

BEST project.

Effects of the intervention

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1. Introduction

It is one of the important aims of BEST to evaluate the possible effects of the interventions in the companies. From a methodological and theoretical point of view it is necessary, but often difficult, to distinguish between the *effects* caused by the intervention and other changes happening independently of the intervention. In practice this distinction is difficult to make. All we see are changes over time. To what degree are these changes due to the intervention? That is the issue of causal inference.

In intervention research there are two main ways of studying effects of interventions. 1. The randomised, controlled trial. 2. Case studies of causal chains.

2. The randomised, controlled trial

In the randomised, controlled trial (RCT) the problem of establishing the causal relationship between intervention and effect is solved by applying a very strict design. This design is now more than 100 years old and has been of tremendous importance not only in medicine but also in many other fields of research (sociology, psychology, biology, physiology, etc). The whole trick is that the control group serves as a “stand in” for the intervention group. It is assumed that the intervention group would have experienced the development of the control group without the intervention. The effect is the difference between the change in the intervention group and the change in the control group. *In principle*, this design is very strong and solves most of the problems related to causal inferences.

The problems arise when we want to use the RCT *in practice* at the worksites: People do not accept randomisation, we cannot find enough units, we do not control the intervention, etc. etc. This means that we have to find other solutions. In particular, it should be noticed that the RCT is based on the principle of “large numbers”. This means that differences at baseline between the control group and the intervention group are seen as random. In occupational studies the unit of intervention is often not the individual but the *company* or the *department*. It is often seen that studies include 2-3 intervention sites and 2-3 control worksites. People seem to believe that this is in accordance with the principles of the RCT, but that is in fact not the case. It takes dozens of worksites in each group to do a meaningful randomisation! Otherwise numbers are not large enough.

Another problem in connection with the RCT is that the steps in the causal chain are often neglected. If a certain treatment results in lower mortality, disease rate, absence rate, or exclusion from the labour market, the next question is “Why?” The RCT does not *necessarily* answer this. The model may be a black box model.

3. Case studies of causal chains

An alternative to using the RCT is to study *all steps in the causal chain(s)*. An example will illustrate the point. Some years ago in the US the incidence of Cardiovascular Diseases (CVD) started to

go down. The question was “Why?” Was this due to changing life style, better treatment or unknown causes? The researchers started to study causal chains. They could establish that clear trends were seen with regard to *knowledge* about cardiovascular risk factors and also with regard to behaviour (diet, smoking, and hypertension). All of these risk factors had started to develop in the beneficial directions at about the same time as the decline of CVD. The researchers could also study the developments in *subgroups* based on age, gender, race, and socio-economic status. All of these analyses confirmed the role of the lifestyle factors in the decline of CVD. On the basis of observational research of the Framingham type it was possible to construct *risk functions* and to make predictions about the development of the national CVD rates. These risk function estimates fitted quite well with the actual developments. Thus, in this case a “national intervention” (without control group!) had taken place: Campaigns about tobacco, diet, and hypertension. Following these campaigns a reduction of tobacco smoking, a reduced consumption of butter, fat milk, cheese, meat, etc, and an increased treatment of hypertension followed. And the anticipated health effect also occurred: The CVD rates went down. No other hypothesis could explain all these data in a satisfactory way. Conclusion: This is – in fact – a causal chain.

This situation is similar to the normal situation in occupational intervention research in several ways: 1. We do not have adequate control groups. 2. We cannot change the exposure directly – but we hope that the interventions in the companies will result in positive changes. 3. We do several things at the same time. 4. Many other – internal and external – factors will influence the work environment during the study period.

In order to study the steps in the causal chain, we need a *theory of change* (or several) – often called *program theory*. Theories of change may very well be developed together with the worksites before the interventions are implemented. By doing this we are able to identify several targets for our research of change and effects.

In BEST we can distinguish between two types of interventions: The *external* and the *internal*. The external is the one in which the BEST researchers participate, while the internal is the one carried out by the companies based on local problems and resources.

