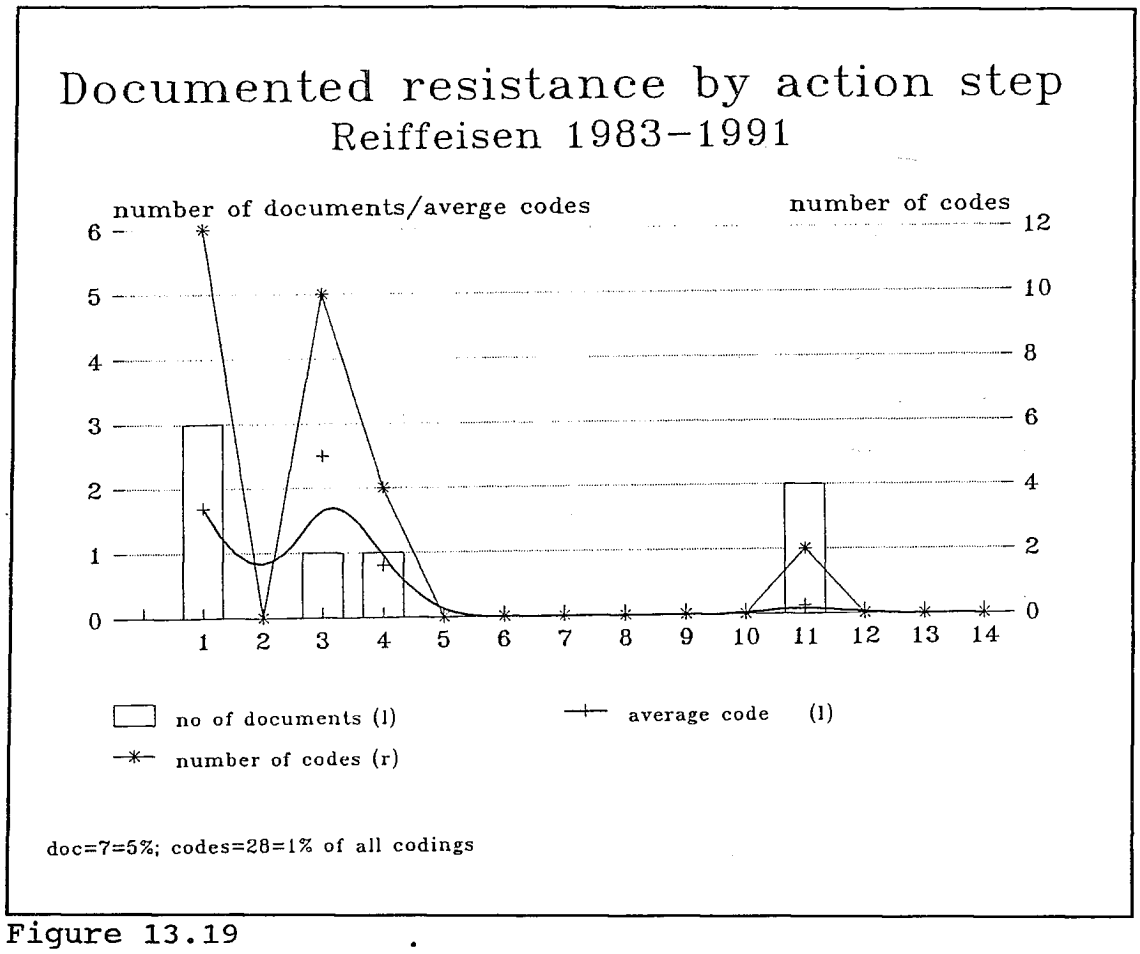


Figure 13.19

per documents. Resistance is most salient at the beginning of the project, disappears in step 5, only to reappear in step 11. The pattern fits the **bi-modality hypothesis** H9.8. The analysis of codings shows the first peak of representation of resistance, a second peak is barely visible. Resistance is represented as predicted, with very low salience in the second mode. The absence of resistance after an initial outburst, and the reappearance resistance, albeit with very low salience, in step 11 can be taken as a second indicator for the workings of internal modulation and filtering. A closer look at the content of the documented resistance can add evidence to that. On the whole I conclude that other studies of organisational actions using same method will be needed, to verify the bi-modality hypothesis of resistance using extensive documentary analysis and time series data. It has been shown that the method enables us to measure communication over time and allows us to provide evidence for a hypothesis that is based on the analogy with acute pain.

13.2.3.3 Themes in communication of resistance

The predictions on the structure of resistance are expressed in the following eight hypotheses as formulated in chapter 9:

> H9.1: Resistance to change deploys an organisational conflict about how to increase efficiency (conflict).
>
> H9.3: Resistance events implicitly or explicitly express criticism of hardware, software or orgware of a computer project (issues).
>
> H9.6: Resistance is localized relative to an informal image of the organization (localization).
>
> H9.10: Organisational presentations and informal communication of resistance differ in content.
>
> H9.11: Organisational presentations assess resistance and convey decisions about alterations of the project (decisions).
>
> H9.13: In localizing resistance the potential influence of relevant organisational positions is assessed (influence).
>
> H9.14: Resistance focuses the attention of the change agency on user requirements for hardware, software and orgware (focus).
>
> H9.24: If some change agents doubt the successful continuation of the project due to user responses, they will come up with an organizational presentation of resistance (doubts).

I present the evidence separately for formal communication in documents and informal communication in interviews in order to test H9.10. All quotations are translated from Swiss German or French and are enhanced; the source is given in parenthesis.

Resistance in documents

The 28 resistance codings in documents provide evidence for some of the hypotheses. In step 1 the Raiffeisen project is in its early stage, needs, the moods of local banks, and their reactions to proposals for a future strategy of computing are explored. Evidence can be found for H9.11, on the assessment of resistance, and for H.6, on the localization of resistance. In exploring the computing needs of the central bank, 'highest

levels of scepticism' are expected from staff with regard to changes in work conditions (doc 120, 28.7.1983). At the beginning of the project 17 local bankers are invited to participate in workshops, and to discuss the project in several hearings in 1985 of which records were kept. The criteria according to which bankers have been selected are unclear. These criteria lead to a question of one of the participants, who points to a 'problem' of Raiffeisen: He envisages considerable delays in the project due to Raiffeisen culture, which he sees as a disadvantage; the principle of 'autonomy', which means that 'contrary to the situation in big banks, at Raiffeisen people talk to each other and negotiate....., will lead to considerable problems with the timing' (o1, 9 May, 1985). At a second workshop local bankers react to the proposal for a new information processing concept at Raiffeisen, which plans a separate cooperative among banks to do the data processing, and which will be legally independent from the central bank. This provides evidence for hypothesis H9.1: a conflict on how to improve efficiency between the task force and the client system. One member objects to the project. He will agree only to 'an improvement of central services on the present basis' (o2, 17 May, 1985). The manager of task force summarizes the mood of some participants: 'why automatizing, if one can do it manually' (o2, 17 May, 1985). Another participant has doubts that local banks will buy the new service because of the organisational culture: 'federalist thinking will prevent many banks from using these modern services' (o2, 17 May, 1985). Another participant sees no reason why Raiffeisen should compete with big banks in matters of computing: 'We do not need to match big banks in computing. The human being is in the centre, which is the strength of the Raiffeisen movement' (o2, 17 May, 1985). Another participant asks rhetorically and with disagreement: 'does Raiffeisen move into a centralist direction like the big banks?' (o2, 17 May, 1985). Another participant joins such fears of centralistic tendencies and interference into the details of running the local banks, and gives a warning example: 'forms of services could be inhibited by the central bank, even if they were locally required' (o2, 17 May, 1985). Another one will only continue the discussion, if the costs of the project are within the reach of local banks: 'the computer must not become a financial burden' (o2, 17 May, 1985). A last participant does not want central pressure on local banks: 'local banks must not be forced into a solution' (o2, 17 May, 1985).

The step 3 the board decides strategically that Raiffeisen should not develop a unitary solution for all banks, but cater for the needs of smaller and larger banks separately. Document 131 is a report to the board on the IT policy of the future, which includes the reduction of suppliers from more than 10 down to three. The slow diffusion of computing at Raiffeisen is noticed: '2/3 of all local banks do not have access to computer data processing' (131, August 1985; 2226). The lag in computer access is explained with the cost arising from computer data processing (131, August 1985). It is assumed that banks spend on average of 0.1% of the yearly balance sheet total on Information Technology. This target figure will not be reached by Raiffeisen until a number of years to come, albeit significant increases in the budget is anticipated in the future (131, August 1985; 2726). Only 16% of Raiffeisen local banks have stand alone computer solutions. 1000 local banks lag behind the development with regard to data processing (131, August 1985). The low degree of automation of Raiffeisen is recognized (131, August 1985). Financial reasons seem to explain the low level of automation according to the author of the report (131, August 1985). Personnel reasons also explain the low level of automation. It is not specified what is meant by that. The reference to this issue during the interview suggests that the level of education and negative attitudes of some local bankers were meant (mk, September, 1988). Organisational reasons, like short opening hours, also explain the low level of automation (131, August 1985; 2516). A different computing system will bring changes in the local organisation. The level of training and the quality of local work will aggravate these problems (131, August 1985). Measures have to be planned to 'take people's fear of the computer'. This is seen as basically a issue of training (131, August, 1985).

In step 4 the task force is formed with the brief to develop a new central service for small banks, the RBRZ (Raiffeisenbanken Rechenzentrum) project. Document 133 is the proposal to the board of directors. The internal survey from November 1985 is summarized assessing the preferences of users as part of the evaluation of a new system. The results show that the support for a new system is decreasing, the more concrete the question is: 76% would work on a visual display unit, 66% would input their data, and only 50% would be prepared to invest money into IT (doc 133; code 2626). Another paragraph clarifies that the political behaviour of local banks is not

taken into account when evaluating different systems: 'political criteria like the variable reactions of local bankers are not included in the evaluation of the computer solution'; no reason is given for that omission. This implicitly points to resistance from local banks that is anticipated (code 2526). Various computer suppliers have established customer relationship with local banks; a forced change of suppliers due to changes in strategy would mobilize resistances among the local banks.

In step 11 the programming for the PC solution starts, after the system analysis has been finished with much delay. Document 12 is an executive summary on the project status. Project delays are mentioned, that are attributed to technical and personnel problems. Personnel problems that are alluding to the internal conflict are coded as resistance, and provide evidence for hypothesis H9.13: The problem of adequate user involvement is likely to be a condition of success of the project; user acceptance is anticipated as a major problem if user involvement is not handled adequately. Resistance is localized with the local banks. In one of the monthly project reports 'problems with the user acceptance' are predicted as a warning, because adequate user participation has not been undertaken, and work is under 'extreme time pressure' (86, 17 August, 1989; 2256). 'Massive delays in the project progress' are later reported due to lack of manpower and system technical problems (12, 7 December 1990; 2246).

The evidence from formal documents supports H9.1 on the conflict about how to increase efficiency; H9.3 on the criticism that resistance provides; H9.6 on the localization; H9.13 on the assessment of the power of resistance; and H9.14 on the focusing of organisational attention. Resistance as represented in documents relates mostly to the project strategy, particularly the issue of centralization, autonomy and participation of the local banks. Resistance to more specific software or hardware are not found in the documents.

Resistance in interviews

My content analysis allows me to describe the issues which are thematized under resistance as shown in figure 13.20. What are the issues that are discussed in the context of resistance? Hardware, software, finance and personal issues reach less than 5% of resistance talk; around 15% is about training, information and participation; 24%

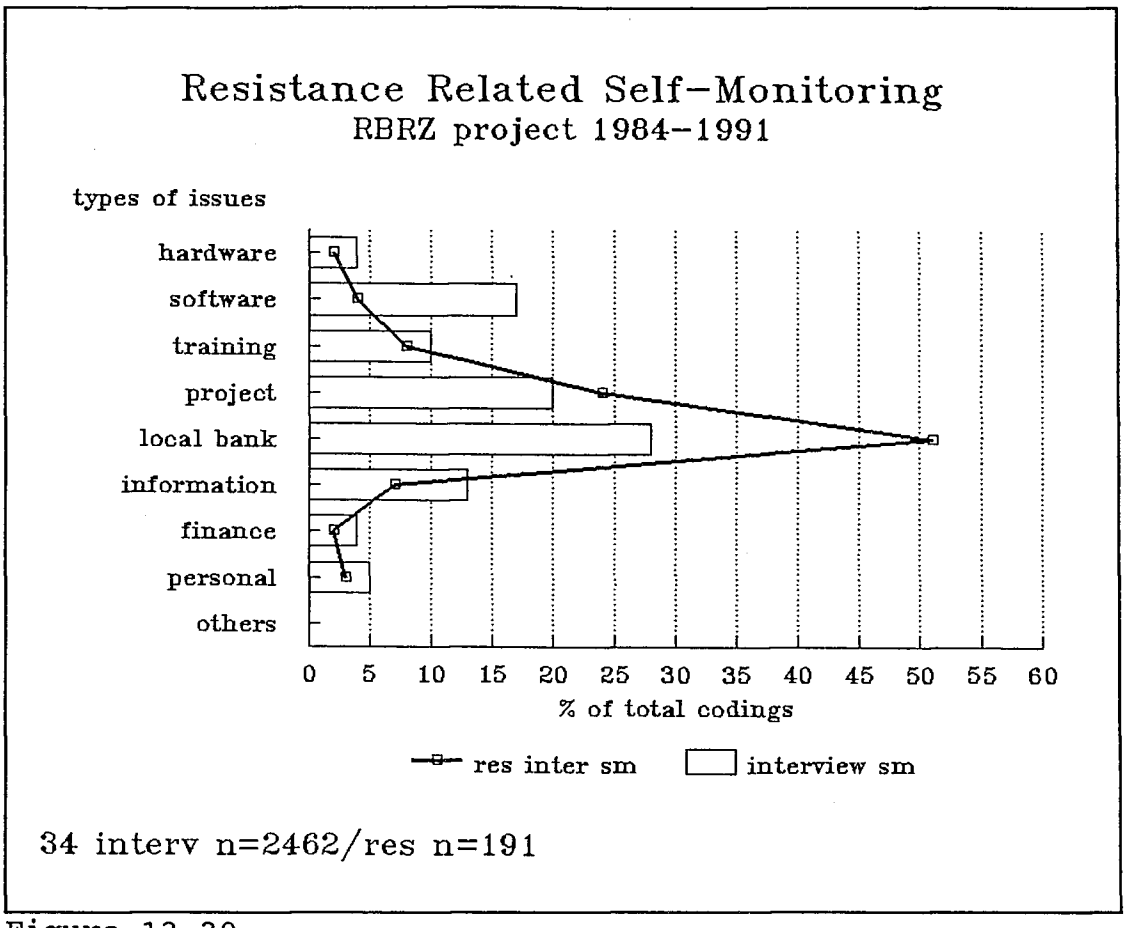


Figure 13.20

is on the organisation of the project; the bulk of resistance talk with 51% is on the work organisation of local banks. This structure is different from the average structure of issues in interviews. The issue that is mentioned more frequent under resistance is local banks and their work organisation. This suggests that H9.3 and H9.14 are supported: the work organisation in local banks, the orgware, becomes a significant issue in relation to resistance. This is stated by a member of the task force, who sees the problems of the project less on the technical side for system analysis and programming than 'in doing the daily work at the local level, I expect, the people will not take it'. In interviews resistance against the project is localized in four areas: a) in the central bank where voices are raised against a switch of supplier from NCR to IBM, b) in the board in form of inactivity, c) within the task force against the project as a whole,

which appears too large and already outdated, and d) among the **users** against the RBRZ in general or against aspects of it. User resistance is either oriented towards the past or is oriented towards the future. Past oriented users resist the project because of the alterations in comparison to the old system; future oriented users resist the solution in parts or as a whole with reference to higher expectations about computing in general. H9.6 on the localization of resistance is supported.

13.2.3.4 Evidence of filtering and modulation of resistance

It has been shown that resistance is only a marginal concern of the RBRZ project. Attention to resistance is given in interviews at the end of steps 8, 9 and 10, and in documents in steps 1, 3, and 4 at the beginning of the project, and again in the middle of the project in step 11. Steps 8 and 9 are hectic periods in 1988: the paper solution starts production, the project is restructured to solve a conflict among members of the task force: the paper and the PC solution become separated work groups. Step 10 is a more relaxed period; system analysis for the PC solution starts and the IBM host replaces the old NCR system. The low salience of resistance can be interpreted in two ways: Either resistance does not exist and the little resistance talk that there is an interviewer effect; or resistance events are misrepresented and subject to censorship. I will briefly explore the feasibility of both arguments.

Non-existent resistance; an interviewer effect?

The first interpretation suggests that the low salience of resistance accurately reflects the non-existence of resistance. Resistance is a non problem: If there is no resistance, there is nothing to talk about. In the light of the external evidence of resistance as presented in previous chapters this interpretation is not plausible. Widespread scepticism about the RBRZ project and negative attitudes to computers in general are found both in 1985 and in 1989 among Raiffeisen bankers; diffusion data show the lag in computer penetration at Raiffeisen in comparison with other Swiss banks; and participant observations clearly show the user resistance against the RBRZ project with either future or past orientation. The internal representation of 'resistance' diverts from the

external evidence. Statistically a 'no resistance' judgement is associated with a beta error: the error probability of rejecting the existence of a difference in a situation there 'actually' is a difference.

After concluding that resistance is a non problem at RBRZ, the problem remains to explain the residual communication of resistance in documents and in the interviews. A positive interviewer effect would explain the variance between resistance and its representation in interviews. The assumption is that people are friendly and tell me about 'resistances' because they think I am interested in it; the content of communication represents the interviewees' expectations of the interviewer's expectations. A social fact is often influenced by the very act of observation. Hence, resistance is constituted and amplified through the interview procedure, and even the residual salience of resistance is an overestimation. Such an interpretation cannot be ruled out totally; the higher salience of resistance in the interviews as compared to documents indicates that. However, in the interviews the focus of the analysis has been the evaluation of the RBRZ project with regard to hardware, software and orgware. People have been asked to narrate all the problems that have occurred in the RBRZ project since the beginning. Unless the topic was brought up by the interviewees themselves, no reference to 'resistance' was made in the interviews. Furthermore an interviewer effect does not explain the representations of 'resistance' in historical documents that are unobtrusive data and not subject to observer influence at least until the observations are reintroduced into the communication process. The comparison of internal and external, and informal and formal evidence of resistance suggests underestimation rather than overestimation of resistance in the RBRZ project. The fact that interviews uncover events, which would otherwise not be told, is of interest for the analysis of resistance in an organisational action. Resistance does not become salient unless there is an internal observer.

Misrepresenting resistance

The second interpretation stipulates a systematic misrepresentation of the actual events. Resistance is not allocated significant attention during the RBRZ project. This may reflect the working of processes that prevents the allocation of attention to events, which potentially are 'resistance'. These processes are functionally analogous to pain

mechanisms and their effect has been described in hypothesis H9.9.

> H9.9: During periods when resistance is not formally communicated gate control and misrepresentation of resistance are working.

If evidence for resistance is given externally, but this resistance is not represented in the organisational communication system, a process of internal modulation of information is postulated to explain the discrepancy. In chapter 9 I have discussed five modulation processes that may be at work: filtering by denial or by gate control; and transformation by vague description, by contextualizing, by simplifying, and by assimilation of events to a familiar diagnosis. I will interpret evidence from the analysis of documents and interviews in the light of these processes.

Denial, gate control and conflict in the task force

Resistance to the RBRZ project is denied at Raiffeisen. It was shown in chapter 13.1 that negative attitudes to computers in general and to the RBRZ project are widespread, and the penetration of computing is lagging at Raiffeisen in comparison to Swiss bank standards. Little evidence of that is provided by formal communication. Resistance is presented four times more frequently in informal communication than formal communication. Although members of the task force are aware of resistance in the past and in the present, they do not report it in documents. A senior member of staff explicitly refuses to use the term 'resistance' in the interview: 'the frontier clearly wanted change, I think that is very clear. Hence I will by no means talk about resistance' (mk, 2 Sept 1988, code 2526). Later he continues 'those who were not on the line, they were naturally forced to make changes ... that resistance would come from them is in the nature of things'. He also refers to his earlier report, where the problem of a 'low degree of automation due to .. and personnel reasons' (doc 131, August 1985) is clearly stated. This is a dual process of denial on the one hand and contextualizing of the problem in different terms on the other. The interviews did not show any other case of denial of 'resistance'.Members of the task force are aware of negative dispositions on significant parts of the users; they differ in the way they take that challenge, and in the kind of consequences they draw from it.All members of the task force thematize resistance, but not to the same extent as shown in table 13.5.

