

Change analysis – innovation and evolution

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Introduction

Is information systems development (ISD) an organisationally legitimate and appropriate change measure? This is a fundamental question for information systems (IS) practitioners and researchers. It is one possible question that a change analysis (CA) tries to answer. Before one starts to develop or procure an information system, one needs to be sure that this kind of measure really will solve problems and realise goals. Change analysis is an investigation with the purpose to perform a diagnosis of a current organisational situation and a determination of appropriate change measures. A basic idea of CA is not to take ISD or any other type of change for granted. Determined change measures should be well-founded through an unbiased analysis.

Change analysis was originally developed around 1975 and was at that time an innovation in the area of information systems development and organisational change. The concept of change analysis was originally developed by Göran Goldkuhl, Mats Lundeberg and Anders G Nilsson in the ISAC research group at Stockholm University. This concept was operationalised into the method change analysis/ISAC (Lundeberg et al, 1978; 1981). In the beginnings of the 80'ies the CA concept was brought further by the works of Göran Goldkuhl and Annie Röstlinger. Partially inspired by the ISAC method, we started to develop the change analysis/SIMM method. This method has now evolved over 25 years through research, application and education.

In this paper we will describe the basic idea of CA as it emerged during the 70'ies in the ISAC group and the continual evolution of change analysis/SIMM from the beginning of the 80'ies up until now. During the 80'ies there was a heavy focus on considering change analysis as an organisational problem solving process. Several important description techniques

were developed to support collective problem solving. Much effort was put into structuring the change analysis process encouraging both critical reflection and creativity.

In the early 90'ies the method was influenced by business process thinking. Process oriented notations were developed and included in the method. Important at this stage was the development of a generic business interaction model, called the BAT model (Goldkuhl, 1996). This meant also an introduction of theoretical models to be used as a driver for inquiries. During the late 90'ies this was even sharpened through the introduction of workpractice theory and its generic practice model (Goldkuhl & Röstlinger, 2003).

The structure of the CA/SIMM has evolved over the years. As more and more parts were included, we needed to make the structure more flexible. The method evolved during the 90'ies from a monolithic method structure to a flexible configuration of method components.

CA has during 30 years evolved as a perspective and a method. Some highlights from this evolution will be showed in this paper. It is beyond the scope of this paper to make any comparison with other methods. We will focus on how change analysis originated and how it has evolved since its inception.

Change analysis as choice of change measures

The use of information technology (IT) for improving organisations is today so extensive that we simply tend to take it for granted. However, the use of IT is not the only proper answer to the question "how to improve an organisation". There are other types of change measures. Development of information systems should not be taken for granted as *the* change measure, although it many times is an appropriate type of change.

The concept of change analysis was introduced by Lundeberg, Goldkuhl & Nilsson (1978, 1981) as a way to avoid an un-reflected decision on information systems development. One main ground and experience for this was a large action research project in mid of 70'ies. We participated and tested some of the ISAC methods for early ISD in a project in a large Swedish enterprise. After many problems in this project we eventually found out that the ISD project actually was a pseudo endeavour in order to avoid a basic conflict in the enterprise. After finding out this we first got very upset, but later we were grateful for this experience and the emerging insight: Perform always a change analysis before one starts the development of an IS.

Change analysis is to be seen as a separate activity to investigate some organisational situation in order to arrive at informed choices of action. The decided change measures should be seen as proper ways of resolving problems and obtaining the goals of the organisation. Not any change measure should be taken for granted. The understanding of different problems should guide the search for proper changes. CA should be performed in an unbiased way, which means that CA should be performed without any particular solution bias.

In relation to ISD, change analysis is seen as a separate and preceding step. Change analysis can lead to a decision to develop an information system, but it may also lead to other change measures as well as the decisions of not making any changes at all or even to the decision to close down some part of the enterprise (figure 1). If ISD is chosen as a change measure in CA, there may also be other complementary changes decided upon. This is important since IS should not be seen as a universal solution. There might be other types of problems, which need other appropriate solutions. The result of a change analysis might many times be a “package” of change measures, which complement and support each other.