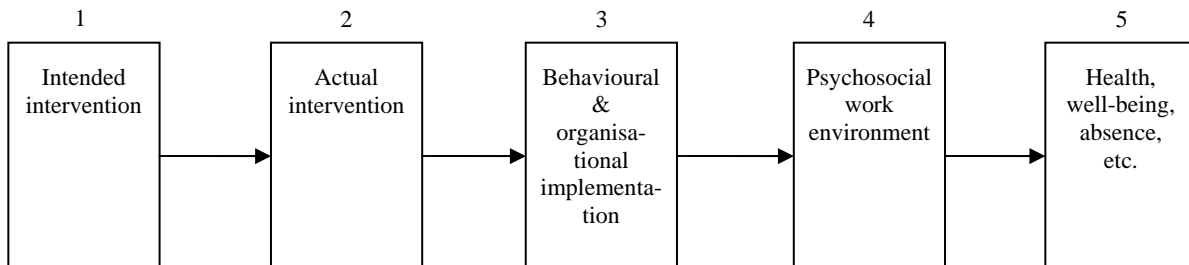
The external intervention consists of the following elements at all BEST companies:

- An agreement with the company about making a high-priority effort to improve the psychosocial work environment
- A standardised survey of the psychosocial work environment
- A subsequent interpretation process ending up in an action plan
- During the process there will be reflexive feedback from the researchers and possibilities for sharing experiences and benchmarking with the other participating companies within the same sector

As indicated above, the intervention is not a standardised and predetermined “package” as is normally the case in the traditional RCT. Therefore it will be necessary for the researchers to study the steps in the intervention process according to the model in figure 1 below. According to this model we operate with the following steps: 1. The intended intervention (including the external as well as the internal). 2. The actual intervention. 3. The behavioural and organisational implementation of the intervention in the company. 4. The psychosocial work environment. 5. Health, well-being, job satisfaction, absence from work, intention-to-quit, etc. (It should be emphasised that the link be-

tween 4 and 5 are not in focus in this study. Rather, it is assumed that improvements in the psychosocial work environment will result in health benefits if the improvements have a sufficient magnitude).

Fig. 1. A model for the causal chain



The causal model has the following steps:

1. *An intervention is decided* in the company, e.g. leadership training in conflict resolution and feedback. The theory is that this will improve the competence of the supervisors and lead to better feedback to the employees and less conflict between employees.
2. *The intervention is implemented*. The supervisors attend a course arranged by external experts in the field. The actual intervention is described with regard to attendance, content, duration, methods, costs, etc.
3. *The behavioural and organisational changes*. The issue here is whether or not the intervention results in changes in the ways in which the supervisors function. Do they give more feedback? Do they act differently in order to solve or prevent conflicts? What do they do or not do? Do they implement any new organisational practices?
4. *The psychosocial work environment*. Do the employees experience changes with respect to social support, feedback and help? Do the employees experience better resolution of conflicts, fewer conflicts or less serious conflicts? In BEST this is assessed in two ways: Qualitatively and quantitatively (through the follow-up survey).
5. *Health, well-being, absence, etc.* The changes in the health-related endpoints will also be assessed. If the employees perceive clear improvements in the psychosocial work environment, it is assumed that health and well-being will improve accordingly.
6. *Sustainability*. Finally, it will be assessed to which degree the established changes are embedded in new behavioural or organisational patterns that are likely to be of a lasting nature. (Not shown in the model).

The above model illustrates a rather simple causal chain. It is, however, rarely so simple especially if we are looking at larger and more significant changes such as new ways of organising the company or a new team organisation.

A further complication is that at the same time as the intervention is taking place, a considerable number of other changes will be initiated by management. They are in principle caused by management goals without relation to the intervention and can encompass smaller and larger changes such as new products and service, structural changes, hiring or firing employees, and changes of management. But these changes will definitely also influence the effects we are interested in measuring.