Table 13.5: Self-monitoring and resistance in the task force

member	approach to system	hierarchy levels	resistance codings	average per group
central thematizer				
ks	open	5	25	
mk	standard	5	19	
ph	*	4	25	22
mo	standard	3	15	
ar	open	3	25	
marginal thematizer				
ap	*	5	8	
sj	open	4	8	
as	*	4	2	4
aep	*	4	1	
br	open	3	1	

Members of the task force are classified whether they follow an open approach or the standardization approach to the system. (*) marks the neutral position

Codings of resistance for members of the task force vary between 1 and 25. Awareness of resistance separates them into two groups: one group for whom resistance is a central theme (on average 22 codings), and a second group for whom resistance is a marginal theme (on average 4 codings). An internal conflict enhances the awareness of resistance. This conflict is about who should represent the users, decide what users need, and hence decide on the specification of the software system. One group favours an open approach of maximizing choices by preserving as many options in the system as requested by anyone and likely to be requested in the future. One of the protagonists defines the objective: 'my philosophy has always been, contrary to others in this house, it is the task of the Association, not to link as many local banks as possible to the centre, but to provide the best computer solution to all banks' (ks, September 1988). The prospective position is clearly expressed by another advocate: 'The minimal solution is the issue of conflict with the other group: one assumes they [the bankers] are unable to understand; It is contradictory to rejuvenate the banking staff, to provide more and more training, and a the same time to deny their competence with a minimal system. We have to serve everybody, the small ones as well as the big

ones....everything that we develop, be it lists, forms, interfaces, or PC solution, needs to be utmost comfortable; the user should not have to look for something; we also think for the support staff, the data entry etc, we want everything to be very simple.' (sj, August 1988). This position has implications for the programming and for the user training. The system analysis and the programming is more elaborate, and user training needs to be more intense. The other group takes the standardization approach: One of the protagonists defines the strategy: 'it is a simple error of judgement, to belief, that under the present constellation one could go and ask the users 'how would you like it?'. This does not work, because the people who will work with the system do normally not understand anything ... to ask is useful psychologically .... one should not make the error to ask the user. He does not know a hundred important factors.. if you ask the badly equipped user, you will tinker on something to be thrown away next year'. His colleague specifies and reveals his notion of technological determinism: 'we take the opinion that we should not increase any further the mess .. again 500 different solutions. To the contrary, we want to bring unity. This is the task of our team, they do not call us user representatives, but we are the user representatives ... we advocate a solution for 500 not an individual one for each bank ... if you implement computers, you do not ask 'how would you like it?', the system tells you what is to be done.' (mo, 1 September 1988). All banks should be given the same system, as simple as possible, with no options to chose from, which on the one hand simplifies programming and training for the task force, but on the other hand does not fit the expectations of the users in many cases as the other approach would. In a long debate the two factions try to agree on how many codes the classification of professions of costumers should foresee. The open approach wants to keep the classification wide to allow selective marketing among costumers in the future. The standardizers went for ten or less codes. Higher level arbitration is necessary, and the conflict dies when a person who advocated maximum choices for users resigns from the task force, partly due to prologued frustration, partly due to illness. The two advocates of the standard approach are sensitive to resistance. Mk explores internal needs of the banks 19 times in relation to resistance; mo does it fifteen times. Mk and mo make an effort to justify their approach in the face of resistance, and explain resistance by lack of finance and skills: 'The reasons are a) the financial situation and b) that these people encounter too high a

demand when confronted with a computer ... there is a huge anxiety out there'. Many of their statements are normative with the form 'the user must ... needs to ..., if he wants' etc.: 'the user must be aware of what it means to implement a computer; he has to anticipate what will change and has to be prepared to change with it' (mo, 1 Sept 1988, code 2526). The two people that have high awareness and support the open approach have each 25 codings and stress the organisational culture that is expressed in the resistance against the project, particularly in the early stages: 'there was enormous opposition against the RBRZ ... quasi against the Association as the bad, big brother ... things are always difficult when in the regional associations the climate is already against the Central Association .. it is difficult to distinguish, is the expression of feelings against the project or against the Association ... the motive is simple, keep as independent as possible' (ar, 25 April, 1989; code 2526). Ks stresses that any central solution contradicts the tradition of the bank which cultivates federalism[1]. Too large a project and a culture of federalism are the main reasons for acceptance problems: 'how big will be the acceptance for something that is unknown to them ..no acceptance for a central computer system in Switzerland' (ks, 25 August, 1988, code 2526). He does not want to speculate too much about the reasons: 'which reasons might explain that .. this is rather a task for the psychologist ... they do not want it'. This is in contrast to Raiffeisen Austria and Germany which have centralized the information processing to a large extent in the 1970s.

Ph with 25 resistance codings takes a neutral stance in the debate on the system specification; he joins the project at a later stage to be fully aware of the conflict; his interest as a programmer is to receive clear and valid specifications. For him the awareness of resistance takes another meaning. It is not the technical system which stirs up the resistance, it is rather the implications for the daily work in the local bank: 'I expect not the technical aspect, but the daily practice to be problematic; this is what people will not join in' (ph, 26 August 1988; code 2516). Ph faces the problem that he joins the team at a later stage to program the PC solution, brings the experience of a failed project from his last job, has to work under time pressure, and cannot rely on

[1] Federalism is understood in the continental sense of local autonomy and 'small is beautiful' projects. The political debate in the UK of recent years on European integration has given rise to a notion of federalism that is the opposite of the continental meaning. In the British debate federalism is associated with increased centralization and loss of autonomy; on the continent federalism connotes increased decentralization and local autonomy.

established user participation but indirect user representation with conflicting views. He has no user at hand to talk things over. For him the resistance becomes an anxious anticipation of failure with reference to his former work experience: 'the system was refused .. the resistance was so large to something, on which one had no say at all..'. In vain insisting to find a user representative that can devote an unrealistic amount of time to evaluate the system at various stages, he is anxious: 'thus I fear that even with a super system, in the end, the acceptance problem will not be solved' (ph 26 August 1988).

The evidence shows that to be aware of and to thematize resistance does not only reflect the variance of 'true' resistance, but equally the context within which communication takes place, be it to legitimize an approach in the face of resistance, to understand and justify it in the light of corporate culture, or as a risk for the future success of the project and therefore a matter of concern for personal prestige. Denial takes place in refusing to use the word, and in describing 'resistance' in different terms, by contextualization, by being vague and ambiguous, by simplifying or by assimilating.

Contextualization

Contextualization comes in two forms: the resistance problem is labelled with alternative terms, and resistance is marginalized within specific contexts. The word 'resistance' is used six times in interviews by members of the task force only, and it never appears in documents as shown in table 13.6. 'Opposition' is used four times to describe user reactions in the context of the IT strategy as early as 1984. 'Acceptance' is the main category to think about the users. It is used to anticipate user reactions and to evaluate solutions at the stage of planning: 'how high will the acceptance be among local banks?' was the basic questions that expresses the uncertainty of the task force and guided any strategy from the beginning according to ks (interview, August 1988). A solution is good or bad according to whether acceptance among local banks can be obtained or not: 'with regard to acceptance you can easily set up computer centres in the regions ..... but, with the distances in Switzerland and with the acceptance, for a central solution it is too late'. Acceptance brings the users into the system analysis. The story is different when using the term 'level of automation'. The low level of automation at Raiffeisen is mentioned twice both in interviews and in documents, in all

cases by the people who take the standardization approach. The low level of automation needs explanation, and signals a need for action to increase it. Automation puts the problem of resistance into the wider context of the whole corporation. User reactions, the personnel factor, is only one among many other factors that influence the level of automation like financial power, market situation, or market supply of adequate computer systems. User resistance is one problem among many and tends to get marginalized relative to financial issues or external issues of the market. The term 'political behaviour' has been used in an early document that evaluated the feasibility of several computer solutions. The imponderabilities of user reactions to different solutions are summarized under 'political behaviour' and explicitly excluded as criteria to assist the decision making. The term 'political' is used as synonymous to 'irrelevant'. Potential and actual resistance to the project is marginalized by the use of alternative words and problematic assumptions.

Table 13.6: Alternative terms used for 'resistance'

terms	task force	local banks	total
interviews			
resistance	6	-	6
opposition	4	-	4
acceptance	4	1	5
low level of automation	2	-	2
anxiety	2	1	3
n=191	18	2	20
documents			
acceptance	1		1
low level of automation	2		2
user scepticism	1		1
negative public opinion	3		3
political behaviour	1		1
n=28	7		7

Local banks do not describe themselves as 'resistant'. Resistance is not used as a self-concept. One interviewee expresses his anxieties about his ability to cope with the new

system. Another banker explains that the solution which they themselves have been evaluating has not been accepted by the central bank. The central bank declined credit to go ahead with a stand alone solution. In that case not the local bank was resistant, but the central bank. Taking into account the performance figures of a local bank, the central bank forces compliance to the central computer service contrary to local inclination.

Vagueness and ambiguity

The opinion survey of local banks from in November 1985 is not published until July 1986 (INFO no 9), 7 months after the data was collected. The results are published item by item without any further comment. 24% of the potential users cannot imagine working on a visual display unit; 34% are not prepared to enter data into a computer; 51% are not prepared to invest in IT equipment; and 64% prefer to wait two years or longer to come to any decision. Many Raiffeisen bankers are reluctant to implement information technology, and no attempt is made to analyze the data and to localize the resistance with regard to who is more reluctant than others. On the whole 'resistance' is not the reading that is given officially to the data. The task force reads the data optimistically and interprets them in favour of the project. The short note in the bulletin promises to take the results into account without specifying how that will be done. Reference is given to the proposal about the computing project what is awaiting a decision by the board of directors at the time. Ambiguity about resistance at Raiffeisen is another way to deal with resistance. In the interview a senior staff first denies the existence of resistance to the project, then admits the necessity of forcing people into a certain solution, and regards resistance as the most natural things in response to forced compliance, and later admits that resistance still happens, as has been described earlier (mk, September 1988).

Assimilation

The process of assimilation is based on the use of metaphors. A metaphor allows us to define a problem in terms of one that is more familiar, or more adequate for some reasons. They characterize problems that had to be faced during the project in terms of another domain. I have classified 66 metaphors into 10 domains that where used in

interviews as shown in table 13.7. None of the metaphors refers directly to resistance, rather to the project as a whole. The most frequent domain is everyday life using idiomatic expressions like 'with them [the computer supplier] he has a sparrow in the hand, with us [Raiffeisen] he has a pigeon on the roof'. It describes the dilemma of many bankers, either to buy an expensive system that is not adapted to their needs, but delivered tomorrow, or to wait for Raiffeisen Association to develop a new system tailor-made, but is available only in some years. One member of the task force describes the criteria that define user-friendliness as 'hobby criteria', meaning that they are a nice pastime, but not really necessary to function well. For him user-friendliness is a superfluous criterion. Several times the size of the project is compared, to a 'balloon', too large and very fragile. Another commentator compares the project to 'making of hey', a Swiss idiomatic expression for disorder and chaos.

Table 13.7: The classification of metaphors used in the RBRZ project

domain	task force	local banks	all
commonly used			
everyday life	10	5	15
other designs	8	1	9
medical	5	3	8
locomotion	3	1	4
nature	2	1	3
only task force used			
military	8		8
arts	7		7
political	6		6
crafts	4		4
sport	2		2
Total	55	11	66

The whole strategy of Raiffeisen is described as 'living day by day', with no real guide for the activity. Another commentator describes the status quo of the project at the time when he joins as the meal was already cooked', meaning that the most important

decisions are already been taken and form constraints for future actions. A local banker describes his initial problems with running the new system locally as 'getting a salad', which is a Swiss idiomatic expression for getting into a mess. A local banker laments over the unprofessional standard of the new computer system and describes it as **tinkering**, programming changes here and there without a proper professional design. Faults in the new system are described by a local banker as **'youthful errors'**, meaning that faults are to be expected and excused in every new development, and that time will eradicate them all. Locomotion is used as a metaphor by a local banker who regrets that **'we have to leave the old track'**, meaning that old ways of doing are redundant. A member of the task force describes the project as **'hurling'**, meaning that the project faces various problems that get out of hand as the technical expertise is not there. Other areas of construction are invoked to identify problems and to suggest solutions, mostly by the task force: **'pre-built houses'** or a **'tailor-made suite'** are used to contrast a system that is produced by a major supplier in some standard form to a tailor-made development. The **'Geneva Auto Salon'** is used to show that fixed design versions and user choices are not mutually exclusive. A car supplier hardly asks the costumer to specify his or her wishes about the automobile beyond a few details, but customer have a choice between several models that may differ more fundamentally. The **'construction of a helicopter'** is invoked to show that software development should have similar stages of testing prototypes even in artificial contexts. Medical metaphors like the **functional organisation of a hospital** are used to contrast the lack of a clear divisions of labour within the project, where essential functions like testing are not set up beforehand and have to be established as needed with all the additional effort this requires. Another medical metaphor compares the size and ambitions of the former version of the project with a **hydroencephalis**, meaning to big to function normally. A local banker describes himself as being in an **'experimental rabbits'** to express his awareness of initial faults in the system as well as understanding for the testing that is required. At several stages of the project external consultants were involved to give expert advise. A member of the task force expresses his frustration by describing the business consultants in the computer project as **'the best paid writers'**.

The military is prominent among the task force as a source of problems, solutions, ideas and metaphors. The term **'frontier'** denotes local banks which are in

direct contact with the customer. The particular organisation of the Swiss army, the **'militia system'**, is used to describe the Raiffeisen organisation. Local bankers are rarely professional bankers; rather they come from various backgrounds, receive a minimal training to run a local bank, and often bring some kind of accounting experience from their former occupation. This situation externalizes much of the training costs that arise in a normal bank, but creates problems because many lack basic knowledge of banking which would enable them understand the changes that the new computer system brings. Adapting the computer system to that militia system of local banks means for some members of the task force: Simplification and standardization as much as possible. Being member of a militia implies a lack of professionalism and hence flexibility. A political metaphor describes the strategy of the project as **'divide et impera'** referring to the separation of IT into two solutions, centralized for small banks and local for large banks. A member of the task force deplores the politics of conflicts in the team, as it detracts energies from the real task. **Diplomacy** is called for, when dealing with local banks, in order to calm their anxieties and worries. A **vacuum of leadership** is diagnosed for some periods of the project. The way in which the participation of local banks is initially arranged is described as **dictatorial.** Candidates for the pilot phase have been determined by the board without consent of the task force. The board has an additional agenda: banks are chosen which have a mess running the bank and keeping their accounts in order. It was hoped that the pilot status would sort things out. To the contrary, these banks were of no help to the task force, rather an additional burden. The **craftsmanship metaphor** is indorsed to express the dilemma involved in the project between working tailor-made for the users at acceptable costs. The goldsmith and other crafts stand for the unnecessary ornamentation that many of their products display because of user demands. The conclusion is that the Raiffeisen project should not fall into that trap of providing non-functional satisfactions. A more positive use of the metaphor portrays programming as a craft that cannot rely on fixed rules in attaining user-friendliness, but needs the feel and the experience of the programmer.

Simplification, rules of thumb

Explanations simplify the world by pressing events into a 'cause and effect' schema. These schemata guide actions to control the causes in order to obtain the effect. Table 13.5 lists the various explanations that are used by for the resistance of users in interviews. Not every reference to resistance is an explanations.

Table 13.8: Explanations given for resistance in interviews

explanatory context	frequency
systemic attributions	
costs/benefits	3
complexity	3
knowledge expropriation	3
work load	3
uncertainty, risk	3
centralisation, autonomy	3
forced changes	3
implications	3
political pressure	2
financial	1
organisational bottleneck	1
skill level	1
competition	1
personal attributions	
unwillingness	2
caution	2
refusal	2
no cooperation	2
delaying decisions	2
anxiety, fears	2
preferring old system	2
habits, old ways	1
other priorities	1

Explanations are either systemic or personal. Resistance is explained systemically by costs, the complexity of issues, the avoidance of knowledge expropriation, work load, centralization and autonomy. The personal reasons are unwillingness, caution, refusal, delaying decisions and others. Systemic explanation are more frequently given than personal one. For most commentators resistance seems to be a organisational problem,

not a problem of the individual banker. By identifying the causes of a problem, technical actions are suggested. Explaining resistance by the low skill level of local bankers implies that resistance can be reduced by enhancing adequate training; explaining it in cost/benefit terms implies to reduce the costs of the system to a level where the benefits exceed the costs, or to make sure that bankers perceive the benefits more clearly; explaining by organisational bottleneck focuses the effort in providing adequate support in managing daily work once the system is in place. Other explanations are merely descriptive as they are out of control for the task force, which is the case for most of the individual attributions. There is not much to be done when local bankers that are unwilling to cooperate, refuse the system, or are cautious. Attributing resistance to the individual is the demise of the task force's responsibility. Rules of thumbs may be imported by metaphors used. The most salient metaphor at Raiffeisen is the **'militia' metaphor** which suggests to deal with low levels of specialized skills by ensuring high levels of standardization, no choices on procedures, and forced compliance to central command. The military domain as frame of reference justifies the standardization approach which is taken by some members of the task force simply by using the military language and its internal logic of assumptions. The standardization approach ultimately prevails in the RBRZ system, particularly as the internal conflict is solved in their favour and one of the protagonists of the open approach resigns for health reasons.

13.3 Summary of self-monitoring and resistance

I have reported results of the case study based on external and on internal observations of resistance. External observations refer to resistance as observed by an outsider. Three external measures of resistance are used: diffusion of computers, attitudes to the project in 1985 and general attitudes to computers in 1989. Internal observations refer to resistance that is represented in organisational communication such as formal documents or informal interviews. Two internal measures of resistance are used: resistance talk in interviews and documents, and staff ratings of resistance of local banks.

Comparing computer diffusion to other Swiss banks shows that Raiffeisen lags about 5 years in quantity, and about 10 years in quality of computer hardware and software. 1985 to 1990 is the transition period from the old central service to the new one. I interpret this widening gap as resistance in the system: the implementation of the new system does slows the diffusion of computers. The quantitative gap is significantly widening after 1985; while the large qualitative gap to other banks is closing fast. The opinion survey of 1985 on the new computer system allows me to analyze that resistance. Acceptance measures whether people are inclined to work on a visual display unit, and to enter their own data, and to invest in a new system, and evaluate their own project already, and whether they would volunteer for a pilot scheme. A regression model explains 15% of the variance and provides evidence for four hypotheses: The balance sheet total, the market share, the age of the branch and influence the level of acceptance. The larger the bank, the more likely it accepts the new central service (H13.1 confirmed); the larger the market share the less likely it accepts the new service (H13.2 confirmed); paradoxically younger banks are more resistance than older banks (H13.3 partially confirmed); and contrary to the evidence from the general population, language does not predict acceptance (13.4 falsified). Acceptance in 1985 and general computer attitudes in 1989 correlate positively. Staff ratings of local banks are validated by acceptance measures taken in 1985 and by general attitudes to computers taken in 1989 in local banks. Job characteristics and resistance correlate. Bankers with perceived job significance, responsibility, motivation potential, and job security are less likely to resist the project; bankers who are satisfied with the organisational climate, and experience intrinsic job motivation before the new system is implemented are more likely to resist the changes.

To put resistance talk into context, I content-analyzed organisational communication by function (orientation, self-monitoring, decision making, planning, action execution, alterations), issues (hardware, software, training, project, local banks, information, finance, personal), focus (input, processing, output) and context (conflict, technical interruptions, user reactions, uncertainty, resistance, others). Structural diagrams and time series data depict the structure and dynamics of organisational attention from 1984 to 1991. The method allows me to characterize the organisational communication and action and to compare these to other projects in structure and

dynamics, even though the basis for comparison is small with two other cases. Monitoring internal needs and requirements of the bank is the most frequent function of communication (46%), and is more prominent in interviews than in documents; external orientation is most frequent at the beginning of the project, as is self-monitoring. All communication functions are present at all times, which casts doubt on a linear model of action, which claim that orientation and self-monitoring come before decision-making and planning. Such models are too simplistic as a descriptive device. The method demonstrates the variable presence, and variable time relationship of these functions during the project. Coverage of decision-making and planning are more frequent in documents than in interviews, which indicates that documents may be used as guidance for future actions and interviews are used to reflect on and to evaluate the project. Alterations to the project peak in the middle phase; the focus of attention shifts significantly from hardware to software to organisational concerns over time. Differences in the attention structure of task force and users indicate their psychological distance: the task force focuses attention on matters of software and project organisation, and the local bankers focus on training, finance and work organisation in the local banks.

The **self-preoccupation of the project team** is shown by the data: communications on internal organisational problems exceed the concern with the local organisation of banks. The monitoring of training needs and local banks' work organisation is masked by the project team's concerns about themselves. Internal conflicts from project steps 5 to 11 explain that at least partially. Declining attention given to the information of the users contrasts by a steady increase in coverage of computer matters in the internal newsletter. The more 'informing the users' is actually done, the less is written about that information. Uncertainties about the project, user reactions and conflicts are the most frequent contexts of organisational self-monitoring.

The **salience of resistance is low** during the whole RBRZ project: resistance is more salient in informal than in formal communication; all members of the task force are aware of resistance among users; and more than half of the local banks refer to their own resistance or to the resistance of colleagues. The evidence from formal documents supports several hypotheses: resistance deploys a conflict about how to increase efficiency; resistance criticizes the project; organisational presentation localizes

resistance; localization involves the assessment of the power of resistance; and resistance focuses organisational attention. Resistance that is presented in documents is mostly against the project strategy, particularly on the issue of centralization, autonomy and participation of the local banks. Resistance to more specific issues of software or hardware are not found in the documents.

The divergence between formal and informal communication indicates that filtering processes that are at work in functional analogy to the modulation of acute pain. In fact, the predicted bimodal time structure of resistance is verified. The general awareness of user resistance is not matched by the presentation of resistance in formal communication during the project. The comparison of internal and external, informal and formal evidence of resistance suggests undercoverage rather than overcoverage of resistance in the RBRZ project. Although no formal instruction on censorship of resistance can be found, denial takes place in refusing to use the word 'resistance', and redefining 'resistance' in various terms by contextualizing, being vague, simplifying or assimilating to metaphors and analogies. **Thematizing resistance does not 'mirror' resistance**, but often the context within which communication takes place, be it to legitimize an approach despite the resistance, to understand and justify resistance in the light of corporate culture, or as an alarm signal for the success of the project and therefore a matter of concern for personal prestige. **Contextualization** comes in two forms: labelling it with alternative terms, and marginalizing it within specific contexts. Alternative terms for resistance that are used in the project are the euphemism acceptance, the psychological traits anxiety and user scepticism, opposition, political behaviour and negative public opinion. The notion of 'low level of automation' puts the resistance problem into a corporate context which marginalizes it at the same time. The level of automation is influenced by other factors than resistance. The way public opinion results are reported and the contradictions in the interviews display the vagueness and ambiguity with which the project team approaches the resistance. I have identified more than 66 metaphors from 10 areas with which the project teams **assimilate** user resistance to kinds of other problems areas. Most prominent are associations to everyday life and common sense, and the military, or more specific the militia metaphor. **Simplifications** refer to the way resistance is actually explained, often by deploying a metaphor. Systemic explanations are more frequent than personal ones.

The most poignant source of explanations is the military. It justifies the standardizing approach, which ultimately prevails in the RBRZ project.

The fruitfulness of the pain analogy is demonstrated in (a) shifting the study of resistance from dependent to an independent variable; (b) shifting the analysis from a motivation to communication; (c) not assuming apriori a negative phenomenon; and (d) demonstrating the functionality of bad news, and resistance is the bad news for many people. Only as bad news does it acquire salience in organisational attention. The pain analogy leads me to ask other questions, allows me to generate more than 50 hypotheses and to collect evidence for at least some of them in organisational research into resistance to change. I finally explore the power of resistance in shaping the RBRZ project in the next chapter to conclude my functionalistic argument.