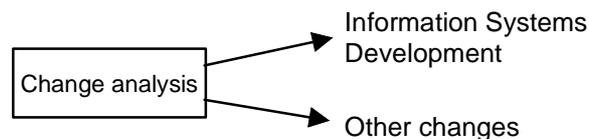


Figure 1. Change analysis as a choice of change measures

Change analysis as organisational problem solving

Research on CA was brought further 1981 in the Human-Infological research group (HUMOR). We started to develop the method Change Analysis/SIMM. This research continued 1990 in the research network VITS (www.vits.org).

One purpose of using CA is to create changes in organisations, i.e. changes which can be implemented as solutions of different problems. Change analysis is therefore a method for problem solving. A CA process starts with vague ideas of problems. During the CA-work the problems are considered in a thorough way to get verified, balanced and structured problem descriptions.

We conceive the process of problem solving as a creative interaction and communication process. A process with different actors involved, ac-

tors with different understandings of the workpractice as well as different understandings of goals and values (Goldkuhl & Röstlinger, 1984; 1988). A well performed problem solving process increases the opportunity to reach excellent solutions. Excellent solutions are measures that really improve the workpractice when they are implemented. According to the intentions of CA involved actors can take part in a joint problem solving process. The participation is supported by use of communication instruments in form of structured documentation (e.g. graphical diagrams). This participation of different actors facilitates the use of the work knowledge of different actors and also makes the problem solving process being transparent, well-founded and balanced. In the method design of CA we have been influenced by general models of problem solving and the phases of preparation, incubation, illumination and verification (Harman & Rheingold, 1984) can be traced in the CA-method.

Problem resolving starts with a problem, i.e. an apprehension that a problematic situation exists. Someone conceives an important difference between the actual and the desired situation, where the deviation is the problem (Dewey, 1938; Schön, 1983). But it is not only one simple problem; we often have to deal with many problems in a complex pattern. We early introduced problem diagrams as a way to handle the need for structuring complex problem situations including various problems (Röstlinger, 1981; Goldkuhl & Röstlinger, 1993). With problem diagrams a problem can be related to other problems in the problematic situation. One problem can have the function of either cause or effect or both cause and effect. A deeper understanding of the different problems and their functions gives prerequisites for finding critical problem causes and in that way getting appropriate solutions of problems. Problem analysis with problem diagrams explicitly emphasise the problem solving dimension of the CA-work.

In order to improve workpractices it is important to reduce problems but not to reduce the strength. In fact it is important to get knowledge of strong points in the organisation. Not to do these strengths away but instead they are essential to keep and improve. Strength diagrams (Röstlinger, 1993) are constructed in the same way as problem diagrams. Different strong points are identified and related in order to find critical causes and effects. By problem analysis and strength analysis the CA-work can focus on both negative and positive aspects related to the organisation and the problematic situation.

To determine if something is a problem or a strength and if a measure is a good or a bad one, it is important to have reference points to compare with. Workpractice goals are such reference points. A goal expresses what is desired. In CA it is therefore important to focus on goals; both to iden-

tify existing goals, explicit as well as implicit goals, and also to modify and develop new goals. In CA we work with goal diagrams as an analysis instrument to relate goals in terms of main goals and sub goals, and to detect conflicts between different goals (Goldkuhl & Röstlinger, 1988). It is important to settle goals for the future workpractice in order to decide on suitable measures.

One important part of the CA-work is to get knowledge of what problems to reduce and what strengths to use. This is called change requirements and is a step forward to the measures. A certain change measure is a concrete way to improve the workpractice, but there can be several different ways of improvement for one change requirement. It is important to have the possibilities to choose between different ways of change actions. Therefore identification and formulation of change requirements are important before the treatment of measures. This part of the CA is summarised in a document called condensed evaluation and is including the most important goals, problems and strengths together with the formulated change requirements.

To formulate change requirements is the final step in the diagnosis phase of the CA process (Goldkuhl & Röstlinger, 2003). A performed diagnosis should lead forward to a decision of what to do if something really needs to be done. A diagnosis giving adequate information about significant aspects of the workpractice is a prerequisite for useable measures that fulfil goals by resolving problems and maintaining and developing strengths.

Change analysis as business process development

Already in 1986, some years before the business process wave started, the first steps in this direction were taken for the CA/SIMM method. Up until then, we had used the Activity graphs from ISAC (Lundeberg et al, 1981) as a method part in CA/SIMM. The working procedure of ISAC A-graphs was a top-down de-compositional approach based on systems theory. During a large industrial project in 1986, a new alternative notation was developed (action diagrams), which replaced A-graphs. Instead of a de-compositional approach, we chose to work mainly “bottom-all”; modelling actions and the flow of information and material (Goldkuhl, 1992). Action diagrams use the basic modelling concepts of action, performer and object.