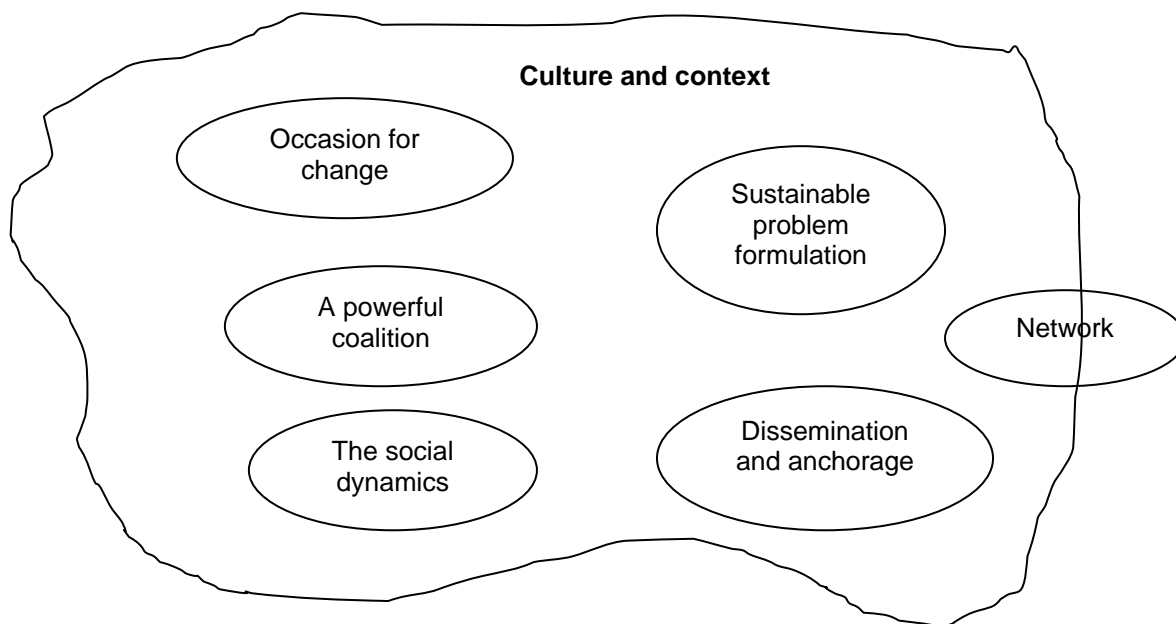
Following the causal chain implies therefore both a study of each step in the chain and a study of the influence from both intervention and management initiated changes. Furthermore, there will be numerous feedback-loops and a number of positive and negative unintended effects of the intervention. It is the challenging task of the project researchers to study these processes during the follow-up period.

4. Studying the causal chain in BEST

4.1. Evaluation of the process

An effective process is necessary to achieve results. If no effect or a negative effect is observed it may not be due to a fault in the theory behind the intervention but to problems in the implementation of the process. It is therefore necessary to evaluate how effectively the process is planned and implemented. The process evaluation will be carried out as qualitative studies. A number of different approaches can be used for such an evaluation. We have selected *the amoebae model*, which was recently developed in a related project. With inspiration from change management theory it describes how actors in the work environment field, who are outside the core activities and the most powerful decision arenas, can manage a potentially successful process.

Figure 2. The amoeba of change



The idea of this model is that change processes, especially if they are initiated by less powerful actors (which is often the case with regard to the work environment), cannot be considered as a linear rational process. It is not possible to prepare and attempt to follow a blue print plan, and it is difficult to predict the outcome. It is therefore important for the actors to work with a number of aspects of the process at the same time and to utilize the possibilities and openings appearing during the process. The central concepts include:

- Occasions for change. Do the actors use or develop the necessary occasions for decisions and activities?

- Sustainable problem formulation. Do the actors develop a valid understanding of the problems in question, which can be used to develop reasonable goals and a theory of change?
- A powerful coalition. Do the actors develop sufficiently strong coalitions to make the necessary decisions and carry out the subsequent changes? Does the coalition include both top management, middle management, professionals, and rank and file employees?
- The social dynamics. Are the social dynamics (involvement, resistance, conflicts, etc.) handled in a way, which is strengthening the intervention?
- Dissemination and anchorage. Are information and results communicated to everyone concerned? Are steps taken to make results sustainable? (Such as changing structures, procedures, physical facilities and others).
- Network. Are external information and resources (including the reflexive interventions of BEST researchers) collected and utilized in a sufficient way?

As can be seen, emphasis will be put on the key person who are formally appointed or turn out to be the primary change agents/facilitators for the intervention.

In addition to the above comprehensive model a more traditional evaluation based on project management will also be included:

- Vision and objectives
- Action plan
- Implementation of the plan
- Evaluation of the outcome
- Corrective measures

Focus will be on the ability to develop a vision for the intervention and the necessary objectives, the preparation of the plan, evaluation of the outcome, and the corrective measures.

4.2 Identification of changes in behaviour or organisation

The process and the implemented changes may seem overlapping and certain process activities in themselves may have direct influence on the effects. An example could be a problem with bullying which may be solved during the dialogues which evolved during the process. However, it is important to distinguish and identify the implemented behavioural and organisational changes. They can, among others, include changes in:

- Work organisation (distribution of tasks and responsibility, team work)
- Structure (division in departments and units, division of management responsibility)
- Meetings and forum (staff meetings, team meetings, management meeting, project meetings)
- Physical facilities (open plan office, room dividers, PC access)
- Communication and information channels (except from meetings also newsletters, intranet, notice boards)
- Personnel policy (appraisal interviews, supervision)
- Competence development (an example of difficulties of differentiation between process and resulting change)

The changes will be identified and recorded during the qualitative studies.