14. Effects of resistance on the Raiffeisen RBRZ project

The final results trace the effects of resistance on the course of the project at the point of evaluation in step 8 to 11. My own evaluation of the project based on 24 interviews in local banks (Bauer, 1989c) is fed back into the organisation. The actual changes in the project will be investigated as the outcome of the awareness of resistance that coincides with it. In terms of theory, my report is integrated into organisational self-monitoring. The outcome is self-monitoring by resistance and by consultancy. The critique of local banks is collected and classified. The proliferation of critique is related to the resistance of the banks, and the work motivation potential. Changes in the attention structure of organisational communication is compared before and after the second time that resistance becomes salient. The argument is that many communication issues are bimodally distributed over time and correlate in the second occurrence with the salience of resistance; hence the point is made that resistance is likely to have affected these changes in the attention structure as well as actual alterations to the project.

14.1 Evaluating the project in 1989

In June and July 1989 I conducted interviews in 24 banks all over the country. In several hours of interviews on the history, the benefits and problems of the computer service are uncovered. Most of these banks are run by one or two persons only. Interviews take place after the start of the paper solution, and before the PC solution is working, i.e. in project steps 8, 9 and 10; during the second period of internal conflicts of the task force as shown in figure 14.1. The controversy between the factions about the users' needs opens, and requires the intervention by senior management. This situation of 'crisis' renders the project sensitive to various influences and critique, which makes the perfect timing for an intervention study. I summarize the results of the evaluation and feed them back in form of a written report to the task force two months later. The report stresses nine points by way of conclusion: The majority of users is not satisfied with the new central service works; most local bankers do not

have computer experience which requires additional training effort; the data input forms need revision; costumer information about transactions is insufficient; data processing is too slow; training has to focus more on work procedures; regional groups to discuss problems are required; training has to focus on the handling and interpretation of data outputs; the layout of the output is deficient (Bauer, 1989c). Most interview partners criticize of the central service, some of them resisting the project other not.

The pain analogy suggests the evaluative function of resistance. Resistance is information that evaluates the ongoing action; in the present case the development of the Raiffeisen central computing service. The proliferation of critique measures the **evaluation function** of resistance to change. Figure 14.2 shows the criticisms of the system given by users in terms of mentioning and variety of critique. User criticism is classified according to three stages of information processing: data input, processing, and data output. Processing includes all issues of work organisations. Points outside these categories are classified as 'other'. The evaluation yields 225 different points from a total of 510 points; some points are mentioned by several banks, between 2 and three times on average. Each bank makes about 20 criticisms on average. Problems of data input are most frequent with about 200 mentioning, much of the points are redundant with 3 to 4 mentioning; data processing and work organisation is criticized in about 100 different points, and least redundant. This body of criticism is the dependent variable to explore the effect of resistance.

Figure 14.1: Internal conflicts and the location of intervention

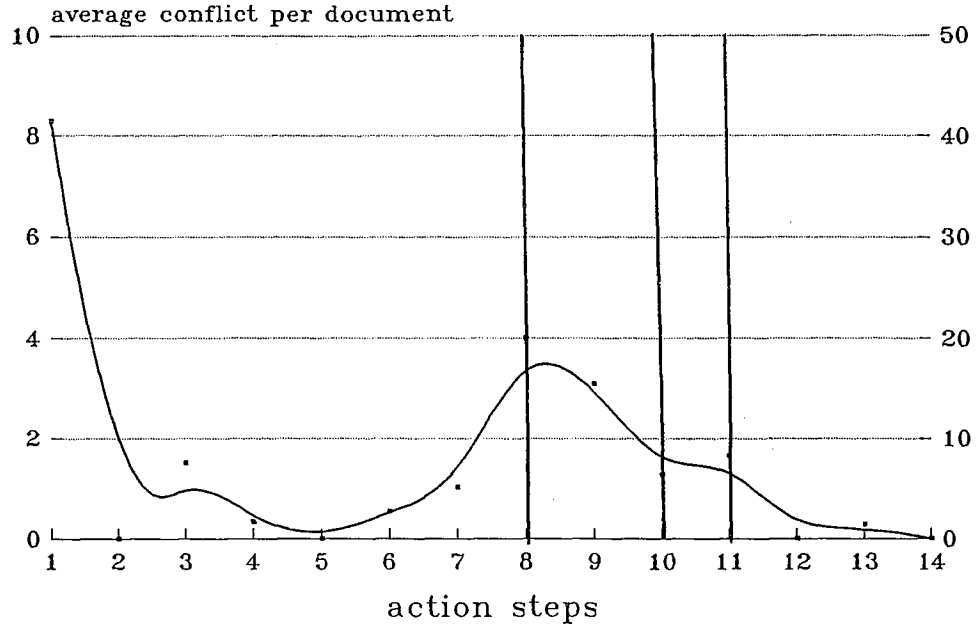
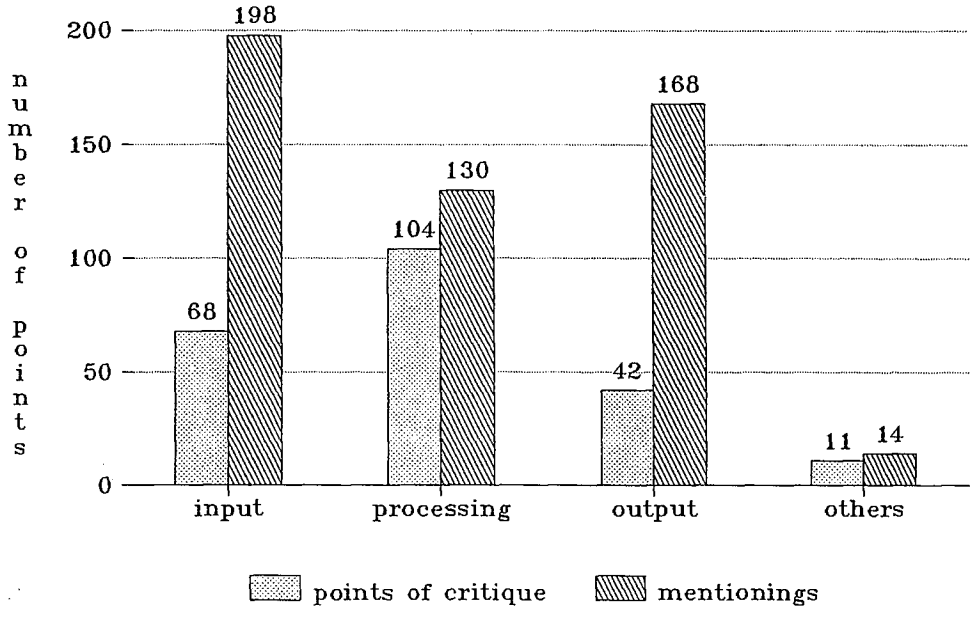


Figure 14.2: Proliferation of critique by local banks



25 interviews; n1=225; n2=510

14.2 Resistance and the proliferation of critique

I tested four hypotheses on the effects of resistance which specify the **evaluative functions of resistance**. They are based on the expectation that resistant banks are more prolific with critique, and that the level of critique depends a) on the performance of the bank, and b) on the self-consciousness of banks as being 'in resistance'. Resistance takes several forms; I make the distinction between low performance and high performance resistance, and between self-reflective and non-self-reflective resistance, and combinations thereof.

> H14.1: resistant banks are more critical of the computer project
> H14.2: Good performer resistance is more critical than bad performer resistance
> H14.3: Resistant banks are represented by bankers who see themselves self-reflectively as resistant.
> H14.4: Self-conscious resistance is more critical of the project, than not self-conscious.

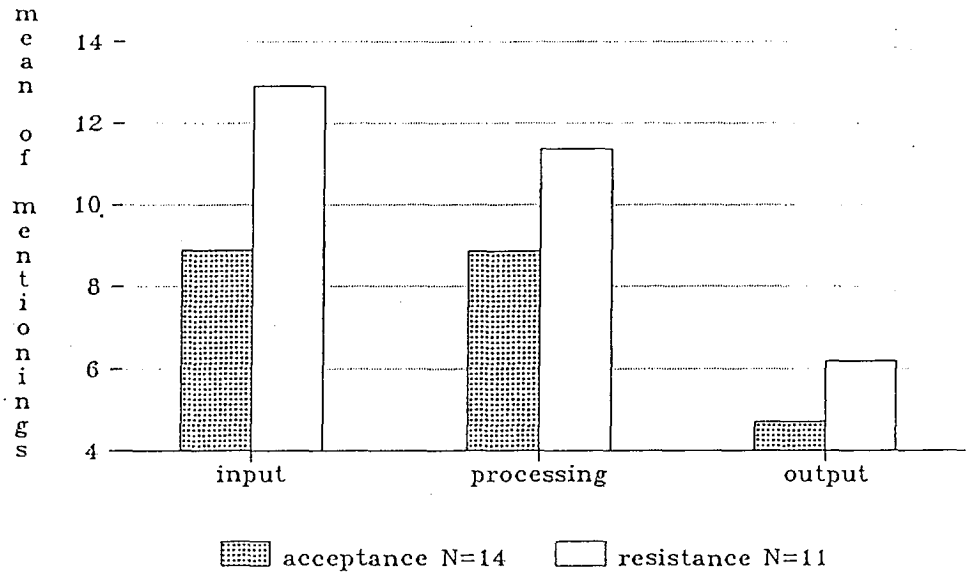
The first hypothesis H14.1 operationalizes resistance as a source of critical information. The evidence is shown in figure 14.3 for input, processing and output. Externally validated staff ratings (see chapter 13) define the high or low level of resistance as independent variable. Resistant Raiffeisen banks are more critical than accepting banks, 36 versus 25 mentioning on average, which is statistically not significant to generalize (oneway $F=2.18$; $p=.15$). The difference is strongest on inputs with around 13 versus 9 mentioning; on processing 11 versus 9 mentioning; and on data output 6 versus 5 mentioning on average. The second hypothesis H14.2 extends the first one. Most researchers in the field have stressed the variety of resistance. Resistance takes many forms and transforms from one into the other. In my data I control the performance of the bank; rentability data of 1988 define good or bad performers (see chapter 12). Being resistant and being a good or bad performer makes a difference for the proliferation of critique to the project as shown in figure 14.4. Resistant banks that are good performers are much more critical, on average 42 points, than are bad performers, on average 23 points (oneway $F=7.14$; $p=.02$; $n=11$). Figure 14.4 also shows an interaction effect. Most critical are good performers, that are resisting, and badly performing banks, that go along with the new system (interaction effect $F=8.15$; $p=.009$; $n=24$). The RBRB project is mostly criticized by **loyal bad performers** and by **resistant good**

performers. Among resistant banks performance makes a difference to criticism. Good performers that resist the project are particularly critical of data processing and work organisation (on average 14 versus 7 points; oneway F=11.1; p=.008; n=11), and of data output as it is presented to them (on average 8 versus 3 points; ONEWAY; F=7.1; p=.02; n=11). One has to consider at least two forms of resistance: **outspoken resistance**, well performing and prolific with critique, and **silent resistance**, less prolific with critique and rather badly performing. This difference relates to work motivation. Outspoken resistance is associated with low level motivation potential (on average 113), silent resistance reflects high work motivation (on average 226) potential measured by JDS (F=5.18; p=.06; df=7). The correlation between MPS and critique is negative with -0.65. This may reflect the dissatisfaction and frustration of the good performing bankers with a deficient computer system. The constraints put on their work by the computer system reduces the variety, identity, significance, autonomy and feedback on their job. For good performers more is at stake which makes them speak out against the system, particularly with regard to work organisation and data output, which affects their every day job.

Another dimension of resistance is its reflexivity: resistance not only for-others, but resistant-for-themselves. Hypotheses H14.3 and H14.4 predict that the degree of consciousness of resistance is associated with the proliferation of critique of the project action. In content analysis of interviews 'talk about resistance' is a variables that measures the degree of consciousness of resistance among the banks. The definition is: bankers that talk about resistance are more self-conscious than others. The external attribution of resistance is reflected in the verbalization of the interview partner. Both hypotheses on consciousness and critique cannot be confirmed. Resistance talk and proliferation of critique do not correlate significantly. These results lead me to a three conclusions: (a) Resistance takes different forms with regard to the evaluation function. The analysis classifies four forms of resistance by combining the variables 'performance of the bank' and 'self-consciousness'.

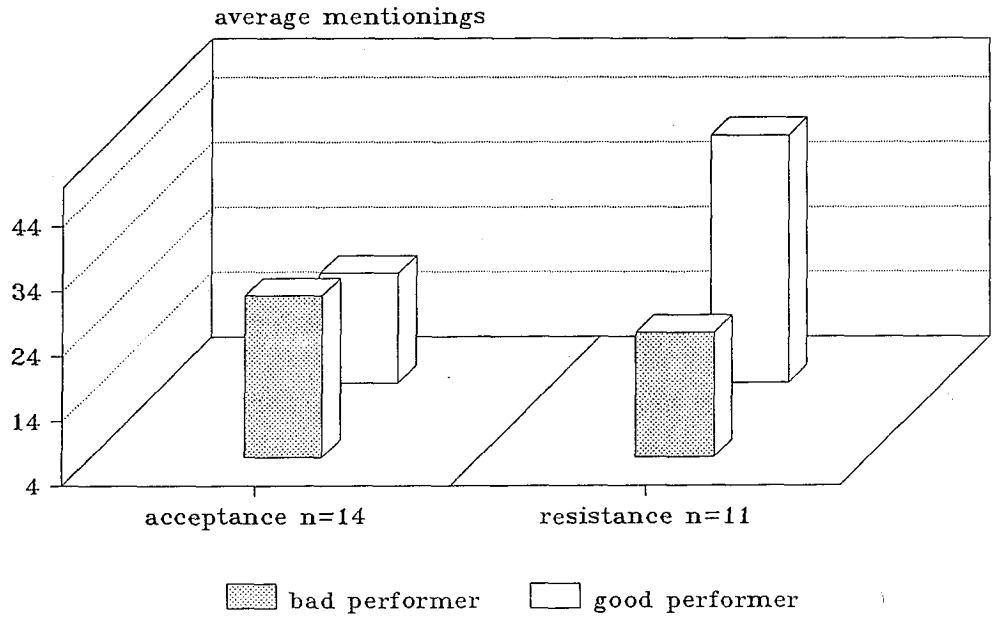
- self-conscious, high performance, resistance
- not self-conscious, high performance, resistance; 'outspoken'
- self-conscious, low performance, resistance
- not self-conscious, low performance, resistance; 'silent'

Figure 14.3: Level of critique by resistance



25 interviews; n=510

Figure 14.4: Critique by resistance and performance



25 interviews; n=510

(b) Among the resistant banks high performance is associated with proliferation of more critique about the computer project. Critical banks show a remarkably low level of work motivation potential, which reflects the constraints put on their work by the computer system. The effect of the reflexive resistance on the proliferation of critique could not be demonstrated, only two forms of resistance can be identified: the outspoken and silent version. (c) Hence the main hypothesis that resistance to change is a prolific source of critical information is demonstrated. The prove that this source of information is ultimately functional requires further evidence, from communication and acknowledgment to action may be a wide gap.

14.3 Resistance and opting out: changing the system

Voicing critique via the channel that is provided by the intervention is one way of enacting resistance as we have seen; voting by running away is another way. Of the 24 banks which I interviewed in mid 1989 and which had the paper solution at the time, 10 took the PC solution by Sept 1991; two had their own system; one bank disappears due to fusion with another; and 12 remain on paper solution. Hence 3 out of 25 or about 12% opted out by the end of 1991. This is in line with the figures for all banks: The RBRZ had 294 costumers in Nov 1990 and only 260 in Dec 1991, which means a general dropout rate of 11.6%. The 10 banks that change to the PC solution by mid 1991 voiced less critique in 1989, were less likely rated as resistant ($r=-0.56$) than the banks remaining in the paper solution. The resistant banks are not inclined to change from the paper to the PC solution. Resistance does not lead to opting out of the system. One may argue that it is a characteristic of critique that stems from resistance, that is comes from within. The resistant part sticks to the system, rather than leaving it when dissatisfied. For the step of opting out other factors are decisive. The hypothesis H14.5 is: Critique that is based on resistance to change strengthens rather than weakens the link to the system. This is different from criticism that is not based on resistance to change, but has other motives. The data basis is too weak to test this hypothesis. However, It is an interesting point for further research. The two banks from the sample that opted out of the system by mid 1991 are **Schoenh** and **LaChaux**. Both are of equal

size with about 14 Million SFr balance sheet in 1988, but work in different environments. LaChaux operates in an urban market with a small market share (1%), is badly performing, voices few points of critique (18 points), and talks about resistance in the interview. LaChaux has pointed to errors in the data processing and complained about the time it takes to alter the system. Schoenh has a large market share (21%), high motivation potential (MPS=202), is well performing, accepts the new system, voices few points of loyal critique (22 points), and does not talk about resistance in the interviews. Schoenh has volunteered as pilot for the PC solution. According to sources in the task force, everybody is surprised, when they opt out of the system without any clear reason. Both cases are very different which prohibits to infer a pattern of opting out.

14.4 The alteration and learning function of resistance

The theoretical framework that is used here suggest that through communicative awareness of a problem the course of the project can be altered, which is formulated in H9.20, and is called the resistance paradox.

> H9.20: The unintended outcome of effective resistance is not the halt of the project, but to direct alterations of the project (The resistance paradox).

Communication is a necessary, but not always sufficient criteria for the effectiveness of resistance. It is necessary to look more closely at what happens to the critique within the action; to what extent does it change things? Following the critique through to the alterations in the project demonstrates the **attention allocation, learning and alteration functions** of resistance as suggested by the pain analogy. Alterations to the project require the critique to be heeded, attention being shifted, and issues being integrated into organisational communication. The data allows me to measure (a) the degree to which the points of critique have been heeded by the task force, and (b) the extent to which my intervention in the process has altered the structure of formal communication; and (c) the amount of alterations that have been reported for the project, which is a lower limit of the number of alterations that have actually been done.

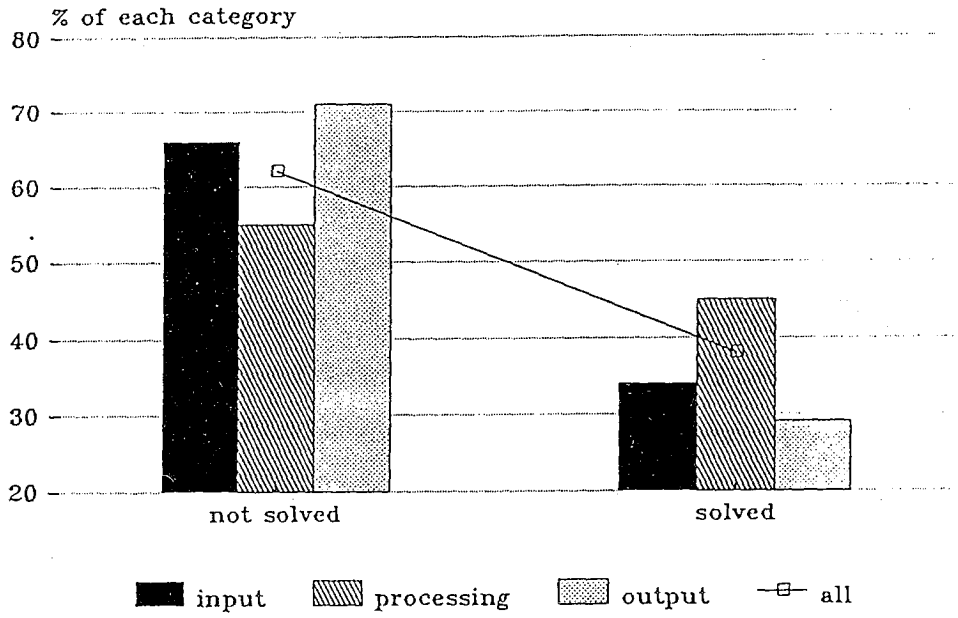
Heeding the critique

The first part of the evaluation consisted in testing the software. In April 1989 I presented a commissioned report (Bauer, 1989b) with the results of a user test of the PC prototype on seven criteria of userfriendliness: transparency, consistency, tolerance, flexibility, support, compatibility and participation (Spinas et al, 1983). The PC solution was critically evaluated on each of these criteria. In meeting with members of the task force it became obvious that a) the report would be selectively used to defend the PC solution as it were, and b) many points are acknowledged, but rejected with no time and resources made available to make alterations, and with the functional priority over ergonomical considerations (minute 16; 17 April 1989). The second part of the evaluation were the interviews with local bankers. After the interviews, still in project step 10, I talked to members of the task force about my impressions, and a written report of the evaluation (Bauer, 1989c) is presented to the task force in September 1989, two months after the data collection at the beginning of project step 11. The immediate reaction of members of the task force is three fold: Many of the points go beyond the competence of the task force touching other departments or even legal issues; several of the problems that are brought up by local banks are already solved but for some reason are not noticed; one member of the task force sees her position strengthened by the report, albeit many decisions have already taken another direction. My report serves as a late **consolation of kind of 'I have told you so'** for past defeats in internal politics. His immediate opponent advocated the idea of **'necessary sacrifices'**: local banks must adapt to the constraints of the computer system; many points of critique are such moments of sacrifice (minutes of the meeting, 11 September 1989). The report is circulated among members of the task force, and a copy goes to a deputy director of Raiffeisen. By the end of the year, still in project step 11, a report is sent back to me commented point by point by one of the managers of level 3. This indicates that the information has been officially received and confirms my hypothesis:

> H9.16a: Change agents classify user criticism into valid and invalid, feasible or unfeasible points, when interpreting user resistance.