Action diagrams became very appropriate for a horizontal analysis of business activities; as a kind of workflow analysis that has become a backbone for process oriented approaches. One main trigger for this kind of

process orientation was the seminal paper by Hammer (1990). A focus on horizontal business processes and on customer satisfaction has since then influenced development of organisations and information systems. CA/SIMM emerged during the 90'ies as a method for business process development (Lind, 1996; Röstlinger et al, 1997; Lind & Goldkuhl, 1997; Christiansson, 1998).

The conception of a business process is of course vital for such methods. In many business process approaches there seems to be a bias towards "business processes as transformation of input objects to output objects for customers". This transformation view has been challenged by a coordination view, where the interaction between customers and suppliers is emphasised (Keen, 1997). In CA/SIMM we adopt a combined view, acknowledging business processes as both workflow and interaction (Goldkuhl & Röstlinger, 2003).

A theoretical basis for the business process analysis in CA/SIMM inquiries emerged through the BAT model (Goldkuhl, 1996; Goldkuhl & Lind, 2004). BAT (Business interAction & Transaction framework) describes in different generic models how a customer and a supplier interact with each other. The BAT models describe business interaction in terms of generic business phases where business proposals, commitments, fulfilments and assessments are exchanged between customer and supplier (figure 2). BAT can be used as a template or a reference model when analyzing business processes in a CA. It helps the participants to direct their attention towards important aspects; as e.g. how proposals are made, how customers and suppliers come to agreements through negotiation and contracting, how agreements are fulfilled in delivery and payment processes, how both customers and suppliers get satisfied through a business transaction.

A business process oriented CA is operationalised through different modelling techniques. Action diagrams, mentioned above, play an important role. This notation makes it possible to obtain a very detailed and comprehensive process model of the organisation describing sequences, conditions, alternatives, triggers and other parts of the action logic. The detailed process descriptions in action diagrams can be abstracted and aggregated to process diagrams. These describe sequential sub-processes but also alternative variant processes (Lind & Goldkuhl, 1997). Process diagrams are often structured according to the phase structure of the BAT model. The interaction between customer and supplier is modelled in co-work diagrams (Röstlinger et al, 1997). This notation describes, in an essential way, how customer and supplier create and fulfil business agreements. In these ways CA/SIMM can be used to analyse and (re)design business processes as both interaction and workflow.

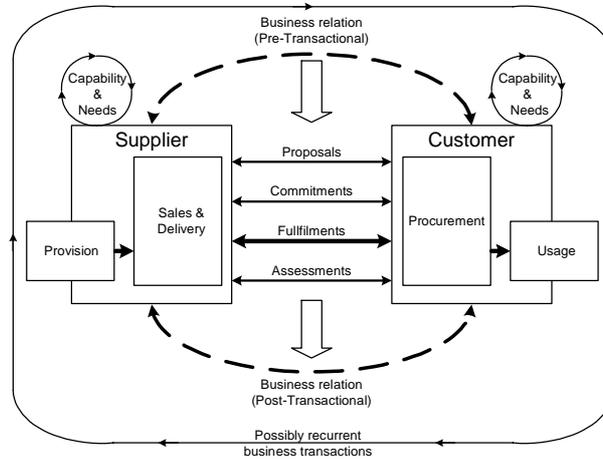


Figure 2. BAT business transaction model (Goldkuhl & Lind, 2004)

Change analysis as practice-theory driven development

Theoretical and methodological development concerning CA/SIMM went on hand in hand. As described above, there was an integral development of the business process notion and supporting modelling techniques. The combined business process view (transformation and coordination) was further developed during the late 90'ies. This combined view was the first step towards a multi-functional view of organisations as practice systems (Goldkuhl et al, 2002). Other important aspects of organisations were added and integrated towards one comprehensive and generic model of workpractices (ibid; Goldkuhl & Röstlinger, 2003).