4.3. Relevant changes in the work environment.

The changes in the work environment will be assessed with the “medium size version” of the Copenhagen Psychosocial Questionnaire (COPSOQ). This questionnaire contains 95 questions on 26 different dimensions (scales). 18 of these dimensions describe the psychosocial work environment (5 scales on demands at work, 5 on work organisation and content, and 8 on interpersonal relations and leadership). Before the interventions take place a basic survey of the work environment is performed with the COPSOQ questionnaire. The results will enable the worksites to compare themselves with other worksites and with national average values on all dimensions. On the basis of an internal discussion and the input from the researchers the companies pinpoint one or more dimensions as the primary targets for the interventions.

After approximately 24 months the same questionnaire is filled in by the employees. The “success” criteria of the intervention will be that the desired changes have been achieved on the selected dimensions. If, e.g. the company decides to aim for improvements with regard to “Meaning of work”, “Quality of leadership”, and “Role clarity”, these dimensions will be seen as the primary aims for the intended improvements.

The researchers will also look for other changes. The core dimensions of the psychosocial work environment (seen from the researchers’ point of view) are the following: 1. Quantitative demands. 2. Influence. 3. Social support. 4. Meaning of work. 5. Predictability. The developments on these five dimensions will be assessed independently of the priorities of the worksites.

Finally, the researchers will also look for other changes – positive as well as negative. In practice a change of 5 points or more on any of the COPSOQ scales (going from 0 to 100) will be seen as “significant” (not in the statistical sense but in the practical sense of the word).

4.4. The effects on health and well-being

Changes in health or well-being are not the primary aims of the BEST project. As mentioned above, the basic *assumption* is that if the psychosocial work environment improves to a significant degree, then this will – eventually – lead to improvements in health and well-being. We have not tried to design the study in a way so that these possible health effects will reach statistical significance. Nonetheless, it is of interest to look at changes in health and well-being. For this purpose we will look at the following dimensions in COPSOQ: Job satisfaction, self-rated health, vitality, mental health, behavioural stress, somatic stress, and cognitive stress. Along with the logic of the “causal chain” we will only expect significant changes in health at worksites where positive changes of the psychosocial work environment have taken place.

4.5 The effects on absence and turnover

It is mentioned above that health and well-being are not the primary aims of the BEST project, and this also applies for absence and turnover. These issues are, however, very important and relevant for many companies, and therefore they will be included in the overall picture of the process. In those cases where the work environment has improved as intended it will be interesting to observe possible associations with absence and turnover. It should be kept in mind that these two measures are influenced by many other factors than the workers’ health. Therefore we are going to focus on another – and more sensitive – measure, namely “intention-to-quit”. This measure is a good indicator of satisfaction, involvement and commitment and also a good predictor of actual turnover. The intention-to-quit question will be included in the baseline as well as the follow-up questionnaire.

4.6 Sustainability

It is a general experience that results tend to disappear when focus is removed after a project has been completed. It is therefore necessary to try to estimate the sustainability. It is a difficult exercise as it is an attempt to predict the future. The best solution would be to extend the observation period in order to get more valid data about sustainability. We will in BEST try to find the resources for that exercise but it is also necessary to be ready for the situation in which an extended observation period is not possible.

Since the future sustainability cannot be directly observed, we have to trust indirect measures. They will among others include:

- Embedment of changes in more permanent structures, procedures, and routines such as certain meetings or other forums, items on agendas, assignment of responsibilities, procedures or routines for handling certain issues, routines for employee involvement.
- Key persons' competence to handle changes and the psychosocial work environment evaluated both from interviews and observations of actions in the observation period.
- The level of satisfaction with the implemented changes among lower management and the rank and file. This variable can be studied both qualitatively and quantitatively.

4.7 To distinguish between intervention effects and other effects

The final question returns to the initial discussion: What changes are caused by the intervention, and what changes would have happened anyway? In order to answer this, the researchers will follow the change processes closely during the two years' intervention period. Activities will be observed, and key persons will be interviewed. It should be possible by these means to make a qualified estimate of the influence on changes from the intervention and from other initiatives. If the desired effects on the psychosocial work environment are not achieved it will be important to be able to distinguish between program failure and theory failure. If the desired effects are achieved, it will be just as important to be able to assess the relative significance of the intervention. In this way we will be able to learn from successes as well as failures.