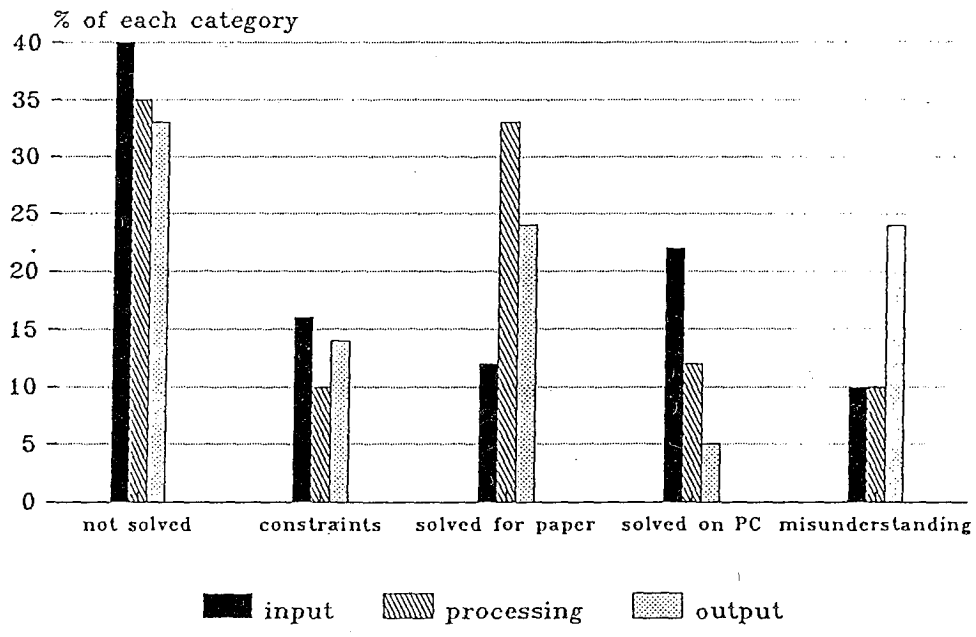
225 points are classified as valid or invalid critique, feasible or unfeasible to solve by the task force. Two years later, in project step 14 in August 1991, each point is classified again by a member of the task force to indicate what has been solved by then

Figure 14.5: Problems solved after two years



critical points n=225

Figure 14.6: Status of problems after two years



cricital points n=225

and what not yet, if it ever will be. Figure 14.5 shows the effect which the critique had two years later. Overall **38%** of all points have been solved; 45% of the data processing and the organisation of work in the local banks; 34% of deficiencies of the input and 29% of the output are solved. Organisational adaptations are more likely to be changed than input and output features, which most likely mean reprogramming efforts. The effect of resistance in the case of Raiffeisen is limited to less than 50% of the criticism; however, the effect of resistance is there, quod erat demonstrandum. Figure 14.6 shows more clearly the structure of these alternations. Around 40% of the points are solvable and remain to be solved; between 10 and 15% are unsolvable due to various constraints, that are out of control of the task force, like hardware, finance etc; between 10 and 20% of points are misunderstandings according to the member of the task force, most of them are about the output.

Many deficiencies are either solved for the Paper solution or for the PC solution. Amendments of the Paper solution are done in the **work organisation** and with regard to the data **output**, i.e. the content and layout of the prints that are sent to the local banks by post; the PC solution brings various amendments for the **data input**, the layout of user interface and the data that is recorded. A comments of caution is necessary here: The interviews with task force staff showed that few critical points were totally unknown. Many of the deficiencies of the project were already noticed at the time of data collection. The documented critique from the users point of view serves as a **catalyst** or as an **additional pressure for 'necessary' changes** to the project, which often require time and money, budgeting and internal politics. The formal documentation of resistance to the project supported these internal efforts.

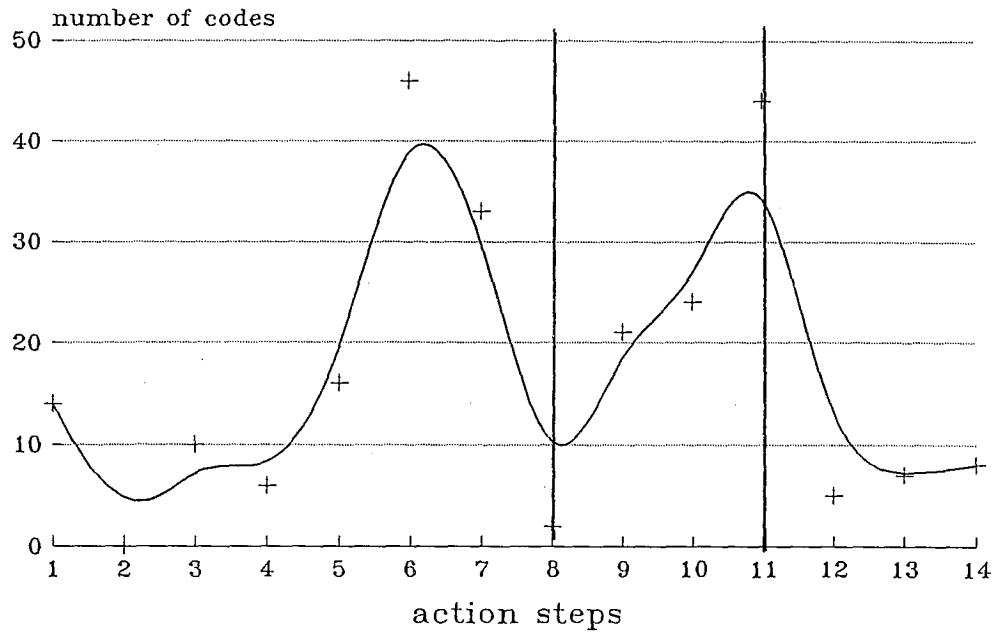
Changes in the attention structure of communication

Another indicator for the effect of resistance onto the organisational action are the differences in the structure of communication before and after September 1989 as formulated in the hypothesis:

> H9.19: Resistance sets the agenda and limits the freedom of the change agency in matters of hardware, software and orgware.

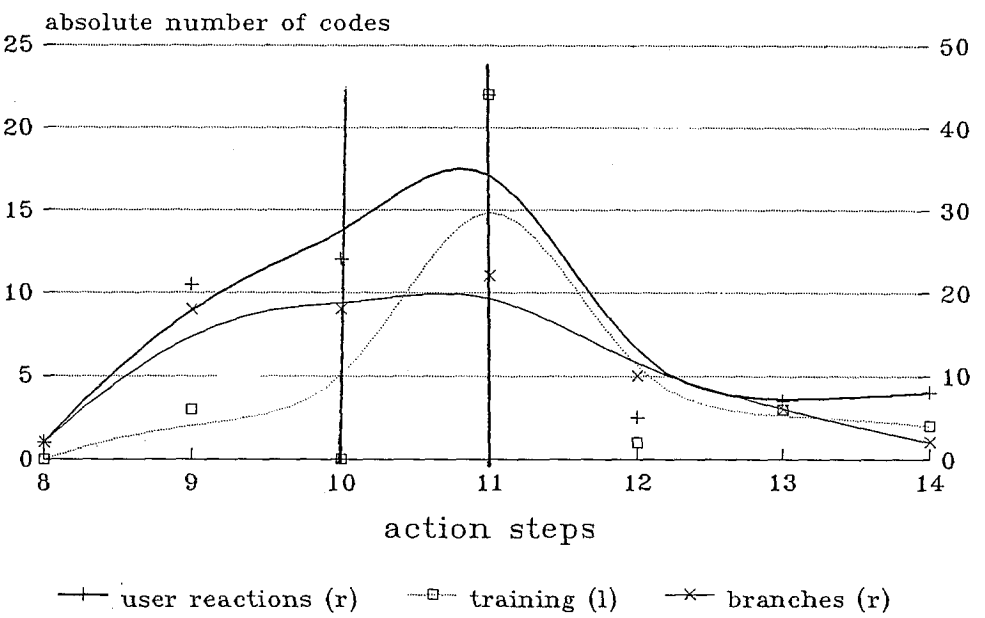
The intensity of formal communication decreases. In terms of functions one finds a marked relative increase in goal setting and decision making, from 15% to 30% (all functions=100%), and a slight increase of self-monitoring from 30% to 34%. Looking into the structure of self-monitoring one finds that training (from 4% to 20%) and the organisation of the task force (from 15% to 25%) are relatively more salient after the intervention. The monitoring of software needs is reduced from 46% to 22%. However, much of these changes could stem from the internal dynamics of the project itself and are not due to resistance and the evaluation. To disentangle internal and external effects a closer look at the time series data is needed. The data cannot be subjected to proper mathematical treatment; I content myself with interpreting the graphs of smoothed time series. User reaction is one of the contexts of self-monitoring. Figure 14.7 shows the trend for user reactions that underlay self-monitoring. Anticipated or actual user reactions facilitate monitoring the project at two times: between project steps 5 and 7, and from step 9 to 11. The latter coincides with the evaluation of the project. The monitoring of training needs show a similar bimodal pattern with a peak in step 4 and in project step 11, coinciding with the feedback of my evaluation in early 1989; the local organisation of banks more salient between project step 9 and 12 as shown in figure 14.8. The shades area marks the time of the intervention. Only one explicit reference is made to the evaluation (doc 86, August 1990). It refers to my conclusions on user training and guidelines for the work organisation in local banks. Similarly the second reference to resistance in formal communication occurs in step 11 independent of my report.

Figure 14.7: The number of user reactions noticed



n=134; N=236

Figure 14.8: Shifting attention during the intervention and resistance



n=108; n1=236 n2=58 n3=133

Overall one can say that during the intervention from step 8 to 11, the sensitivity to user reactions, to training needs and to the work organisation of local banks, as well as the salience of resistance increase, only to recede later. These indicators of communication have a bimodal distribution over time. The argument is that the second mode is related to the formal and informal communication and hence awareness of resistance in the project. The structure of attention changes for a short period. With only one explicit reference to my report, it is unlikely that this shift of attention can be attributed to intervention alone; hence I conclude that the shift of attention is related to the formal and informal awareness of resistance to change during that period. The **attention allocation function** of resistance has therefore been demonstrated with some likelihood.

A last indicator for the effects of resistance is the second peak of actual alterations to the project that are reported between step 8 to 11. Figure 14.9 shows the absolute number of alterations to the project that are formally reported. Alterations occur mainly in step 6 and between steps 8 and 11, i.e. during the intervention period. About 70 alterations of various kinds are reported in the latter period with a peak in step 8 and 10. The decline in step 11 and 12 shows the limited actual effect that resistance has on the project as mentioned above with the percentage of critique that has officially been heeded by the task force. However it looks as if resistance can have an effect a) by providing critical information about where to change the project, and b) if it is supported by external observations, that are integrated into the organisational communication for whatever function that may have for different people.

Summary

The effects of resistance on the RBRZ project are demonstrated at the point of evaluation between project steps 8 and 11. During that period field work takes place and three reports are presented to the bank: the secondary analysis of a survey on computer acceptance; the evaluation of the PC software, and the evaluation of the project from the point of view of local bankers. The effects of resistance on the project are measured (a) by the proliferation of more than 500 points of critique of the project from 24 banks, (b) by changes in the attention structure of the organisational communication during an after the intervention period, and (c) by the reported

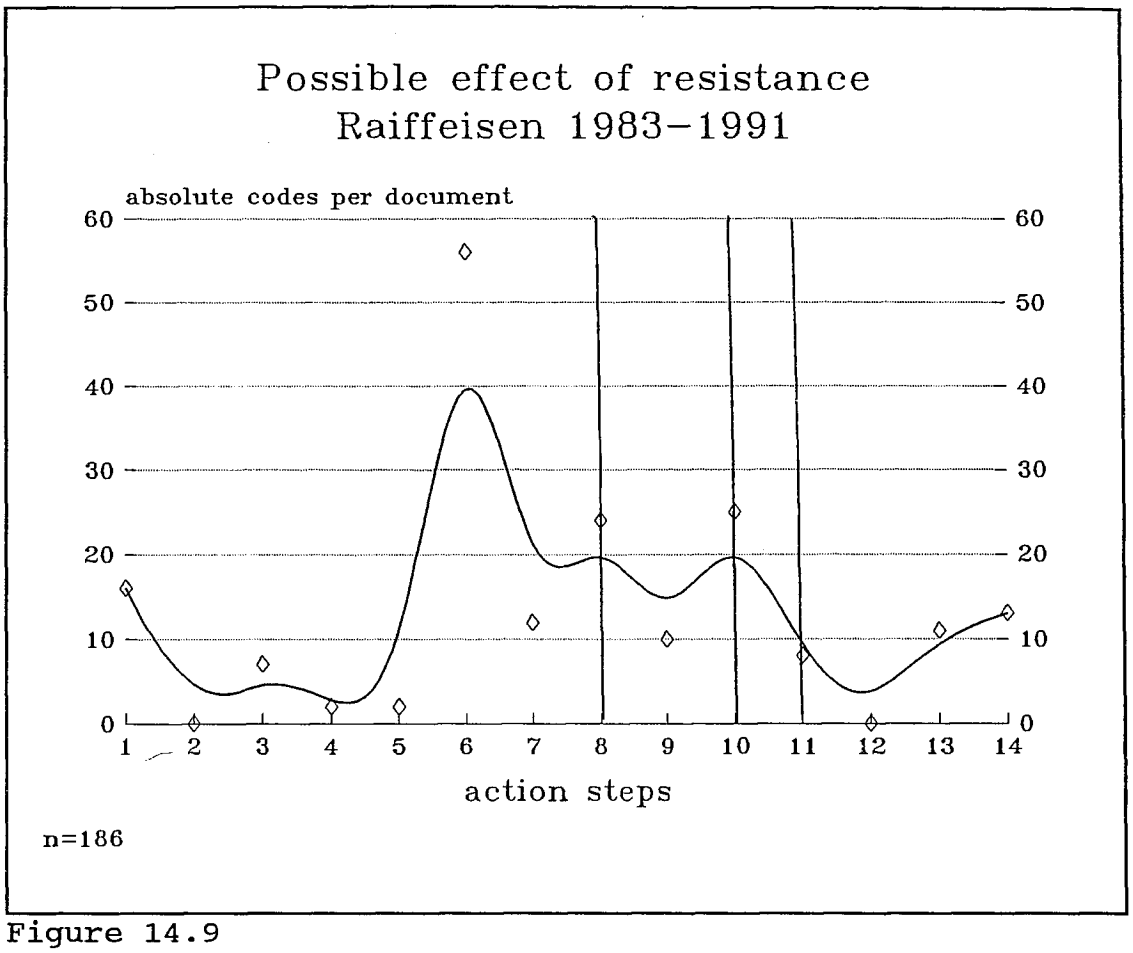


Figure 14.9

alterations to the project in software, hardware or orgware. Several hypotheses have been tested. The critique of local banks is classified in data entry, data processing, and data output. Resistance is based on externally validated staff ratings. The proliferation of critique is related to the resistance of the banks, and to the job motivation potential. Resistant banks are more critical than others. This relationship demonstrates the **evaluation function** of resistance that is suggested by the pain analogy. The data suggest to make a distinction between outspoken and silent resistance. The well performing bank voice more critique than the badly performing ones. The hypothesis that self-conscious resistance enhances the evaluation function could not be confirmed. The focus of resistance critique is on the organisational implications and on matters of data output. Self-monitoring under user reaction and concerns for training needs increase after intervention. Several communication issues are bimodally distributed over time and seem to correlate with the salience of resistance. The point is made that resistance has affected these changes in the attention structure as well as actual

alterations to the project. These changes demonstrate the **attention allocation function** that is suggested by the pain analogy. It has been demonstrated that resistance similar to pain is a systemic process that evaluates the action of which it is part, that allocates attention to important events, and that manages to alter the pace and directions of that action. Despite being very critical, resistant banks do not opt out of the system and chose another option, which suggests a hypothesis for further research: criticism based on resistance to change fosters the links to the system; opting out is less likely an option than for other forms of criticisms. Tracing the link from attention to actual alterations which define the **alteration function** is complex. 38% of problems that were pointed out by local banks are solved two years later, others are regarded as unsolvable within the constraints or remain to be solved. About 70 alterations to the project are reported after the intervention has risen the issues of resistance to change. The problem remains to disentangle clearly the effects of the internal dynamic of the project, the increased sensitivity for resistance, and the intervention by the field study. The data makes the effect of resistance at least plausible, but is not appropriate for exact mathematical treatment to separate the variance that is due to these influences. The present results are limited and require further investigations with a similar methodology.

15. Conclusions and Discussion

This thesis demonstrates the signal function and diagnostic value of user resistance in a software development project. I investigate the uses of 'resistance to change' by reconstructing a computer project over the period of eight years, from 1983 to 1991, in the wider context of public attitudes to and debates about new technology. I am guided by four objectives: first to characterize public attitudes to computers, and to show that people have good reasons for resisting computers in public and private places; secondly to criticize the way 'resistance' is traditionally conceived in organisational theory; thirdly to unfold a functional analogy of resistance to change and the human pain system in terms of self-monitoring; and fourthly to develop a method of analyzing organisational communication in order to trace the uses of resistance within organisational innovation processes. The thesis summarizes substantive results on public opinion, criticizes traditional concepts of resistance, offers an alternative, and explores that alternative view in an empirical study. The thesis is integrated by what Cranach and colleagues describe as **'the complete research situation'**, which is the juxtaposition of several perspectives. In the first gaze the situation and its context is explored. This is based on the acceptance of technology debate, on studies of attitudes and of the diffusion of computers, and on a literature review of 'resistance to change'. The second gaze focuses on people outside the immediate context. This is done by a small exploratory study on the semantics of 'resistance' among management trainees. The third gaze focuses on the observer's observations. Conceptual and methodological reflections form a major part of the study. The fourth gaze focuses on the self-observations of the participants in the study which is based on interviews and documentary analysis. Observations and self-observations are compared and may be similar. Such similarity may be due to the workings of social representations in both internal and external observations. The thesis is divided into four major parts corresponding to the four gazes.

Critique of the literature on resistance to change

Three activities of research into the acceptance of new technology can be distinguished: 'acceptance research I' and the 'smooth talkers'; 'acceptance research II' and the 'whistle blowers'; and 'acceptability research' and the 'missionaries'. Acceptance research suggests social control of technology by focusing on the user, but this can be done in various ways. The user focus is a response to the 'acceptance crisis of technology' in the 1970s. Terms like technophobia or cyberphobia are used which rather mislabel the problem. The acceptance crisis reflects the growing awareness of engineers, politicians, producers, buyers and users that the mere novelty of technology no longer guarantees desirability. New technology is subject to a debate about costs and benefits. Resistance to technology is not a prominent variable in the social analysis of computing. It appears as delay parameter in the diffusion processe, negative attitudes to computers, and is pathologized as cyberphobia. Organized resistance to office and production automation remains marginal in the 1980s. Some researchers ask why that is the case. Only 7% of British manufacturers reported opposition to new technology in the mid-1980s, mainly in establishments with more than 100 employees. In the 1980s resistance to computers is confined to a potential 'loser group'. Those people, mostly elderly engineers or staff with non-specialist training show a passive disagreement with the implementation of new technology. But the 'non-existence' of resistance may be due to information management, i.e. filtering and censorship. Resistance is marginal because it ought to be, rather than because it is. Resistance is stronger in lower and top ranks of organisations, and relatively weak the middle ranks of the organisational hierarchy. The resistance of top decision-making strata to use office automation has sensitized suppliers to the issues of user-friendliness of computers in a historically unprecedented way. Measuring of attitudes to computers is one way of operationalizing public resistance. Negative attitudes to computers are taken as an indicator for resistance or its potential. Terms like 'negative attitude', 'barriers of acceptance' and 'low acceptance' are used. The peak of polling activity on computing was between 1983 and 1987, which I call the '**years of concern about computers**'. Other technological issues such as biotechnology have since replaced computers on the agenda of pollsters. At the time potential resistance to computing was between 25% and 33% in Western public opinion. The attitudes to computers shifted to the negative from the 1970s to the

early 1980s. Observers have used two pathological concepts in that context, which demarcate the extremes on an attitude-behaviour continuum from different perspectives. The concept of 'computer addiction' defines deviance from the point of view of the technological sceptic; cyberphobia sets a boundary of normal/abnormal from the point of view of the computer advocate. Computer addiction has been established convincingly; however, it remains unknown how widespread it is in a population, and its etiology is unclear. Computers may be addictive objects, or they may be chosen by people with a predisposition for compulsive behaviour patterns. The epidemiology of computer addiction is an area for further studies. The historical analysis of the diffusion of computers into everyday life may clarify the complementarity of the two concepts of 'computer addict' and 'cyberphobia' in the public debate. Both seem to be constructions from different vantage points, and demarcate extremes of assumed normally distributed attitudes. Public images and social representations of 'the computer' is a field for further studies. An encompassing review of public opinion and attitude data on computing and information technology through the 1980s is a task for future research. It would make an interesting secondary analysis to compare the dynamics of public opinion across different new technologies such us nuclear power, computers, and the more recent biotechnology. To assemble such data from various sources remains a task for future research. I have shown that attitudes shift not only from positive to negative, but also in their structure. Studies show the differentiation, accentuation and specification of attitudes to computers as the public becomes more familiar with the attitude object. Comparing factor analysis on the same items over time reveals the variable structure of the computer attitudes. The link from attitudes to action remains week. Organisational case studies have the potential to demonstrate the paths from attitudes to action and from actions to attitudes in daily working life. In my study I show how negative attitudes to computing are enacted during the implementation of a computer system in a Swiss bank.

Technology is a public affair. It requires monitoring to draw attention to unintended consequences and the costs arising thereof. Every technical product is the outcome of design, and has an agenda that may be hidden. The danger lies in concealing, and in falling into the naturalistic fallacy by claiming that what 'is' also 'ought to be'. A closer look is needed at how an agenda gets locked into a computer

design and who contributes at which stage and in which manner. The social sciences are often constrained to the role of acceptance-helpers or 'smooth talkers' to increase the sales figures of computer products and to smooth the implementation of computer systems. The technology itself is taken as fixed. Social impact analysis without real influence runs the risk of legitimizing a technological fix. Acceptability research on computer and work design expresses the preference of certain technical trajectories over others, and is at the same time object of resistance. The impact of acceptability research on computer standards in international comparison is another task for future research.