The generic workpractice model (figure 3) describes a workpractice in terms of actions, actors and action objects as results and preconditions. It acknowledges a workpractice as a transformative practice, i.e. transforming some “raw material” (base) into some product (result) aimed for the clients (“customers”) of the practice. It also acknowledges a workpractice as governed by a horizontal coordination, i.e. some assignments (product order) from the clients or some proxy. These two aspects are covered by the combined business process view as described above. Besides these there are several other aspects that are important for workpractices. There is also a vertical coordination, with assignments from management. Instruments and descriptive and procedural knowledge are utilised in the workpractice. We also acknowledge the normative context consisting of

norms and judgements that govern the workpractice. Financial flows play also essential roles.

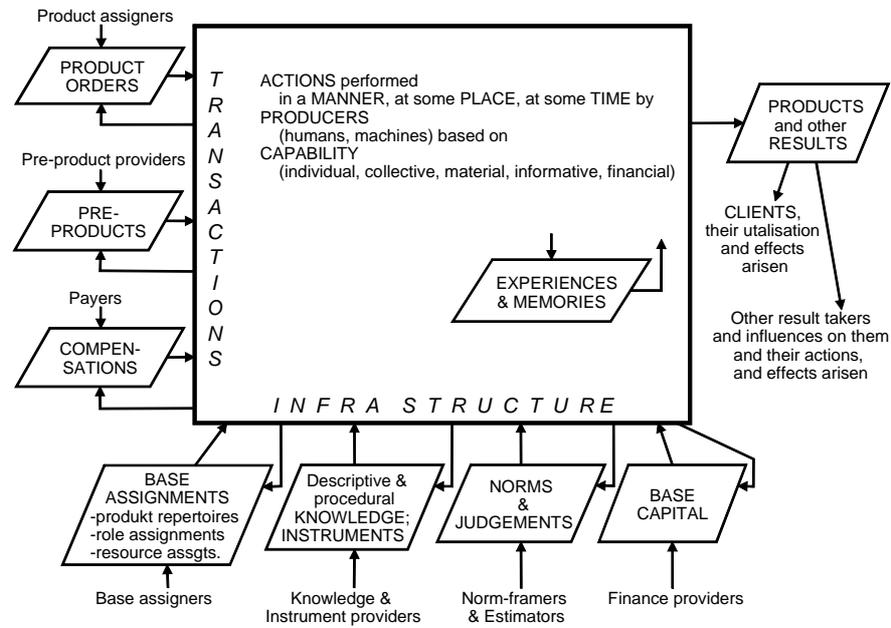


Figure 3. The generic model of workpractices

A workpractice consists of actions performed by human and artificial producers. Such actions, situated in time and place, are carried out according to the institutionalised manner of the workpractice. Actions within a workpractice are based on performers' capabilities that are established and evolving through a continual learning and conscious development.

This workpractice theory affects CA/SIMM in several ways. At a very early stage of a CA process, workpractice definitions are made (ibid). The different categories of the generic workpractice model are used as a template. The workpractice definitions will guide the CA inquirers to focus crucial aspects of the workpractice. To perform a CA/SIMM inquiry has now become not only method-driven but also theory-driven.

The introduction of workpractice theory has made CA more focused. Later parts of CA, as e.g. problem analysis and strength analysis will be governed and informed by the workpractice definitions made. This makes it appropriate to direct attention towards important workpractice characteristics, as e.g. product quality, clarity and reciprocity in assignments, efficiency in transformation, coordination and interoperability between different sub-practices, adequacy and congruence of capabilities, continual

learning, relations and congruencies between different assignments and different norms.

Change analysis as flexible use of method components

The CA method implies prescriptions for use by the CA investigator. The method tells the method user something about what to do and how to do it when investigating workpractices. But also important is when to do it, i.e. in what order shall something be done. The original CA/SIMM had a rather strict sequential order of work steps. The norm was to start with problems then continue with actions/processes and goals and end up with change requirements and change measures. The method structure was fixed and the method was treated as a monolith, i.e. one integrated wholeness with predetermined work steps.

Over the years we have expanded the CA method. Gradually more and more aspects have been incorporated within the method. With many aspects and many types of notations it was no longer so obvious to perform the inquiry by steps taken always in the same order. We also noticed that different actors used CA/SIMM in quite different ways. In 1988 a book on change analysis was published in Swedish (Goldkuhl & Röstlinger, 1988). This book increased the use of CA/SIMM and also the use of CA/SIMM by different actors and in different situations. We always have recommended a situationally adapted use of CA/SIMM. It is important to focus the issue at stake and to put the studied workpractice in the foreground and the method use in the background.