I pay particular attention to Switzerland, the context of my empirical study. The diffusion of computers in Switzerland came in two waves, the first in the 1960s and the second in the 1980s with the arrival of the PC (Personal Computer). By the late 1970s Switzerland was equal to other Western countries in the relative number of computer units; however it lagged in the provision of training and research, which led to a public debate on international competitiveness in order to mobilize resources. Public opinion about computers shifted from job killing to other issues, i.e. often diffusely expressed worries. No social movement can be identified that mobilized resistance against computers. Negative attitudes were mainly but not exclusively represented by labour organisations, and by writers from the historical and social sciences with a peak in 1977. The peak in negative public opinion followed the media coverage with a lag of 7 to 8 years. I estimate that **15% of the Swiss had resisted in some form computers in about 20% to 25% of Swiss companies by 1987 in some form.** After 1987 the optimists gained ground, when attitudes in rural and urban regions assimilate; a gender gap and a language gap between the Romands and the German Swiss remains. Women, German Swiss, the older people, and the left-wing voters tended to be more resistant than others. This sets the immediate context for my organisational study of resistance.

Organisational sociology, social psychology and management studies traditionally study social changes and the problems arising therefrom. The organisational literature is a source for analytic distinctions, concepts and knowledge about 'resistance to change'. Change agents are likely to draw upon them during training, which guides the ways they define problems, make decisions, and act not least in the very context of my study.

This body of literature allows me to reconstruct the social representations of 'resistance'. Resistance to change is an ambiguous event, different perspectives and conceptions make a difference for action. It can be shown that resistance is mostly studied as a dependent variable, elicits mainly negative connotations, and implies a deficit of some kind. Various individual or structural variables may explain resistance; however, the consequences of resistance are rarely studied. Resistance is used to explain all failures of change projects. Ambiguity abounds when the same behaviourial indicators define 'resistance' from the perspective of change, and 'perseverance' and 'commitment' from the perspective of continuity. Resistance has long been associated with lower levels of hierarchy. Information technology has changed that picture, as resistance is found across all levels. Conditions of resistance often refer to deficient characteristics of the actor. Psychometric personality traits like cyberphobia, neuroticism, anxiety, and rigidity, or organisational conditions like vested interests, bureaucratic structures, and the 'British disease' imply a deficit of some kind. The legal discussion on the 'right of resistance' demarcates resistance from opposition. While opposition remains within the rules of the game, resistance is counteraction outside the normative expectations; it is therefore risky behaviour, but justifiable because real institutions never work perfectly and norms need development. Resistance is legitimized on appeal to highest values. Resistance can come from a position of power or from a position without power; it is however not a form of power, but an action which defines the boundaries of the power game. The military discussion of resistance shows its strength. The Clausewitz theorem states that with equal means resistance, i.e. waiting, retreating and small surprise actions, tends to be stronger than the attack. The change agent becomes an obstacle for himself, depleting his resources before reaching the objectives. It has been argued by others that resistance to change is the outcome of outdated management practices of a taylorist kind. This would imply that changes in management practices would make resistance disappear. This remains an untested hypothesis.

Lewinian field theory is an influential conceptual framework for talking about resistance. Structural and historical explanations are differentiated; structure means the totality of simultaneous facts; history refers to the genesis of these structures. Behaviour and experience tend towards a state of equilibrium or the 'good gestalt' where forces

are balanced. Resistance is a 'barrier to locomotion' for individual action or a 'counterforce to change' for social action. Studies of mother-child interaction are the paradigm for the Lewinian analysis of resistance, which I call '**feeding the reluctant eater**'. The Lewinian type of benevolent social engineering may be morally well intended, but is unacceptable in many respects: the changes are regarded as 'good' for the system without prior consent; the goals are prefixed top-down rather than negotiated; the procedure is flexible in details, but determined strategically. This paradigm is implicit in Lewinian studies such as the Iowa and Cornell studies on children, the experiments on forced eating, the research on changing food habits, and the Harwood industrial experiments. Resistance is a motivational problem of arranging force fields. Resistance is a nuisance that can be overcome by controlling its conditions. Various strategies to overcome resistance were suggested in terms of the three steps of 'unfreezing', 'moving' and 'refreezing' the situation. The basic principle is weakening the forces of resistance with a flexible mix of tactics: identify the channels and gatekeepers of communication, induce group discussions, confuse the situation, transform 'things' into 'media', gradually restrict options, appeal for cooperations and favours, distract from the central issues, demonstrate power, have groups moderated by non-experts, create commitment by group discussions, set expectations for concrete changes. The analysis is motivational in terms of 'forces'. A shift from a motivational to an informational analysis of resistance can shows its uses for the change process. Resistance is not necessarily a bad thing. The study of effects must be an empirical question and not an a priori assumption. Earlier studies have given important phenomenological insights that are worth preserving: **resistance is dynamic**; strong-willed, vacillating, disorganized and escalating resistance are **process structures** worth further studies. The relationship of Lewin to the cyberneticians, and the affinity of field theory to the development of open system theory deserves further exploration. The historical link is made by the Macy conferences which Lewin attended enthusiastically shortly before his death (Heims, 1991). Organicism may be a common theoretically origin for Gestalt psychology, field theory, open system thinking and psychological field theory and may explain similar features among these research traditions. The historical condition of war may explain the preoccupation of many researchers with overcoming resistance by all means.

The negative connotations of 'resistance to change'

To validate my analysis of the organisational literature I conducted a semantic study among management trainees in the USA, the UK and Switzerland. Semantic differentials and free associations contrast the conventionalized emotional connotations to 'resistance to change' and to 'to be 'conservative'. The term **'resistance to change' connotes negatively among change agents** (regressive, defensive, sceptical). The **association with 'deficit concepts' exists** (uncertainty, laziness; 18%). English speakers connote resistance less active and less potent than do German speakers. Resistance as a deficit concept is more salient for the English speakers than for the German speakers. These results corroborate the analysis of the literature with the common sense of management trainees. A **residually positive connotations** to 'resistance to change' can be found, which indicates that a functional analysis is conceivable, albeit unusual in that context.

The pain analogy of resistance

The threefold criticism of the literature that (a) reduces resistance to a dependent variable, (b) values negatively and conceives it as a deficiency, and (c) is biased from the point of view of the interested change agent, commits me to search for an alternative approach. I have explored a functional **analogy between acute pain and resistance** to change. The notion of self-monitoring subsystems, borrowed from the Bernese Group of Action Psychology, allows me to generate various ideas and more than 50 hypotheses on resistance, its structure, process and effects. A business company is a self-active system which arranges itself for survival, i.e. for continuing its activity under variable circumstances. The analysis of organisational actions looks at four substructures: task structure (what needs to be done?), role structure (who may principally do what?), information processing (who says what to whom?), and the execution structure of action (who finally does what?). Information processing directs and energetizes the whole action by solving a number of universal problems that can be distinguished. Self-active systems survive by balancing internal and external constraints: for that they rely on one or more ways of **self-monitoring** to adapt to internal requirements under external constraints. The argument is that resistance to change is such a self-monitoring activity that social systems maintain. Resistance is a

source of useful diagnostic information. 'Self-monitoring' is the abstraction which mediates the analogy between resistance to change and acute pain to show the beneficial effects of resistance for the organism as well as for the social system. The analogy is functional in the sense that both make beneficial contributions to the survival of the system, and achieve that by a similar structure, namely self-monitoring. I explored the pain analogy to some extent. The paradox of pain arises when pain feels bad and at the same time is good for the organism. Its significance lies in the bad news, the necessary, alarming and, with symbolic representations, even diagnostic 'evil'. Pain promotes the healing of structural damage by three functions: by focusing attention internally (**attention allocation function**), by evaluating ongoing activity as dangerous for the future of the system (**evaluation function**), and by urging different action now and in the future (**alteration and learning function**). Pain is awareness of a need-state, triggers emotions and thought processes, is generally unpleasant, compelling and fills the limited span of attention; it is localized with reference to the body image (areas, inside, surface), has duration (brief, periodic, persistent), quality (cold, hot, itching, dull), intensity (light, unbearable, excruciating), expression (vocalizations, reports, autonomic reactions, behaviour patterns), and comes, symbolically processed, with causal attributions, depending on past experiences and conceptual learning. Four characteristics of the pain system are important: pain is the outcome of a **parallel information process**: it gains diffuse, affective and motivating quality from the **primary coding** on lower levels of processing; discrimination and interpretation of pain is symbolic and is achieved by **secondary coding** or higher level processing. Symbolic coding of pain involves language and constitutes culture. Pain is input for other self-monitoring subsystems, and comes mostly as a mixture with emotions and conscious cognitions as part taking in culture. The pain system is **internally modulated** by gate control, plasticity and top-down influences. Incoming signals can be blocked, which explains the weak correlation between pain and injury. 'Censorship processes' explain the absence of representation when structural damage has occurred, or its presence when damage is minor or has already regenerated. Modulation is triggered by top-down influences and by strong alternative stimulation. Prolonged modulation of pain has undesirable effects; it alters the functioning of the pain system, and pain becomes chronic. The pain experience often has a **characteristic bimodal pattern**: an initially

sharp pain signals a problem; modulation dampens the signal immediately; a diffuse but intense pain remerges and later may bifurcate: it either disappears or persists as chronic pain. Functional pain can decay into dysfunctional pain when ignored.

I take the idea that consciousness and communication are functionally equivalent on different levels of analysis. Communication is the major form of self-monitoring that a social system has at its disposition. For the analysis of organisational communication its structure, content and forms of 'misrepresentations' are distinguished. Communication is parallel processed; the process is characterized by the direction, the position of the source and the target, and whether it is internal or external, and whether it is formal or informal. Information in organisations is coded in schemata and representations that include a self-image, and is processed with limited capacity. Various forms of misrepresentations are distinguished: gate-keeping, being vague, contextualizing, simplifying, and assimilating with the help of metaphors and analogies. Resistance may be a similarly important signal that something is going seriously wrong. To be effective the signal has to be perceived in a certain way which is constituted by the communication system. The signal is defined by the communication system.

The results of the empirical study

In the study of the development of a new computer service it is expected that resistance a) allocates organisational attention to issues of disagreement about how to improve efficiency, b) evaluates the computer system in hardware, software and orgware, and c) elicits alterations in the design and the implementation of the computer system. In order to accomplish that, the pace of action needs to slow down, in order to give time for reflection, revision and reconstitution. To be effective user resistance needs to be formally communicated. It is stipulated that the absence or presence of resistance is due to internal processes and does not necessarily reflect the presence or absence of events. I assume that resistance to the computer system provides potentially useful information, and so ignoring it would be a missed opportunity for the design of an effective work system. I demonstrate some of the uses of resistance for the design and implementation of a new computer system in a **case study** in a Swiss bank between 1983 and 1991. I developed a method for analyzing organisational communication in time series which

allows me to characterize in relation to the project when, how intense, in what manner, and to what effect 'resistance to change' is a salient issue of communication. The method provides a framework for comparing different actions and for testing hypotheses. By observing my own observing I describe the methodology. The empirical multi-method study is a single case study (N=1) of interrupted time series and a post-hoc design. Eight kinds of data are used: job characteristics; computer attitudes; software and user evaluation; content analyses of interviews, in-house media and documents, diffusion data, and performance data. Two surveys (n1=314 and n2=293) from November 1985 and October 1991 are analyzed to measure the computer attitudes of local banks. Thirty-four narrative and semi-standardized interviews are conducted with members of the task force and in 24 local banks, and 134 documents are analyzed. Narrative interviews and documents are coded on 128 categories. The coding frame classifies functions, issues, focus and context of communication with an acceptable reliability of r=0.74. Time series depict the variable structure of organisational attention between 1983 and 1991. On the whole the study is descriptive and explores a method to analyze resistance as it becomes an issue in a communication system.

Raiffeisen Switzerland consists of around 1200 cooperative banks of smaller size with a limited range of services. It faces the challenge of information technology during the 1980s with a project to provide a central computer services to small banks which cannot afford stand alone systems: the RBRZ (Raiffeisenbanken Rechenzentrum). Raiffeisen follows a double strategy for information technology: decentralisation for larger banks and a central services for small banks; the central service comes in two version, the paper solution and the PC solution. Significant events divide the period from 1983 to 1991 into a sequence of 14 project steps of unequal duration, which represents the inner timing of the project. Complexity is given with four parallel actions: strategy, hardware infrastructure, paper solution, and the PC solution. The organisational hierarchy identifies the direction of communication as bottom-up, top-down, or horizontal along five levels. Whether members of the task force act according to their functional role or as individuals depends on the context. Local banks are either good or bad performers. Time, level of hierarchy, performance and job characteristics are used as independent variables. The case study produces **external and internal evidence of resistance**. External measures are the diffusion of computers, and attitudes

to the project in 1985, 1989 and 1991. Internal observations of resistance are analyzed from documents and interviews, namely resistance talk in interviews and documents, and staff ratings of local banks. Resistance slows the speed of project compared to the planned time schedule, or compared to similar projects (H9.18). Raiffeisen lags about 5 years in quantity, and about 10 years in quality of computer hardware and software compared to other Swiss banks. After 1984 the quantitative gap increases, and the qualitative gab closes. 1985 to the present is the transition period from the old central service to the new one. I interpret the lag as an indicator of resistance in the system. Attitude measures show that the bigger the bank, the more likely it is to accept a new computing solution (H13.1), and the smaller the market share the higher the acceptance of the new computing solution (H13.2). Against expectations older banks are more likely to accept the new solution, even when controlled for size and market share. Acceptance in 1985 and computer attitudes in 1989, and staff ratings inter-correlate, which shows that the indicator for resistance is valid. To put resistance into context I analyzed communication by function (orientation, self-monitoring, decision making, planning, action execution, alterations), issues (hardware, software, training, project, local banks, information, finance, personal), focus (input, processing, output) and context (conflict, technical interruptions, user reactions, uncertainty, resistance, others). Monitoring internal needs is the most frequent function of communication (46%), and this is more prominent in interviews than in documents. External orientation is most frequent at the beginning of the project as is self-monitoring. The analysis of the variable structure of communication content casts doubt on linear models of action, which claim that orientation and self-monitoring precede decision-making and planning. Most of these processes are permanently present, however with varying predominance. Coverage of decision-making and planning is more frequent in documents than in interviews, which indicates that documents may be used as guidance for future actions and interviews are used to reflect on and to evaluate the project. Alterations peak in the middle phase. The focus of attention shifts significantly from hardware to software, and from software to organisational concerns over time. Differences in the attention structure of task force and users shows the **psychological distance** of divergent relevance structures: the task force focuses on matters of software and project organisation, the local bankers on training, finance and work organisation. The relative

self-preoccupation of the project team can be shown: communication on internal problems exceeds the concern with the local banks. The monitoring of training needs and that of work organisation is displaced by internal conflicts from action steps 5 to 11. Declining attention is given to the user information in contrast to increased coverage of computer matters in the internal newsletter. The more the users are actually informed, the less is written about doing it. On the whole one must say that **the salience of resistance is low during the RBRZ project**: resistance is more salient in informal than in formal communication; all members of the task force are aware of resistance among users; and more than half of the local banks talk about their own resistance or the resistance of colleagues. During periods when resistance is not formally communicated gate control and misrepresentation of resistance are working (H9.9). The predicted **bimodal occurrence**, an indicator for internal modulation of resistance, is verified. Organisational presentations and informal communication of resistance differ in content (H9.10). The comparison of internal and external, informal and formal evidence of resistance suggests undercoverage of resistance during the RBRZ project; however, no formal censorship of resistance can be proven. Thematizing resistance does not 'mirror' resistance; it rather expresses the context within which communication takes place, be it to legitimize an approach despite resistance, to understand and justify resistance in the light of corporate culture, or as an alarm signal for the success of the project and a matter of concern for personal prestige. Denial takes place by refusing to use the word 'resistance', by contextualization, by being vague and ambiguous, by simplifying or by assimilating. The alternative term 'low level of automation' subsumes the resistance problem into a corporate context and marginalizes it at the same time. Levels of automation depend on factors other than resistance. The way survey results are reported internally and the contradictions in the interviews display the vagueness and ambiguity with which the project team approaches the resistance. I have identified 66 metaphors from 10 domains. Most prominent are assimilation to everyday life and the militia/military metaphor. Simplifications refer to the way resistance is actually explained, often by deploying a metaphor. Structural explanations are more frequent than personal ones. The most prominent source of explanations it the military metaphor. It justifies the standardizing approach, which ultimately prevails in the RBRZ project.

By its function resistance to change represents an organisational conflict about how to increase efficiency (H9.1). Documented resistance is most frequent at the beginning of the project and concerns the project strategy; the issue is the centralization which puts autonomy and participation of the local banks at stake. Resistance to more specific features of software or hardware are not found in the documents. The effects of resistance on the RBRZ project are demonstrated at the point of evaluation between project steps 8 and 11. During that period field work takes place and three reports are presented to the bank. Resistance events implicitly or explicitly express criticism of hardware, software or orgware of a computer project (H9.3). The effects of resistance on the project are demonstrated (a) by the **proliferation of more than 500 points of critique** of the project from 24 banks, (b) by **changes in the attention structure** of the organisational communication during and after the intervention period, and (c) by the **reported alterations to the project** in software, hardware or orgware. Several hypotheses have been tested. The critique of local banks is classified in data entry, data processing, and data output. Resistant banks are more critical of the computer project (H14.1); good performer resistance is more critical than bad performer resistance (H14.2). Resistant banks are more critical than others which demonstrates the **evaluation function** of resistance as suggested by the pain analogy. The data suggest to make a distinction between outspoken and silent resistance. The banks which perform well voice more critique than the ones which perform badly. Resistance **focuses the attention** (H9.14) on the organisational implications and on matters of data output. Self-monitoring and concerns about training increase after the intervention. The task force classified the criticism which my report had collected into valid and invalid points (H9.16a). Many contents fluctuate bimodally during the project, and the second peak seems to coincide with the salience of resistance. The point can be made that resistance has affected the attention structure as well as actual alterations to the project. Despite the criticism resistant banks do not opt out and chose another option, which suggests a topic for further research. The hypothesis is that criticism based on resistance fosters the links to the system. Opting out is less likely an option than for other forms of criticism.

The outcome of resistance is not to bring the project to a halt, but to direct alterations to the project (H9.20). Tracing the link from attention to actual alterations

which define the alteration function is difficult and needs adequate documentation and observations. 38% of problems pointed out by local banks were solved two years later; others were regarded as insoluble or remain to be solved. About 70 alterations to the project are reported after the intervention has raised the issues. The problem remains to disentangle clearly the internal dynamic of the project, the increased sensitivity for resistance, and the effect of intervention. The data makes the effect of resistance plausible, but they are not appropriate for more refined mathematical treatment that could separate the differential contribution of these influences. The present results are indicative and require further investigations within a similar methodology.

Table 15.1: Hypothesis generated, confirmed, qualified and rejected

Status of hypotheses	number	percentage
Evidence provided	24	43
Partially, qualified	3	5
Tested and rejected	6	11
Total tested	33	59
Not tested	23	41
Total	56	100

It has been argued that the choice of an analogy has to be pragmatic; it has to prove useful for some purpose. The fruitfulness of the pain analogy is demonstrated in (a) shifting the study of resistance from a dependent to an independent variable; (b) shifting the analysis from motivation to communication; (c) not assuming a priori a negative phenomenon; and (d) demonstrating the functionality of bad news in the organisational context: resistance is the bad news for many people. The fact that resistance is bad news among many change agents may in the end not be such a bad thing: it is the basis of its signal function. Only as bad news does it acquire salience in organisational attention. The negative evaluation of resistance which I started out to criticize proves to be a necessary part of the functional system. Just as if pain were not unpleasant, resistance which was not 'bad news' would not move the system in another direction. The pain analogy allowed me to generate more than 50 hypotheses. The final

proof of the pudding is the empirical evidence for these hypotheses. Table 15.1 summarizes the empirical power of the study. Of a total of 56 hypotheses 33 have been put to test; evidence has been found for 24; three have partially been supported and need to be qualified; six hypotheses have been falsified.

Prospects for future research

Trenty-three hypotheses have not been tested and leave open questions for future studies. Every study has its limitations, and three limitations of the present study are most evident. First, the data is descriptive and inadequate for proper time-series analysis. My serial data are based on often very small frequencies; they cannot be subjected to statistical analysis. Much of the argument therefore remains suggestive rather than providing proofs. It must be among the ambitions of further studies to collect larger quantities of data to show the postulated effect in a statistically sound manner. Secondly, the documentary basis was too small to prove the direct influence of resistance. Ideally one would trace the references to resistance from informal comments to formal documentation, reconstruct the various transformations of the events in different accounts, and trace the effects of such representations on the project event by event. My documents do no allow for such detailed reconstruction of the history of events, even though the project did not lack events. Here a dilemma of organisational research becomes evident: the more frequent and the more accurate the documentation of a project is, the more one may suspect that its bureaucratic character is interfering with the course of the project itself. As strongly as one would wish for complete documentation of organisational projects for the purpose of research, one would also wish to avoid the paper work whould one work on such a project. Research and organisational reality may have a conflict of interest. Relying on casual documentation carries the risk of incomplete data. Thirdly, my case study has been designed to describe the implementation of a new computer solution in a Swiss bank. What basis of generalization does that offer? Because the Raiffeisen bank is an untypical bank, decentralized, cooperative and limited by ideology, I am cautious in generalizing my results on to banks. I rather think that certain features of the analyzed process are typical for a software development project, whatever the specific organisational context. In that area the study could provide a baseline to compare other projects.

It has been demonstrated with that resistance may indeed usefully evaluate the action of which it is part; it allocates attention to neglected issues, and it manages to alter that action, in the first instance, by slowing the pace. In terms of my model the study has sofar explored, with some sophistication, the **signal function of resistance**, i.e. the primary coding of resistance. The analysis of organisational communication has shown the intensity, timing and quality of representations of resistance. An immediate effect of that signal function is the slowing of the speed of the project which gives room for further analysis, reflection and exploration of needs. The model opens up a large space for future research to explore in more detail the **secondary coding of resistance**, i.e. the symbolic representations that are deployed in an organisational context. The significance of pain is mediated by symbolic representations of what problem in particular it might indicate; the **diagnostic value of pain** is based on theories of the body. By analogy the functional analysis of secondary codings of resistance leads to the further investigations of project changes in relation to resistance, and to the analysis of diagnostic theories of organisational functioning that mediate them. Theories of organisational functioning are part of the **organisational culture** and on a higher level they are **social representations of resistance**. I am confident that the framework and methodology laid out in this thesis would be helpful to analyze the workings of, and to locate in time and space such symbolic representations within social activity. The framework of self-active systems, self-monitoring and the method of content-analysis of interviews and documents may be a guideline for my future research.

You can only rely on what resists (Napoleon)

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Appendix

Appendix 3: Swiss survey questions on Computing 1984-1990

Table 1 gives a synopsis of the questions that were used, for the wording of the questions see the appendix 1. The questions are grouped according to their issue. Some of these question are replicated, and are therefore comparable for a trend analysis. Replicated questions are enhanced in the table 1.

Table 1: Synopsis of questions from Univox and 'TagesAnzeiger'

topic	Uni84	Uni86	Uni87	Uni88	TAGI84/87
-comp contact	Q13-Q15	Q1	-	Q9	**PC**
cost/benefit	**Q5**	**Q2**	**Q3**	-	**Q3**
expl. costs	**Q3**	**Q4,**	-	Q4-Q8	**Q2**
expl benefits	**Q2**	**Q3**	-	-	**Q4**
problems	Q1	-	-	-	**Q1**
pro/contra	Q6	-	-	-	-
What to do?	Q7-Q12	-	-	-	-
tech interest	-	-	**Q2**	**Q10**	-
tech progress	-	-	**Q1**	**Q1**	-
risk accept	-	-	-	Q2	-
tech imperative		-	-	Q3	-

enhanced questions are replicated and comparable;
data from the 1990 survey are not yet accessible

The Questions used in Swiss surveys on new technology

A: TAGI/Hergiswil 1984 and 1987: N=374 (1984) N=221 (1987); business in agglomoration of Zurich
stratified random sampling, telephone and personal interviews of managers and owners

data are broken down by size of business and PC usage:
- small and large business (under 49/ 50 over)
- actual PC users and future PC users

PC 'Wie viele PC besitzt ihr Betrieb?'

Q1 'Glauben sie, dass es bei der Einfuehrung von PC in Ihrem Betrieb Probleme geben koennte?'

Q2 'Welche Probleme ergeben sich?... erwarten Sie?

Q3 'Hat die Einfuehrung von PC in Ihrem Betrieb zur Erleichterung und Rationalisierung beigetragen?'

Q4 'Hat es bei der Einfuehrung der PC in Ihrem Betrieb Problem gegeben?'

B: Gfs/Univox 1984: N=700
quota sample of general population of Switzerland

The data is broken normally down by:
- sex
- age (20-39, 40-60, 60-84 years)
- Life standard (I and II, III and IV)
- white collar, blue collar
- language (French, German speaking)
- living area: agglomoration, mountain area
- Canton: ZU, BE
- party affiliation: FDP, CVP, SPS, none

Q1 'Sie haben wahrscheinlich schon irgendwo den Ausdruck Computer gehoert oder gelesen. Was ist ein Computer? Wuerden Sie mir einen Computer kurz beschreiben?

Q2 'Nennen sie mir doch einen Vorteil des Computereinsatzes'

Q3 'Nennen sie mir doch einen Nachteil des Computereinsatzes'

Q4 'Im Geschaeftsleben, aber auch in der Verwaltung werden heute immer mehr Computer eingesetzt. Mit dem Computer kann man viele Arbeiten rascher und besser ausfuehren als frueher, die Verwendung von Computern hat aber auch gewisse Probleme gebracht, welche wohl?'

Q5 'Computer werden heute in vielen Gebieten und fuer viele Aufgaben eingesetzt. Hat der Computer aus ihrer Sicht eher mehr Nachteile, eher mehr Vorteile gebracht oder halten sich Vorteile und Nachteile etwa die Waage'

Q6 'Wir wollen nun ueber die Einstellung zum Computer, zur Microelektronik sprechen, ob man eher fuer oder gegen den Einsatz dieser neuen Einrichtungen ist. Wie ist dies bei ihnen selber, wie sind Sie eingestellt ?'

Q7 'Wenn sie bei ihrer Berufsarbeit die Wahl haetten zwischen einem Arbeitsplatz mit und ohne elektronische Hilfsmittel - z.B. mit oder ohne Bildschirmgeraet - was wuerden sie dann waehlen ...?'

Q8 'Und wenn sie keine Wahl haetten ... was waere dann ihre Reaktion? Wuerden sie sich damit abfinden oder den Versuch machen, eine andere Taetigkeit oder Stelle zu bekommen?'

Q9 'Was muesste ihrer Ansicht nach getan werden, um moegliche negative Folgen, zumindest aber die Haerten bei der Einfuehrung von Computern und Mikroelektronik zu vermeiden?

Q10 'Wer muesste das tun?'

Q11 'Kann man sich ueberhaupt gegen die weitere Verbreitung von Computer und Mikroelektronik wehren, etwas dagegen tun, oder ist diese Entwicklung unaufhaltsam, so dass man bestenfalls Schlimmstes verhueten kann?

Q12 'Was tun, um sich einigermassen dagegen zu schuetzen?'

Q13 'Wo, wie haben Sie mit Mikroelektronik oder Computern zu tun? Wo auch noch?Und wo noch?

Q14 'Gibt es an ihrem Arbeitsplatz oder in der Firma/Organisation, wo sie arbeiten, Computer oder Einrichtungen mit elektronischen Teilen?'

Q15 'Man hoert und liest heute viel von Mikroelektronik und Computern. Haben Sie selber in irgendeinem Zusammenhang mit Mikroelektronik oder Computern zu tun, sind Sie direkt oder indirekt irgendwie von solcher Technik abhaengig oder bestehen bei ihnen keinerlei Beziehungen?'

Univox 1986: N=695

Q1 'gibt es an ihrem Arbeitsplatz oder in der Firma/Organisation, wo Sie arbeiten, Computer oder Einrichtungen mit mikroelektronischen Teilen?'

Q2 'Computer werden heute in vielen Gebieten und fuer viele Aufgaben eingestetzt. Hat der Computer aus Ihrer persoenlichen Sicht eher mehr Nachteile, eher mehr Vorteile

gebracht oder halten sich Vorteile und Nachteile etwa die Waage?'

Q3 'Nennen sie mir doch einen Vorteil des Computereinsatzes'

Q4 'Nennen sie mir doch auch einen Nachteil des Computereinsatzes'

Univox 1987: N=654 (older than 20 years)

Q1 'glauben sie, dass der wissenschaftlich-technische Fortschritt den Menschen auf lange Sicht helfen oder schaden wird?'

Q2 'alles in allem wie stark intessieren sie sich fuer technische Neuerungen?'

Q3 'hat der Computer aus Ihrer Sicht eher mehr Nachteile oder mehr Vorteile gebracht?'

Univox 1988: N=676

Q1 'Glauben Sie, dass der wissenschaftlich-technische Fortschritt den Menschen auf lange Sicht helfen oder schaden wird?

Q2 'Hier unterhalten sich zwei ueber 'technischen Fortschritt'. Welcher der beiden sagt eher das, was auch Sie denken ..?
(Risiken in kauf nehmen, bei geringem Risiko verzichten)

Q3 'Was meinen Sie zu der Behauptung: 'Ohne Computer ist die Zukunft nicht mehr zu bewaeltigen'?

Q4 'Glauben sie persoenlich, dass zunehmende Anwendungen von Computern durch den Menschen das taegliche Leben einfacher oder komplizierter machen wird?'

Q5 'wird die zunehmende Anwendung von Computern mehr Gelegenheit zur Selbstentfaltung oder weniger Gelegenheit zur Selbstentfaltung schaffen?'

Q6 'wird die zunehmende Anwendung von Computern zu mehr zwischenmenschlichen Kontakten oder zu einer groesseren Isolation es einzelnen fuehren?'

Q7 'wird die Arbeit durch zunehmende Anwendung von Computern interessanter oder uninteressanter werden?'

Q8 'wird die Arbeit durch die zunehmende Anwendung von Computern eher aufreibender oder eher weniger aufreibend?'

Q9 'arbeiten Sie selber in ihrem Beruf mit Bildschirm, Computer oder computergesteuerten Maschinen?'

Q10 'alles in allem, wie stark interessieren sie sich fuer technische Neuerungen'?

Appendix 5

Table 1: category system for the analysis of associations

---

positive:
- Definition: associations which have a clear positive connotation in common language usage (rater judgment) having the character of a compliment
- examples:
German: Hartnaeckigkeit, aufgeschlossen, berechtigt
English: steadfast, progressive, curious, loyalty, tender

neutral:
- Definition: associations which have neither a positive nor a negative connotation in common language usage (rater judgement)
- examples:
German: festhalten, Abschied, verteidigen, stehen bleiben
English: problems, reality, attitudes, structural, identity

negative:
- Definition: associations which have clearly a negative connotation in common language usage (rater judgement)
- examples:
German: Hemmungen, Politfilz, Traegheit, engstirnig
English: fear, tradition, bureaucracy, vested interests

deficient:
- Definition: associations which are linguistically marked by prefixes like 'un-, dis-, mis- or expression of the form 'no ... or lack of ....' or similar expressions
- examples:
German: desinteressiert, fehlender Mut, Misstimmung, unwillig
English: unimaginative, unprepared, closed-minded, 'lack of ..'

All these institutions take foreign students. The sample is a mixture of nationalities. Respondents were instructed to name the country were they spent the most time of their life as their nationality. The variable supposedly reflects the most important influence of socialization.

Table 2: the variable **'nation'**:

nationality	sample	%
Swiss	n=125	32.2%
British	n=115	29.6%
North American	n=58	14,9%
others	n=73	23.2%

Many respondents in the sample were mature students who already had professional experience; asked to state their professional status, respondents give a label: **'Non-implementers'** (others, general students, teachers; n=53; 13.7%) are less likely to enact and to reflect upon organisational change than do **'implementers'** (consultants, middle management, executives; n=95; 24.1%).

The data file

```
get file 'semdiff.dat'.
    388 cases, each consisting of
     60 variables (including system variables).
     60 variables will be used in this session.


recode succ1 to bad2 (0 missing sysmis=4).
recode gender (1=0) (2=1).
value labels gender 0 'male' 1 'female'.
recode language (1=0) (2=1).
value labels language 0 'English' 1 'German'.
recode occup (1=6) (2=1) (3=4) (4=3) (5=5) (6=8) (7=9) (8=7) (9=2).
variable labels occup 'ranking of organisational experience'.
value labels occup 1 'low:studgen' 2 'others' 3 'teacher' 7 'proff' 4 'academ'
  5 'empl/work' 6 'studmgmt' 8 'midmgmt' 9 'high:topmgmt'.
recode country (1=1) (2=4) (3=2) (4=5) (5=3).
compute natdyn=country.
recode natdyn (3=4).
recode natdyn (5=3).
value labels natdyn 1 'low:Britain' 2 'Switzerland'
  4 'others' 3 'high:North America'.
compute change2=occup.
recode change2 (1 2 3=0) (7 8 9=1) (else=sysmis).
value labels change2 0 'non impl' 1 'impl'.
missing value language change2 ().

factor var=succ1 to bad2
The raw data or transformation pass is proceeding
    388 cases are written to the uncompressed active file.
/anal=caut1 fool1 untime1 act1 bel1 to optim1 aggre1 pos1 bad1
/for=sort blank(.5)
/print=def kmo
/plot=eigen
/crit=fac(3) iter(30)/ext=pc
/save=def (3,equares)/rot=equamax
/anal=succ2 to fool2 comp2 act2 prog2 inter2 optim2 stable2 aggre2 to pos2
 bad2
/for=sort blank(.5)
/print=def kmo
/plot=eigen
/crit=fac(3) iter(30)
/ext=pc
/save=def (3,oblicon)/rot=oblimin.
```

Factor Analysis

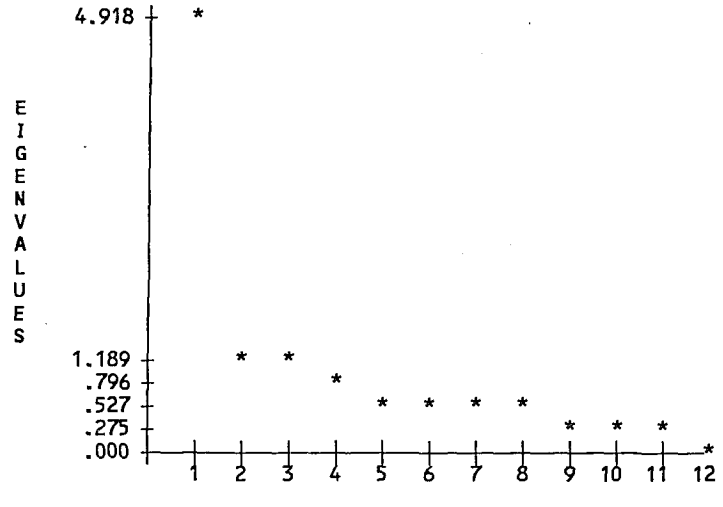
'resistance to change'

Analysis Number 1 Listwise deletion of cases with missing values

Kaiser-Meyer-Olkin Measure of Sampling Adequacy = .89302

Bartlett Test of Sphericity = 1742.4367, Significance = .00000

Extraction 1 for Analysis 1, Principal-Components Analysis (PC)



PC Extracted 3 factors.

Factor Matrix:

	FACTOR 1	FACTOR 2	FACTOR 3
PROG1	.85588		
POS1	.83149		
OPTIM1	.77745		
BAD1	-.77501		
INTER1	.70217		
AGGRE1	.65748		
FOOL1	-.65611		
UNTIME1	-.62721		
ACT1	.56707		
CAUT1		-.70494	
YIELD1			.78984
BEL1		.51567	.55634

Final Statistics:

Variable	Communality	*	Factor	Eigenvalue	Pct of Var	Cum Pct
CAUT1	.59372	*	1	4.91792	41.0	41.0
FOOL1	.60098	*	2	1.25696	10.5	51.5
UNTIME1	.49518	*	3	1.18921	9.9	61.4
ACT1	.45692	*				
BEL1	.68469	*				
PROG1	.73419	*				
YIELD1	.69836	*				
INTER1	.53076	*				
OPTIM1	.64792	*				
AGGRE1	.57526	*				
POS1	.71211	*				
BAD1	.63402	*				

3 PC EXACT FACTOR SCORES WILL BE SAVED WITH ROOTNAME: EQUARES

Equamax Rotation 2, Extraction 1, Analysis 1 - Kaiser Normalization.

Equamax converged in 6 iterations.

Rotated Factor Matrix:

	FACTOR 1	FACTOR 2	FACTOR 3
FOOL1	-.77185		
POS1	.77018		
BAD1	-.74285		
PROG1	.73212		
UNTIME1	-.69101		
INTER1	.57438		
OPTIM1	.56312		
CAUT1		-.74236	
AGGRE1		.63725	
ACT1		.53068	
YIELD1			.78475
BEL1			.75631

Factor Transformation Matrix:

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	.82965	.46526	.30858
FACTOR 2	-.54817	.78363	.29230
FACTOR 3	-.10582	-.41166	.90518

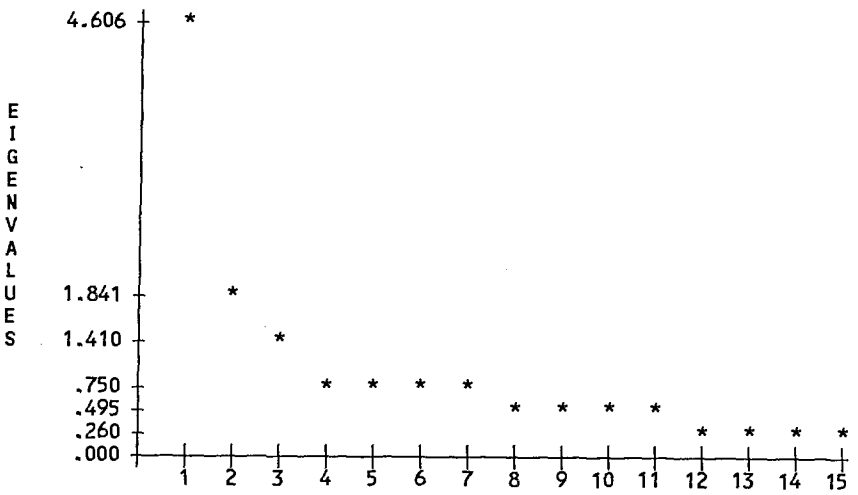
'to be conservative'

Analysis Number 2 Listwise deletion of cases with missing values

Kaiser-Meyer-Olkin Measure of Sampling Adequacy = .85001

Bartlett Test of Sphericity = 1703.0002, Significance = .00000

Extraction 1 for Analysis 2, Principal-Components Analysis (PC)



PC Extracted 3 factors.

Factor Matrix:

	FACTOR 1	FACTOR 2	FACTOR 3
POS2	.81122		
BAD2	-.78318		
PROG2	.77903		
FOOL2	-.69400		
INTER2	.68423		
OPTIM2	.62000		
SENS2	.59428		
ALT2	.54982		
ACT2	.53563		
CAUT2		-.59620	
AGGRE2		.56794	
COMP2		.54147	
USUAL2			
STABLE2			.67181
SUCC2			.51867

Final Statistics:

Variable	Communality	*	Factor	Eigenvalue	Pct of Var	Cum Pct
SUCC2	.53229	*	1	4.60562	30.7	30.7
ALT2	.46440	*	2	1.84137	12.3	43.0
SENS2	.51073	*	3	1.41007	9.4	52.4
CAUT2	.41421	*				
FOOL2	.51905	*				
COMP2	.50311	*				
ACT2	.52992	*				
PROG2	.61598	*				
INTER2	.51592	*				
OPTIM2	.43366	*				
STABLE2	.61033	*				
AGGRE2	.42096	*				
USUAL2	.47022	*				
POS2	.67164	*				

BAD2 .64466 *

3 PC EXACT FACTOR SCORES WILL BE SAVED WITH ROOTNAME: OBLICON

Oblimin Rotation 2, Extraction 1, Analysis 2 - Kaiser Normalization.

Oblimin converged in 24 iterations.

Pattern Matrix:

	FACTOR 1	FACTOR 2	FACTOR 3
POS2	.80443		
BAD2	-.79313		
PROG2	.72406		
FOOL2	-.69821		
SENS2	.68520		
INTER2	.65029		
ALT2	.64680		
OPTIM2	.53741		
COMP2		.64228	
ACT2		.56772	
AGGRE2		.55913	
SUCC2		.51579	
STABLE2			.77569
USUAL2			.63557
CAUT2			.52043

Structure Matrix:

	FACTOR 1	FACTOR 2	FACTOR 3
POS2	.81293		
BAD2	-.79529		
PROG2	.74992		
FOOL2	-.70250		
INTER2	.66555		
SENS2	.65287		
ALT2	.61276		
OPTIM2	.57242		
ACT2		.61769	
COMP2		.59811	
AGGRE2		.59386	
SUCC2		.52413	
STABLE2			.76180
USUAL2			.64036
CAUT2			.54834

Factor Correlation Matrix:

	FACTOR 1	FACTOR 2	FACTOR 3
FACTOR 1	1.00000		
FACTOR 2	.11157	1.00000	
FACTOR 3	.01274	-.08724	1.00000

Correlations between factor scores and independent variables

```
corr age gender language change2 with equares1 to oblicon3/opt=2 5.
```

Correlations:	EQUARES1	EQUARES2	EQUARES3	OBLICON1	OBLICON2	OBLICON3
AGE	-.0145	.0611	.0938	-.0481	.0103	-.0049
	(388)	(388)	(388)	(388)	(388)	(388)
	P= .388	P= .115	P= .032	P= .172	P= .420	P= .462
GENDER	.0247	.0532	.0089	-.0965	.0135	-.0711
	(388)	(388)	(388)	(388)	(388)	(388)
	P= .314	P= .148	P= .431	P= .029	P= .395	P= .081
LANGUAGE	-.0239	-.1578	.1523	.2720	-.0076	.0283
	(388)	(388)	(388)	(388)	(388)	(388)
	P= .319	P= .001	P= .001	P= .000	P= .440	P= .289
CHANGE2	-.1267	-.1510	-.0188	-.0526	.0127	.1481
	(148)	(148)	(148)	(148)	(148)	(148)
	P= .062	P= .033	P= .410	P= .263	P= .439	P= .036

Frequency of factor scores and independent variables

```
fre var=natdyn age gender language change2
   /hist=normal/stat=none.
```

NATDYN

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	.00	17	4.4	4.4	4.4
low:Britain	1.00	115	29.6	29.6	34.0
Switzerland	2.00	125	32.2	32.2	66.2
high:North America	3.00	58	14.9	14.9	81.2
others	4.00	73	18.8	18.8	100.0
	TOTAL	388	100.0	100.0	

AGE age group of subject

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	0	7	1.8	1.8	1.8
UNDER 21	1	9	2.3	2.3	4.1
21-25 YS	2	190	49.0	49.0	53.1
26-30 YS	3	65	16.8	16.8	69.8
31-40 YS	4	92	23.7	23.7	93.6
41-50 YS	5	18	4.6	4.6	98.2
ABOVE 50	6	7	1.8	1.8	100.0
	TOTAL	388	100.0	100.0	

GENDER gender of subject 1=male, 2=female

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
male	0	256	66.0	66.0	66.0
female	1	132	34.0	34.0	100.0
	TOTAL	388	100.0	100.0	

LANGUAGE language of questionnaire

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
English	0	253	65.2	65.2	65.2
German	1	135	34.8	34.8	100.0

TOTAL	388	100.0	100.0

CHANGE2

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
non impl	.00	53	13.7	35.8	35.8
impl	1.00	95	24.5	64.2	100.0
	.	240	61.9	MISSING	
	TOTAL	388	100.0	100.0	

```
fre var=equares1 to oblicon3/for=not
 /hist=normal/stat=def median skew kurt.
```

EQUARES1 REGR FACTOR SCORE 1 FOR ANALYSIS 1

Mean	-.000	Median	.120	Std Dev	1.000
Kurtosis	.181	Skewness	-.550	Minimum	-2.887
Maximum	2.603				