All these things together increased the need for a more open and flexible structure of the CA/SIMM method. But the need for a redesigned method also forced us to direct attention to the method concept. What is a method for workpractices investigation and development? According to our view a method implies prescriptive rules to support actors performing investigations. These rules are based on some perspective and purposes. A method can consist of separate method components. Each component consists at least of procedural rules (what and how to do), notational rules (what and how to document), concepts (what and how to talk and think about a phenomenon/a task/an issue); Röstlinger & Goldkuhl (1994). Confer figure 4.

This clarification of the method concept was important for the way we changed CA/SIMM. The method changed from a monolithic method structure to a more flexible configuration consisting of different method components. The CA/SIMM was now designed as a basic block structure re-

lated in sequence including decision points together with different flexible components (figure 5); cf also Goldkuhl & Röstlinger (2003).

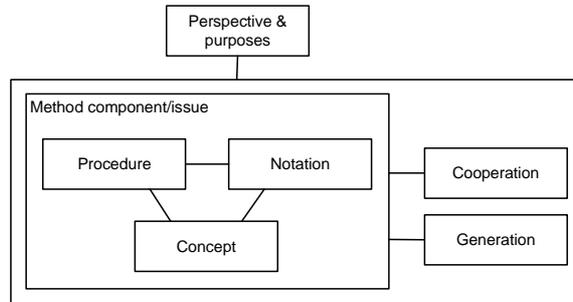


Figure 4. Method concept

The main basic blocks are “workpractice diagnosis” and “study of change measures”. Each block contains of several separate method components. The investigators have the possibility to choose between the different components in order to get the best support in the current inquiry situation. E.g. in the block workpractice diagnosis there are among others the components workpractice definition, inter-practice analysis and processes & action analysis. These components imply different foci on the workpractice and they can partly be used as complement as well as substitute to each other.

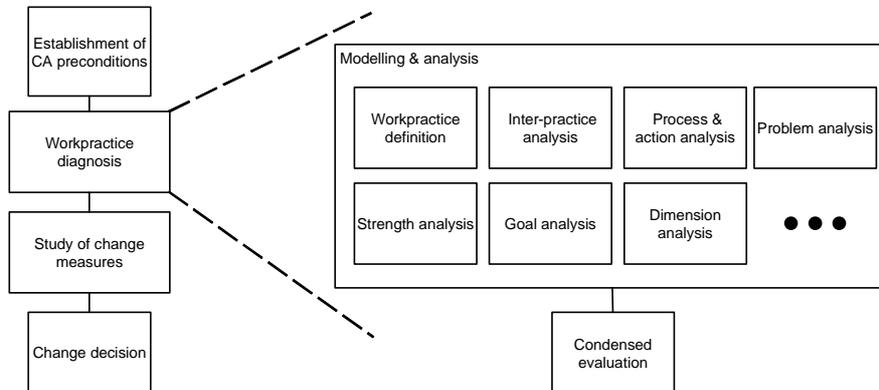


Figure 5. Change analysis method structure

The more flexible structure with basic exchangeable method components gave the CA method a more generic function. CA/SIMM and different generic parts of CA/SIMM can be used by many different actors in a variety

of inquiry situations. Different aspects are differently important in different situations. The purpose is to support an efficient and situationally adapted use of the components. The use of CA/SIMM shall enhance a focused creativity and it shall contribute to a transparent inquiry including both communicative quality and decision rationality (Habermas, 1984; Goldkuhl & Röstlinger, 1984; 1988; Forester, 1999).

Conclusions

The CA/SIMM method has evolved over many years. Through many publications and education at several universities the method has been widely spread and used. It has been used by many practitioners in many real life applications and in many different settings.

The method has also been used and tested by us and several research colleagues in many action research projects. Besides this empirical grounding, we have also performed internal grounding (continual revision of concepts and structure in order to make the method more coherent) and theoretical grounding (relating the method explicitly to different theoretical sources). It is through this kind of combined empirical, internal and theoretical grounding (Goldkuhl, 2004) that the CA/SIMM method has evolved over the years.

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