EQUARES2 REGR FACTOR SCORE 2 FOR ANALYSIS 1

Mean	-.000	Median	.123	Std Dev	1.000
Kurtosis	-.318	Skewness	-.389	Minimum	-2.835
Maximum	2.304				

Valid Cases 388 Missing Cases 0

EQUARES3 REGR FACTOR SCORE 3 FOR ANALYSIS 1

Mean	.000	Median	.118	Std Dev	1.000
Kurtosis	.113	Skewness	-.644	Minimum	-2.963
Maximum	1.868				

OBLICON1 REGR FACTOR SCORE 1 FOR ANALYSIS 2

Mean	.000	Median	-.004	Std Dev	1.000
Kurtosis	.244	Skewness	.129	Minimum	-3.212
Maximum	3.128				

Valid Cases 388 Missing Cases 0

OBLICON2 REGR FACTOR SCORE 2 FOR ANALYSIS 2

Mean	-.000	Median	.048	Std Dev	1.000
Kurtosis	.883	Skewness	-.371	Minimum	-3.372
Maximum	3.586				

Valid Cases 388 Missing Cases 0

OBLICON3 REGR FACTOR SCORE 3 FOR ANALYSIS 2

Mean	-.000	Median	-.062	Std Dev	1.000
Kurtosis	.599	Skewness	.538	Minimum	-2.409
Maximum	3.723				

Valid Cases 388 Missing Cases 0

Hypothesis testing

```
oneway equares1 to oblicon3 by natdyn(1,4)/ran=schef
 /opt=6//stat=1.
```

- - - - - - - - - - O N E W A Y - - - - - - - - - -

Variable EQUARES1 REGR FACTOR SCORE 1 FOR ANALYSIS 1
By Variable NATDYN

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	.2885	.0962	.0943	.9632
Within Groups	367	374.2599	1.0198		
Total	370	374.5485			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
low:Brit	115	.0246	.7736	.0721	-.1183 To .1674
Switzerl	125	-.0353	1.2703	.1136	-.2602 To .1896
high:Nor	58	-.0091	.8341	.1095	-.2284 To .2103
others	73	-.0426	.9595	.1123	-.2665 To .1813
Total	371	-.0141	1.0061	.0522	-.1168 To .0886

Group	Minimum	Maximum
low:Brit	-2.4516	1.6918
Switzerl	-2.8869	2.6034
high:Nor	-2.3998	2.0126
others	-2.6812	1.9791
Total	-2.8869	2.6034

Variable EQUARES2 REGR FACTOR SCORE 2 FOR ANALYSIS 1
By Variable NATDYN

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	5.4736	1.8245	1.8582	.1363
Within Groups	367	360.3606	.9819		
Total	370	365.8343			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
low:Brit	115	.1058	.9947	.0928	-.0780 To .2895
Switzerl	125	-.1791	1.0316	.0923	-.3617 To .0036
high:Nor	58	.0593	.8437	.1108	-.1626 To .2811
others	73	-.0699	1.0208	.1195	-.3081 To .1683
Total	371	-.0320	.9944	.0516	-.1335 To .0695

Group	Minimum	Maximum
low:Brit	-2.8348	2.0357
Switzerl	-2.6351	1.8167
high:Nor	-2.1193	1.3625
others	-2.6291	2.3040
Total	-2.8348	2.3040

Variable EQUARES3 REGR FACTOR SCORE 3 FOR ANALYSIS 1
By Variable NATDYN

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	6.1972	2.0657	2.0607	.1050
Within Groups	367	367.9030	1.0025		
Total	370	374.1002			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
low:Brit	115	-.0600	.9940	.0927	-.2436 To .1236
Switzerl	125	.1703	1.0181	.0911	-.0099 To .3506
high:Nor	58	.0373	.9853	.1294	-.2218 To .2964
others	73	-.1705	.9958	.1165	-.4029 To .0618
Total	371	.0111	1.0055	.0522	-.0916 To .1137

Group	Minimum	Maximum
low:Brit	-2.9627	1.7797
Switzerl	-2.9142	1.8678
high:Nor	-2.9357	1.4677
others	-2.9136	1.6759
Total	-2.9627	1.8678

Variable OBLICON1 REGR FACTOR SCORE 1 FOR ANALYSIS 2
By Variable NATDYN

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	39.7324	13.2441	15.2292	.0000
Within Groups	367	319.1620	.8697		
Total	370	358.8944			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
low:Brit	115	.0193	.8404	.0784	-.1360 To .1745
Switzerl	125	.3310	1.0072	.0901	.1527 To .5093
high:Nor	58	-.6621	.9103	.1195	-.9015 To -.4228
others	73	-.0885	.9547	.1117	-.3112 To .1343
Total	371	-.0034	.9849	.0511	-.1040 To .0971

Group	Minimum	Maximum
low:Brit	-1.9056	3.1278
Switzerl	-3.2120	2.9023
high:Nor	-2.6805	1.3602
others	-2.1563	2.0649
Total	-3.2120	3.1278

(*) Denotes pairs of groups significantly different at the .050 level

Mean	Group	high:Nor	others	low:Brit	Switzerl
-.6621	high:Nor				
-.0885	others	*			
.0193	low:Brit	*			
.3310	Switzerl	*	*		

Variable OBLICON2 REGR FACTOR SCORE 2 FOR ANALYSIS 2
By Variable NATDYN

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	4.7905	1.5968	1.6101	.1866
Within Groups	367	363.9673	.9917		
Total	370	368.7578			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
low:Brit	115	.0293	1.0624	.0991	-.1670 To .2255
Switzerl	125	.0535	.9343	.0836	-.1119 To .2189
high:Nor	58	-.2491	.9204	.1209	-.4911 To -.0071
others	73	.1020	1.0459	.1224	-.1420 To .3461
Total	371	.0082	.9983	.0518	-.0937 To .1101

Group	Minimum	Maximum
low:Brit	-2.9956	3.5860
Switzerl	-3.3720	1.9652
high:Nor	-2.6220	1.4017
others	-3.0062	2.5123
Total	-3.3720	3.5860

Variable OBLICON3 REGR FACTOR SCORE 3 FOR ANALYSIS 2
By Variable NATDYN

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	16.2287	5.4096	5.6297	.0009
Within Groups	367	352.6492	.9609		
Total	370	368.8780			

Group	Count	Mean	Standard Deviation	Standard Error	95 Pct Conf Int for Mean
low:Brit	115	-.2211	.8545	.0797	-.3790 To -.0633
Switzerl	125	.0286	1.0596	.0948	-.1590 To .2162
high:Nor	58	-.0436	.8290	.1089	-.2615 To .1744
others	73	.3778	1.1243	.1316	.1155 To .6402
Total	371	.0086	.9985	.0518	-.0933 To .1106

Group	Minimum	Maximum
low:Brit	-2.1864	2.2104
Switzerl	-2.4093	2.6073
high:Nor	-1.9363	2.2368
others	-1.2110	3.7232
Total	-2.4093	3.7232

(*) Denotes pairs of groups significantly different at the .050 level

Mean	Group	l o w B r i t	h i g h : N o r	S w i t z e r l	o t h e r s
-.2211	low:Brit				
-.0436	high:Nor				

.0286 Switzerl
.3778 others *

This procedure was completed at 23:32:49
t-t groups=language(0,1)/var=equares1 to oblicon3.

Group 1: LANGUAGE EQ 0 Group 2: LANGUAGE EQ 1

t-test for: EQUARES1 REGR FACTOR SCORE 1 FOR ANALYSIS 1

	Number of Cases	Mean	Standard Deviation	Standard Error
Group 1	253	.0175	.797	.050
Group 2	135	-.0327	1.301	.112

		Pooled Variance Estimate			Separate Variance Estimate		
F Value	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.
2.67	.000	.47	386	.638	.41	188.95	.683

Group 1: LANGUAGE EQ 0 Group 2: LANGUAGE EQ 1

t-test for: EQUARES2 REGR FACTOR SCORE 2 FOR ANALYSIS 1

	Number of Cases	Mean	Standard Deviation	Standard Error
Group 1	253	.1152	.968	.061
Group 2	135	-.2158	1.026	.088

		Pooled Variance Estimate			Separate Variance Estimate		
F Value	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.
1.12	.430	3.14	386	.002	3.09	260.27	.002

Group 1: LANGUAGE EQ 0 Group 2: LANGUAGE EQ 1

t-test for: EQUARES3 REGR FACTOR SCORE 3 FOR ANALYSIS 1

	Number of Cases	Mean	Standard Deviation	Standard Error
Group 1	253	-.1111	.997	.063
Group 2	135	.2083	.975	.084

		Pooled Variance Estimate			Separate Variance Estimate		
F Value	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.
1.05	.774	-3.03	386	.003	-3.05	279.20	.003

Group 1: LANGUAGE EQ 0 Group 2: LANGUAGE EQ 1

t-test for: OBLICON1 REGR FACTOR SCORE 1 FOR ANALYSIS 2

	Number of Cases	Mean	Standard Deviation	Standard Error
Group 1	253	-.1985	.937	.059
Group 2	135	.3719	1.011	.087

		Pooled Variance Estimate			Separate Variance Estimate		
F Value	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.
1.16	.304	-5.55	386	.000	-5.43	256.32	.000

Group 1: LANGUAGE EQ 0 Group 2: LANGUAGE EQ 1

t-test for: OBLICON2 REGR FACTOR SCORE 2 FOR ANALYSIS 2

	Number of Cases	Mean	Standard Deviation	Standard Error
Group 1	253	.0056	1.005	.063
Group 2	135	-.0104	.995	.086

		Pooled Variance Estimate			Separate Variance Estimate		
F Value	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.
1.02	.909	.15	386	.881	.15	276.05	.881

Group 1: LANGUAGE EQ 0 Group 2: LANGUAGE EQ 1

t-test for: OBLICON3 REGR FACTOR SCORE 3 FOR ANALYSIS 2

	Number of Cases	Mean	Standard Deviation	Standard Error
Group 1	253	-.0206	.965	.061
Group 2	135	.0387	1.065	.092

		Pooled Variance Estimate			Separate Variance Estimate		
F Value	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.
1.22	.182	-.56	386	.579	-.54	251.40	.590

This procedure was completed at 23:34:31
t-t groups=change2(0,1)/var=equares1 to oblicon3.

Group 1: CHANGE2 EQ .00 Group 2: CHANGE2 EQ 1.00

t-test for: EQUARES1 REGR FACTOR SCORE 1 FOR ANALYSIS 1

	Number of Cases	Mean	Standard Deviation	Standard Error
Group 1	53	.1625	.612	.084
Group 2	95	-.0770	1.032	.106

		Pooled Variance Estimate			Separate Variance Estimate		
F Value	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.
2.84	.000	1.54	146	.125	1.77	145.40	.079

Group 1: CHANGE2 EQ .00 Group 2: CHANGE2 EQ 1.00

t-test for: EQUARES2 REGR FACTOR SCORE 2 FOR ANALYSIS 1

	Number of Cases	Mean	Standard Deviation	Standard Error

	Number of Cases	Mean	Standard Deviation	Standard Error
Group 1	53	.3382	.901	.124
Group 2	95	.0503	.914	.094

F Value	2-Tail Prob.	Pooled Variance Estimate t Value	Degrees of Freedom	2-Tail Prob.	Separate Variance Estimate t Value	Degrees of Freedom	2-Tail Prob.
1.03	.929	1.85	146	.067	1.85	108.93	.066

Group 1: CHANGE2 EQ .00 Group 2: CHANGE2 EQ 1.00

t-test for: EQUARES3 REGR FACTOR SCORE 3 FOR ANALYSIS 1

	Number of Cases	Mean	Standard Deviation	Standard Error
Group 1	53	.0998	1.021	.140
Group 2	95	.0614	.971	.100

F Value	2-Tail Prob.	Pooled Variance Estimate t Value	Degrees of Freedom	2-Tail Prob.	Separate Variance Estimate t Value	Degrees of Freedom	2-Tail Prob.
1.10	.666	.23	146	.821	.22	103.22	.823

Group 1: CHANGE2 EQ .00 Group 2: CHANGE2 EQ 1.00

t-test for: OBLICON1 REGR FACTOR SCORE 1 FOR ANALYSIS 2

	Number of Cases	Mean	Standard Deviation	Standard Error
Group 1	53	-.0219	.874	.120
Group 2	95	-.1255	.988	.101

F Value	2-Tail Prob.	Pooled Variance Estimate t Value	Degrees of Freedom	2-Tail Prob.	Separate Variance Estimate t Value	Degrees of Freedom	2-Tail Prob.
1.28	.335	.64	146	.526	.66	119.09	.511

Group 1: CHANGE2 EQ .00 Group 2: CHANGE2 EQ 1.00

t-test for: OBLICON2 REGR FACTOR SCORE 2 FOR ANALYSIS 2

	Number of Cases	Mean	Standard Deviation	Standard Error
Group 1	53	.0793	.821	.113
Group 2	95	.1043	1.018	.104

F Value	2-Tail Prob.	Pooled Variance Estimate t Value	Degrees of Freedom	2-Tail Prob.	Separate Variance Estimate t Value	Degrees of Freedom	2-Tail Prob.
1.54	.090	-.15	146	.879	-.16	127.61	.871

Group 1: CHANGE2 EQ .00 Group 2: CHANGE2 EQ 1.00

t-test for: OBLICON3 REGR FACTOR SCORE 3 FOR ANALYSIS 2

	Number of Cases	Mean	Standard Deviation	Standard Error
Group 1	53	-.2330	.956	.131

Group 2	95	.0592	.933	.096

		Pooled Variance Estimate			Separate Variance Estimate		
F Value	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.	t Value	Degrees of Freedom	2-Tail Prob.
1.05	.826	-1.81	146	.072	-1.80	105.51	.075

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St. Gallen 24.8.88

Interviews zum Begleit-Projekt Raiffeisen EDV-RKRZ

Im Rahmen einer Dissertation zum Thema 'EDV-Einführung' schreibe ich die Geschichte der EDV beim Schweizer Verband der Raiffeisenkassen. Dabei interessiert besonders, wie eines der letzten Projekte, die RKRZ-Lösung, entstanden ist. Die Geschichte dieses Projekts will ich aus den verschiedenen Sichtweisen der beteiligten Personen rekonstruieren.

Ich schätze Ihre Bereitschaft fuer ein Interview.

Das Interview soll in zwei Phasen ablaufen:

a) in einer ersten Phase erzählen Sie mir die Geschichte der EDV und der RKRZ-Lösung in freier Rede. Ich werde dabei einige Notizen machen.

b) in einer zweiten Phase werde ich gewisse Punkte aufnehmen und nachfragen, wo weitere Erläuterungen nötig sind.

Falls es Ihnen nichts ausmacht, nehme ich das Gespräch auf Tonband auf, was Bearbeitung Ihrer Angaben später sehr erleichtert.

In den frühen 80er Jahren hat der Raiffeisenverband beschlossen, für die regionalen Kassen ein zentrales Rechenzentrum als Dienstleistung bereitszustellen. Eine Reihe von Ereignissen, Problemen und Problemlösungen hat inzwischen dahin geführt, wo das RKRZ heute steht. 'Und meistens kommt es anders als man denkt': dieses Leitmotiv verweist auf die verbreitete Erfahrung, dass wie auch immer die Planung erfolgt, das Endergebnis eines Projekts entspricht selten dem urspruenglichen Plan. Welches sind nun die Ereignisse, die bestimmen, was in einem Projekt am Ende herauskommt?

Bitte erläutern Sie mir aus Ihrer Sicht den Stand der Dinge beim Verband der Raiffeisenkassen und wie es dazu kam. Als Gedächtnisstütze habe ich hier ein grobes Raster der Ereignisse seit 1983.

Case | Project

Class of events | System:

Source of info: | Date:

When ?

Who ? (actors)

What ? (details of the events, activties)

Why ? (accounts, intentions, reasons, situation)

Comments (hypotheses, relations, interpretations)

MB 6/88

Appendix 11: Methodology

Coding sheet: content analysis 'organizational self-monitoring'

I: Source of data — single per document

- date
- type of souce
  - 1 interview
  - 2 periodical document
  - 3 single internal document
  - 4 single external document

II. Level and span of information processing — two per document

author	who to/about whom ?	receiver
1	board	1
2	steering commitee (Department)	2
3	task force (RKRZ)	3
4	individuals	4
5	users	5
6	computer supplier (external)	6

III: Action step — multiple per document/single per unit

- 10-13 strategy
- 20-22 hardware infrastructure
- 30-33 application Paper
- 40-43 application PC

IV. Information processing

- functions
  - 51 orientation (external) — single per unit
  - 2 self-monitoring (internal)
  - 3 goal-setting, decision and communication
  - 4 planning
  - 5 execution, concrete activities
  - 6 control, alteration
  - 7 stopping, interruption
  - 8 evaluation, storing (long term)
  - 9 consumption (long term)
- issues
  - 61 hardware — single per unit
  - 2 software
  - 3 training, skill, competence, support
  - 4 organization RKRZ, project timing, leadership, linkage, errors
  - 5 organization branches, security, transfer
  - 6 information/participation
  - 7 financial, costs
  - 8 personal motives
  - 9 other issues

V. Self-monitoring

- location 71
  - hardware — single per unit
  - 2 software
  - 3 training, skill, competence, support
  - 4 organization RKRZ, project timing, leadership, linkage, errors
  - 5 organization branches, security, transfer
  - 6 information/participation
  - 7 financial, costs
  - 8 personal self-monitoring (anger, anxiety etc.)
- function
  - 81 data input — single per unit
  - 2 data processing/organisation
  - 3 data output
- context
  - 91 social conflict — single per unit
  - 2 technical interruption
  - 3 user reactions
  - 4 uncertainty, lack of clarity
  - 5 other problems
  - 6 resistance, delay, acceptance
  - meta use of metaphor
  - ideo general statements, ideology

Appendix 13

The questionnaire used in the Raiffeisen survey of November 1985

(English translation of the questionnaire issued in German, French and Italian)

1. Are you completely satisfied with the offer of central service as it is ? yes/no

2. According to your opinion, where are improvements necessary ?

Rank the following points according to their importance for you:

training, work instructions
personal support, counsalling
more information for branches
more information for the bank clients
more assessments and statisistics
less errors in the data entry
additional texts on data entry forms
lower costs
less paper output
extension of services (mortgages etc.)

3. What prevents you from buying your own computer system ?
Rank the following points according to their importance for you:

too expensive
not enough space
responsibility for data and analysis
to many uncertainties
to complex and intransparent

4. what could be your motives to look for a new solution ?
Rank the following points according to their importance for you:

less costly data processing
faster data processing
simpler data processing
more information for clients
extended range of services

5. Can you imagine to work at a VDT unit ? yes/no

6. Would you be willing to input your data yourself, e.g. at a VDT unit ?

no / yes,if less costly / yes, if faster

7. Are you principally willing to invest money to optain your formulated goals ?

no
yes, up to SFr 5000.--
yes, up to 10000.--
yes, up to 15000.--
yes, over 15000.--

8. How long are you willing to wait for a new solution for the central service ?

not at all
up to 1 year
up to 1.5 ys
up to 2 ys
more than 2 ys

9. Would you volunteer as a 'test pilot' for the new solution ?
yes/no

10. complementary infirmations (optional)

no
name of the bank
balance sheet
place and data
signature

11. Further remarks and wishes with reference to that business

Thanks

Secondary analysis of the 1985 opinion survey

The variables

```
get file 'raifbank.dat'.

select if (no le 303).
compute market=memb/inhabit.
compute langue=language.
recode langue (3=2).
recode langue (1=0) (2=1).
value label langue 0 'German' 1 'Ital/Romand'.

recode satis (1=0) (2=1).
missing value satis ().
value labels satis 1 'yes' 0 'no'.

recode pati (5=1) (4=2) (2=4) (1=5).
value labels pati 1 'over 2 yrs' 5 'none'.

recode input (3=2).
recode accept input (missing=2).
recode pilot (missing=1).

compute akzept=accept+input+invest+proj+pilot.
compute akz=akzept.
recode akz (5 thru 7=1) (8 thru 10=sysmis) (11 thru high=2).
value lables akz 1 'low' 2 'high'.


fre var=langue market age balan/for=not/hist=non/stat=def median.
```

LANGUE

COUNT	VALUE
155	.00
148	1.00

```
I.........I.........I.........I.........I.........I
0         40        80        120       160       200
          Histogram frequency
```

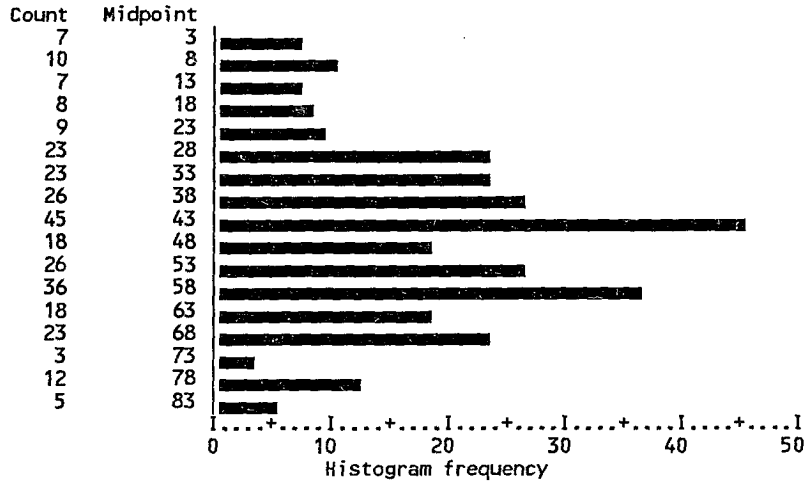
MARKET

Count	Midpoint
0	-.05
10	.00
37	.05
32	.10
35	.15
45	.20
49	.25
38	.30
20	.35
10	.40
9	.45
3	.50
5	.55
3	.60
2	.65
1	.70
0	.75

```
I....+....I....+....I....+....I....+....I....+....I
0         10        20        30        40        50
          Histogram frequency
```

Mean	.220	Median	.211	Std dev	.134
Minimum	.004	Maximum	.693		

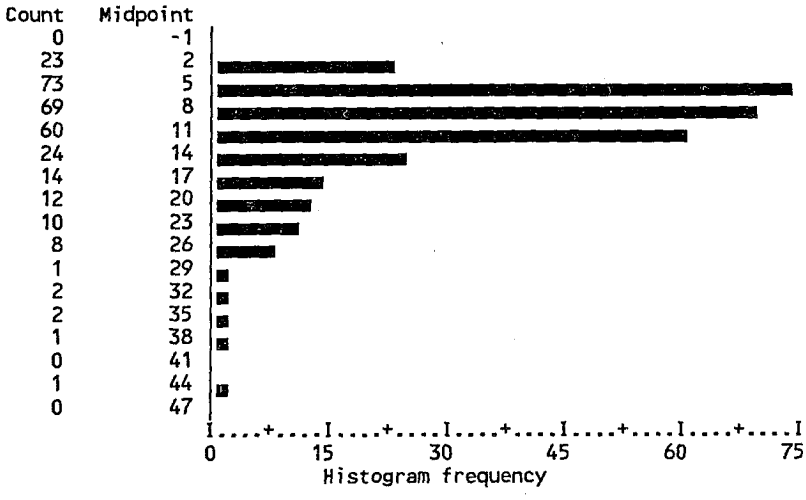
AGE age of the site



Mean	44.977	Median	45.000	Std dev	18.672
Minimum	2.000	Maximum	85.000		

Valid cases 299 Missing cases 4

BALAN balance sheet 1985 in mio SFR



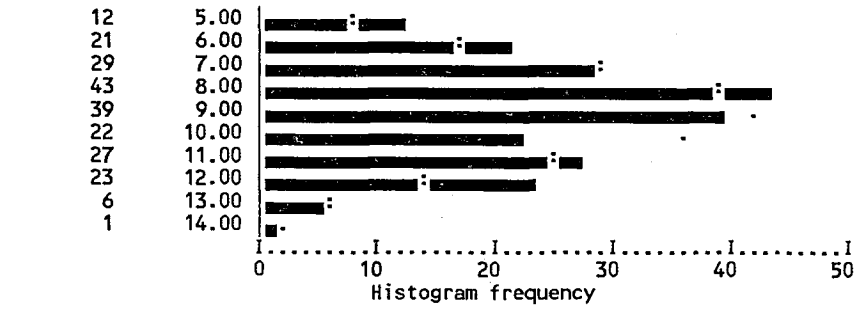
Mean	10.336	Median	8.950	Std dev	6.769
Minimum	.830	Maximum	44.500		

Valid cases 300 Missing cases 3

AKZEPT

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	5.00	12	4.0	5.4	5.4
	6.00	21	6.9	9.4	14.8
	7.00	29	9.6	13.0	27.8
	8.00	43	14.2	19.3	47.1
	9.00	39	12.9	17.5	64.6
	10.00	22	7.3	9.9	74.4
	11.00	27	8.9	12.1	86.5
	12.00	23	7.6	10.3	96.9
	13.00	6	2.0	2.7	99.6
	14.00	1	.3	.4	100.0
	.	80	26.4	Missing	
	Total	303	100.0	100.0	

AKZEPT



Mean	8.830	Median	9.000	Std dev	2.113
Skewness	.128	Minimum	5.000	Maximum	14.000
Valid cases	223	Missing cases	80		

Component variables of akzept

ACCEPT acceptance of vdt work

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
no	1	42	13.9	13.9	13.9
yes	2	261	86.1	86.1	100.0
	Total	303	100.0	100.0	

INPUT own data input

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
no	1	58	19.1	19.1	19.1
yes,if lower costs	2	245	80.9	80.9	100.0
	Total	303	100.0	100.0	

INVEST prepared to invest

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
none	1	69	22.8	30.9	30.9
upto 5000 SFR	2	58	19.1	26.0	57.0
upto 10000 SFR	3	32	10.6	14.3	71.3
upto 15000 SFR	4	21	6.9	9.4	80.7
more	5	43	14.2	19.3	100.0
no answer	0	80	26.4	Missing	

Total	303	100.0	100.0	

PROJ own system project

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
not mentioned	1	243	80.2	80.2	80.2
evaluating/decided	2	46	15.2	15.2	95.4
already realised	3	14	4.6	4.6	100.0
Total		303	100.0	100.0	

PILOT prepared to be a pilot

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
no	1	191	63.0	63.0	63.0
yes	2	112	37.0	37.0	100.0
Total		303	100.0	100.0	

SATIS general satisfaction with central servic

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
no	0	125	41.3	41.3	41.3
yes	1	178	58.7	58.7	100.0
Total		303	100.0	100.0	

PATI patience to wait

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
over 2 yrs	1	69	22.8	29.4	29.4
	2	54	17.8	23.0	52.3
	3	24	7.9	10.2	62.6
	4	53	17.5	22.6	85.1
none	5	35	11.6	14.9	100.0
	0	68	22.4	Missing	
Total		303	100.0	100.0	

```
corr accept input invest proj pilot satis pati with akzept/opt=2.

Correlations:  AKZEPT

  ACCEPT       .4366**
  INPUT        .5837**
  INVEST       .8951**
  PROJ         .4596**
  PILOT        .4006**
  SATIS       -.1498
  PATI         .1291

Minimum pairwise N of cases:   200          1-tailed Signif:  * - .01  ** - .001


corr market balan age langue with akzept/opt=2.

Correlations:  AKZEPT

  MARKET      -.1938*
  BALAN        .3265**
  AGE          .1930*
  LANGUE       .0585

Minimum pairwise N of cases:   221          1-tailed Signif:  * - .01  ** - .001
```

```
corr accept input invest proj pilot satis pati/opt=2.

Correlations:  ACCEPT     INPUT      INVEST     PROJ       PILOT      SATIS

  ACCEPT       1.0000     .3875**    .1924*     .0773      .2082**   -.1033
  INPUT         .3875**  1.0000      .3607**    .1939**    .1119     -.1692*
  INVEST        .1924*    .3607**   1.0000      .2940**    .1316     -.0723
  PROJ          .0773     .1939**    .2940**   1.0000     -.0825     -.1461*
  PILOT         .2082**   .1119      .1316     -.0825     1.0000     -.0944
  SATIS        -.1033    -.1692*    -.0723     -.1461*    -.0944     1.0000
  PATI          .1150     .0305      .0909      .2076**    .0793     -.1421

Correlations:  PATI

  ACCEPT        .1150
  INPUT         .0305
  INVEST        .0909
  PROJ          .2076**
  PILOT         .0793
  SATIS        -.1421
  PATI         1.0000

Minimum pairwise N of cases:  200          1-tailed Signif:  * - .01  ** - .001


regression var=balan age market langue akzept
 /stat=def zpp
 /dep=akzept/met=enter/des=def sig n/missing=pairwise.

        * * * *  M U L T I P L E   R E G R E S S I O N  * * * *

Pairwise Deletion of Missing Data

             Mean   Std Dev   Cases  Label

BALAN      10.336     6.769     300  balance sheet 1985 in mio SFR
AGE        44.977    18.672     299  age of the site
MARKET       .220      .134     299
LANGUE       .488      .501     303
AKZEPT      8.830     2.113     223

Minimum Pairwise N of Cases =  221


Correlation, 1-tailed Sig, N of Cases:

              BALAN        AGE       MARKET     LANGUE     AKZEPT

BALAN         1.000        .268      -.056      -.002       .326
                .          .000       .168       .488       .000
              300          299        299        300        221

AGE            .268       1.000       .182      -.024       .193
               .000          .        .001       .338       .002
               299         299        299        299        221

MARKET        -.056        .182      1.000      -.087      -.194
               .168        .001         .        .067       .002
               299         299        299        299        221

LANGUE        -.002       -.024      -.087      1.000       .058
               .488        .338       .067         .        .192
               300         299        299        303        223

AKZEPT         .326        .193      -.194       .058      1.000
               .000        .002       .002       .192         .
               221         221        221        223        223
```

Equation Number 1 Dependent Variable.. AKZEPT

Block Number 1. Method: Enter

Variable(s) Entered on Step Number
1.. LANGUE
2.. BALAN balance sheet 1985 in mio SFR
3.. MARKET
4.. AGE age of the site

Equation Number 1 Dependent Variable.. AKZEPT

Multiple R	.40205
R Square	.16165
Adjusted R Square	.14612
Standard Error	1.95287

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	4	158.83352	39.70838
Residual	216	823.75849	3.81370

F = 10.41204 Signif F = .0000

---------- Variables in the Equation ----------

Variable	B	SE B	Beta	Correl	Part Cor	Partial
LANGUE	.190106	.263975	.045039	.058464	.044866	.048942
BALAN	.085192	.020312	.272883	.326477	.261296	.274422
MARKET	-3.209451	1.009066	-.203477	-.193846	-.198152	-.211517
AGE	.017880	.007478	.157970	.192954	.148963	.160581
(Constant)	7.758482	.425915				

---------- in ----------

Variable	T	Sig T
LANGUE	.720	.4722
BALAN	4.194	.0000
MARKET	-3.181	.0017
AGE	2.391	.0177
(Constant)	18.216	.0000

Documented resistance

An early self-monitoring document

1. In an early exploration of computing needs of the central bank, **'highest levels of scepticisms'** are expected from staff about the changing conditions of work (doc 120, 28.7.1983).

Minutes from two workshops with local banks

2. At the beginning of the project 17 local bankers were invited to participate in a number of workshops and to discuss the project at an early stage. The criteria according to which bankers were selected are unclear. This was even the matter of a question by one of the banker. In that context one of the participants pointed to a 'problem' of Raiffeisen. He envisages considerable delays in the project due to Raiffeisen culture, which he sees as a disadvantage: the principle of **'autonomy'**, which means that **'contrary to the situation in big banks, at Raiffeisen people talk to each other and negociate. This will lead to considerable problems with the timing'** (o1, 9 May, 1985).
3. At a second workshop local bankers reacted to the proposal of the central bank for a new information processing concept at Raiffeisen, which envisaged a cooperation to do the data processing, which was legally independent from the central bank. One member objected. He would agree only to **'an improvement of central services on the present basis'** (o2, 17 May, 1985)

4. The manager of task force summarizes the mood of some participants: **'why automizing, if one can do it manually'** (o2, 17 May, 1985).

5. Another participant has doubts that local banks will buy the new service because of the organisational culture: **'federalist thinking will prevent many banks from using these modern services'** (o2, 17 May, 1985)

6. Another participant sees no reason why Raiffeisen should compete with big banks in matters of computing: **'We do not need to match big banks in computing. The human being is in the centre, which is the strength of the Raiffeisen movement'** (o2, 17 May, 1985).

7. Another participant asks alarmed and with implicit disagreement: **'Does Raiffeisen move into a centralist direction like the big banks?'** (o2, 17 May, 1985).

8. Another participant fears centralistic tendencies and interference in the details of running the local banks giving an example: **'forms of services could be inhibited by the central bank, even if they were locally required'** (o2, 17 May, 1985).

9. Another participant opposes the particular point of the seeting of a legally separate cooperation for the data processing (o2, 17 May, 1985).

10. Another participant opposes the anticipated centralization that seem to be implied by the computing project (o2, 17 May, 1985).

11. Another participant would only continue the discussion, if the costs of the project are within the budget of local banks: **'the computer must not become a financial burden'** (o2, 17 May, 1985).

12. Another participant does not want central pressure on local banks: **'local banks must be forced into a solution'** (o2, 17 May, 1985).

Report of the evaluation of computer suppliers

13. The slow diffusion of computing at Raiffeisen is noticed: '2/3 of all local banks do not have access to computer data processing' (131, August 1985).

14. The lag in computer access is explained with the cost arising form computer data processing (131, August 1985)

15. It is assumed that in high street banks on average of 0.1% of the yearly balance sheet goes on computing. A lag of Raiffeisen is diagnosed. This target figure will not be reached by Raiffeisen until a few year to come, albeit significant increases in computer budget is anticipated for the near future (131, August 1985).

16. Only 16% of Raiffeisen local banks have stand alone computer solutions. A lag is diagnosed. A 1000 local banks are behind the development with regards to data processing (131, August 1985).

17. The low degree of automation of Raiffeisen is recognized (131, August 1985).

18. Financial reasons explain the low degree of automation (131, August 1985).

19. Personnel reasons explain the low degree of automation. It is not specified what is meant at that point. But the reference in the interview suggests that the level of education and negative attitudes of some local bankers are meant (131, August 1985).

20. Organisational reasons, like short opening hours, explain the low degree of automation (131, August 1985).

21. A different computing system will bring changes in the local organisation. The level of training and the quality of local work will aggravate these problems (131, August 1985).

22. Measures have to be planned to 'take people's fear of the computer'. This is seen as basically an problem of training (131, August, 1985).

Proposal to the Board

23. It is mentioned that not all local bankers are prepared to work on a VDT (133, October, 1986).

24. It is mentioned that even less local bankers are prepared to do their own data entry (133, October, 1986).

25. It is mentioned that only half of the local banks are prepared to invest in computing (133, October, 1986).

26. It is mentioned that **'political criteria like the variable reactions of local bankers are not included in the evaluation of the computer solution'**. It is anticipated that different solution mobilize different resistance among the local banks (133, October, 1986).

Project reports

27. In a project report **'problems with the user acceptance'** are anticipated in a warning manner, because adequate user participation has not been undertaken, and work has to proceed under **'extreme time pressure'** (86, 17 August, 1989).

Orientation of the Board of directors

28. 'massive delays in the project progress' are reported due to lack of manpower and system technical problems. This is not a strictly resistance remark, but is refers to the reasons of the delay in the project (12, 7 December 1990).

Widerstand gegen Veränderung
Eine funktionale Analyse von Benutzerreaktionen auf technische Neuerungen in einer Schweizer Bank

Stichworte

Widerstand gegen Veränderung, selbst-aktive Systeme, selbstüberwachende Teilsysteme, funktionale Analyse, Schmerzanalogie, Bankensoftwareprojekt, narrative Interviews, Akzeptanzforschung

Zusammenfassung

Diese These belegt die Signalfunktion und den diagnostischen Wert von Benutzerwiderstand in Rahmen eines Projekt der Softwareentwicklung. Ausgangspunkt bildet die kritische Analyse von weit verbreiteten Vorstellungen, die, wenn nicht gar Widerstand negierend, so doch von einer Negativ- und Defizitvorstellung ausgehen. Diese Vorurteile verhindern, dass die Signalfunktion des Widerstandes wahrgenommen wird. Indizien für diesen Sachverhalt finden sich erstens in der Forschungsliteratur zu den Themen Folgenabschätzung, Einstellungen und Akzeptanz von neuen Technologien, sowohl international als auch in der Schweiz; zweitens in der Tradition Lewin'scher Feldtheorie, die ich als das Paradigma von der "Fütterung der Widerspenstigen", eine Form von Sozialtechnologie mit guter Absicht, rekonstruiere. Drittens weise ich in einer semantischen Studie nach, dass Negativ- und Defizitvorstellungen von Widerstand unter Agenten der Veränderung in der Schweiz, in Grossbritannien und in den USA in der Tat dominieren (n=388).

Die Kritik verpflichtet zur Neukonzeption. Mein Vorschlag beruht auf einer Schmerzanalogie einerseits, und auf der Berner Theorie der Selbstüberwachung in selbst-aktiven Systemen andererseits. Eine Organisation, die neue Technologie einführt, wird als ein selbst-aktives System betrachtet, das seine Aktivitäten mit Hilfe externer und, vorallem, intern generierter Information steuert. Die funktionale Analogie vom Schmerzsystem auf Widerstand in organisationalen Prozessen wird entfaltet. Sie beruht

auf paralleler Informationsverarbeitung, Filterung und Recodierung von Information, auf einer bimodalen Verteilung von Aufmerksamkeit über die Zeit, und auf den Funktionen Aufmerksamkeitfokussierung, Bewertung, Veränderung und Lernen von Handlungen. Die so entfaltete Analogie erlaubt es mir, über 50 Hypothesen zum Widerstand und seine Auswirkungen auf organisationale Prozesse zu formulieren.

Einige diese Hypothesen werden in einer Fallstudie in einer Schweizer Bank getestet. Die Computerisiserung in der Zeit von 1983 bis 1991 wird in der Zentralbank und in einer Stichprobe von 24 Filialen rekonstruiert. Dazu verwende ich mehrere Datentypen: zwei Umfragen (1985 n=305; 1991 n= 326), Projektdokumente (n=134), narrative Interviews (n=34), Arbeitsanalysen (n=34), Feldbeobachtungen und Leistungsdaten der Banken (n=24). Ich entwickle eine Methode, die es erlaubt die variable Struktur der organisationalen Aufmerksamkeit über die Zeit zu beschreiben. Die Inhaltsanalyse zeigt auf, wann in Relation zur Handlung, wie intensiv, und in welcher Art 'Widerstand' zwischen 1983 und 1991 ein organisationales Thema wird. Die Schmerzanalogie erweist sich in mehrerer Hinsicht als fruchtbar: a) Die Analyse von Widerstand verschiebt sich von Struktur zu Prozess, und von der einer abhängigen zu der einer unabhängigen Variable; b) der konzeptuelle Fokus verschiebt sich von Motivation zu Kommunikation; c) die Schmerzanalogie erodiert jene a priori Vorstellung, wonach Widerstand eine schlechte Sache ist und ein Defizit des Widerständigen zum Ausdruck bringt; und d) die Signalfunktion von "schlechten Nachrichten" wird aufgezeigt: Widerstand im organisationalen Veränderungsprojekt ist diagnostische Information, die aufzeigt, **wann, wo und weshalb die Dinge schief laufen**.

La résistance au changement
Une analyse fonctionnelle des réponses aux changements technologiques dans une banque suisse

Mots clefs

Résistance au changement, systèmes auto-actifs, réflexivité, analyse fonctionnelle, informatisation bancaire, entretiens narratifs, recherche d'acceptance

Résumé

Cette thèse démontre la fonction signalétique et la valeur diagnostique de la résistance de l'usager dans un projet de développement informatique. Le point de départ consiste en une analyse critique du sens commun des gestionnaires qui nie l'existence même de la résistance, la considère en tant qu'ennui, ou encore la traite comme manifestation d'une carence individuelle ou structurelle. Ces conceptions empêchent les agents de changement d'apprécier la valeur signalétique de la résistance au changement dans les processus organisationnels. Trois sources témoignent de cet état de faits: premièrement, les écrits traitant des conséquences de la technologie informatique et des attitudes envers cette dernière, aussi bien à l'échelle internationale qu'en Suisse. Deuxièmement, la tradition psychologique de la théorie du champ, sorte de "social engineering", qui tente d'imposer la nouveauté dans un contexte qui y est réfractaire, et peut ainsi être reconceptualisée comme un paradigme où l'on "nourrit l'enfant de force", contre son gré. Troisièmement, une étude empirique de la sémantique de la résistance au changement menée auprès de 388 apprentis gestionnaires en Grande-Bretagne, en Suisse, et aux Etats-Unis, et qui démontré la valeur négative associée à la résistance conçue comme déficience.

En contraste, cette thèse propose un concept de la résistance basé, d'une part, sur une analogie avec l'expérience de la douleur physique et, d'autre part, sur la notion de réflexivité dans le cadre des systèmes auto-actifs. Toute organisation qui introduit une

nouvelle technologie constitue un système auto-actif puisqu'il oriente et dynamise l'activité en fonction des intrants internes et externes. L'analogie de l'expérience de la douleur physique par rapport à la résistance au changement me permet de mettre en parallèle nombre de processus communs: le traitement parallèle d'information, le filtrage, le recodage, la distribution temporelle bimodale et la centralisation de l'attention, de même que l'évaluation et le changement d'activité. A l'aide de cette analogie, je suis en mesure de générer plus de 50 hypothèses sur la résistance au changement et ses effets sur les processus organisationnels.

Certaines de ces hypothèses sont testées par une étude empirique au sein d'un groupe bancaire suisse. L'introduction de services informatisés entre 1983 et 1991 est reproduite à la banque centrale et dans 24 succursales. J'utilise pour données deux sondages d'opinion (1985; n=305; 1991 n=326), des documents organisationnels (n=134), des entretiens narratifs (n=34), des analyses de tâches (n=34), des observations sur le terrain, et des données comptables sur le rendement (n=24). J'élabore une méthode pour analyser les structures variables de la communication organisationnelle. L'analyse de son contenu me permet de décrire de quelle façon, à quel moment, et avec quelle intensité la question de la résistance est devenue problématique entre 1983 et 1991. L'analogie de la douleur s'est révélée fructueuse à plusieurs égards: a) en déplaçant le focus des études de résistance vers ses processus plutôt que sa structure; b) en reconsidérant la résistance comme variable explicative plutôt que dépendante; c) en réorientation l'analyse vers la communication plutôt que la motivation; d) en sapant la présomption selon laquelle la résistance est par définition négative; e) en indiquant la valeur diagnostique des "mauvaises nouvelles" dans la communication organisationnelle. Comprise de cette façon, la résistance est information; elle nous dit **où, quand et pourquoi les chose vont mal.**

Curriculum Vitae

Martin Bauer was born the 28 February 1959 in Arbon, Switzerland, a small industrial town on the shore of Lake Constance as 'benjamin' to a family of six. He received primary and secondary education in the Thurgau region and gained Matura type B (with Latin) in 1978, having explored various parts of Europe by hitch-hiking and 'Interrail'. After military service he left the region to study psychology, management, and economic history at the University of Berne. The Swiss Jazz School in Berne offered opportunity to develop and the 'Westend Jazz and Blues Band' to practice the musical mind. Teaching, music, work as a hotel night porter and for the National Bureau for the Prevention of Traffic Accidents added to the means of living. In 1986 he graduated as licentiatus philosophiae with a thesis that was awarded the NCR-Prize. After an intermezzo with NCR Marketing in Switzerland the opportunity arose to do a PhD at the London School of Economics in 1987. He moved to London and has since taught social psychology at King's College, the South Bank University and Imperial College London. The 'Bastard Brass and the Jazz Mongers' have for several years sounded through the Three Tons Bar at LSE. Currently he is Research Fellow at the Science Museum, London, working on Public Understanding of Science and Technology, which includes the comparative analysis of international opinion surveys, and on a content analysis of press coverage of science and technology in post-war Britain. He works as a consultant for the European Community and the Royal Society.