

MEASURING ENTERPRISE PROACTIVENESS IN MANAGING OCCUPATIONAL SAFETY

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ABSTRACT

The aim of this paper is to communicate results, and lessons learned, from developing and applying a national questionnaire based survey for measuring the initiation of occupational safety activities in Danish enterprises and public institutions¹. The survey is cross-sectional and it is part of the general working environment surveillance system in Denmark. The current survey has a response rate of app. 76% (N=6423) at enterprise level. An investigation of the validity of measurements obtained with three different indices has been carried out.

The survey shows that through a 5 year period there has been a statistically significant improvement in the use of work place assessments (WPA) among private enterprises and public institutions. A further result is that the smallest companies obtained the lowest score on the knowledge and proactivity indices, while they obtained the highest score on the safety attitude index.

INTRODUCTION

Our survey is a part of the Danish work environment surveillance system. In general the purpose of work environment surveillance is to reduce actual risk and inform policy development. Surveillance is part of a strategy to support all interested parties through the provision of adequate, relevant and reliable information. This information is made available at many different levels, be it for policy making, administrative, managerial and practical purposes. There is a vast literature that focuses on the need for surveillance of the working environment (for a comprehensive review see Brooke et al., 2006). One major source of impetus in the area was the Third Ministerial Conference on Environment and Health, held in June 1999 in London, which emphasised the need for developing national indicators for occupational health systems (OHS) to support the design and follow-up of the implementation of appropriate national policies. In 2001, following the conference, the Finnish Institute of Occupational Health published a working paper on country profiles and national surveillance indicators in OHS and, in the process, clarified much of the debate and rationale for development of surveillance systems (Rantanen, 2001).

The Danish work environment surveillance system is tightly coupled to politically based initiatives and plans. A new plan, named "Action Programme – 2010" and focusing on health and safety activities, was launched in Denmark early in 2006. The goal is, within a four year period, to take action in relation to four problem areas: work accidents, musculoskeletal disorders, psychosocial working environment, and noise.

¹ The name of the survey is "Surveillance of health and safety activities in enterprises."

The main research objective of our study is to examine the relationships between organizational size, proactivity, working environment knowledge and safety climate attitudes. To test the relationships between these factors, we investigated the validity of measurements obtained with three different indices.

Proactivity

For more than two decades the concept of proactivity has attracted much attention within the area of organizational behaviour and work psychology. In a comprehensive review of the literature on proactive behaviours, Crant (2000) argues that the different approaches reviewed share some resemblances on a theoretical level, and in particular with respect to their application of an action oriented perspective on organizational behaviours.

Bateman and Crant (1993), for example, argue that proactivity is a personal behavioural construct that exhibits a “relatively stable tendency to effect environmental change” (p 103). In similar vein, Frese et al. (1996) talk about proactivity as being characterized by individual initiatives, emerging in the pursuit of a certain goal to bring about changes in work. Frese and Fay (2001) bring this further in proposing that proactivity will have a positive impact on individual as well as organizational performance. Given all this it is to be expected that proactivity will enhance organizational performance, also in terms of the working environment. Proactivity, in a working environment context, can be defined as a continuous organizational process that aims to anticipate, improve and evaluate occupational health and safety practises. While much of the literature focuses on general individual proactivity, our focus is on measuring organizational working environment proactivity.

Work place assessment

In Denmark companies and institutions are obliged by law to carry out a so-called workplace assessment (WPA). The WPA stipulates identification and survey of the working environment in the company or public institution, highlighting the type and range of problems, and a description and evaluation of these problems (Jensen et al. 2003).

Sørensen et al. (2003) have studied the application of the work place assessment, combining data from two Danish national surveys. They found that company size is positively correlated with the quality of occupational health management systems and workplace assessment activities for all enterprises – large enterprises have better management systems of higher quality. These findings are in line with those of other Scandinavian studies (Torp et al., 2006; Saksvik et al. 2003).

Knowledge and attitudes

It could be postulated that knowledge is a prerequisite for acting in an adequate manner in meeting the demands of the working environment. When we talk of knowledge in this sense we mean awareness of and insight into planning, prioritising, and evaluating the use of preventive measures. This way of thinking about working environment knowledge is inspired by discussions related to concepts such as “intangibles”, “intellectual capital”, and “knowledge management” (see e.g., Blair and Wallman, 2003; Boisot, 1998; Bukh et al., 2001 and Demarest, 1997).

Many studies have shown that safety climate attitudes play a central role for a safe working environment (see e.g., Hale, 2000; Guldenmund, 2000; Choudhry et al. 2007).

One important purpose of safety climate is the possibility it provides for the early identification of working environment problems, prior to them becoming actual accidents (Shannon and Norman, 2009). In our case we want to investigate if it is possible to distinguish company size on a safety attitude dimension. Most of the studies that have studied small companies have found that these companies find it very difficult to manage working environment problems and that accidents occur more frequently than in other size categories (for an overview see e.g. Champoux and Brun, 2003).

Research questions

Many questionnaire based studies of the work environment include the identification and evaluation of environmental factors which may affect the workers' health. Our study takes a different point of departure. We want to determine whether it is possible to differentiate companies and institutions on several dimensions. Does organizational size correlate with the ability to comply with work environment regulations and legislation, proactivity, knowledge on occupational safety and health or safety climate attitudes? In this paper we will explore three questions:

- What are the trends in the application of work place assessments?
- Is it possible to differentiate proactive companies or institutions from the less proactive?
- Is it possible to differentiate companies or institutions according to their safety climate and knowledge of occupational health and safety measures?

Note that when we use the term “company” throughout the paper it covers both companies and public institutions.

METHOD

A cross-sectional questionnaire based study was carried out in the period from October to December 2006. Respondents were selected from the Danish national register of companies and public institutions. Data was collected at an organizational level

The sample consists of 9720 companies and public institutions stratified according to employee size and industrial sector. The drop out rate was 1245.

We sampled from all industrial sectors and in three size groups (1-4, 5-19 and 20+). The questionnaire was administered to an employer (or a employer representative) and an employee safety representative in each company.

Data was collected through mail based questionnaires, telephone interviews and internet based questionnaires. Replies were anonymous, the organizations were free to answer and we did not pay any participation fees. The participation rate was 76% (N=6423) when counting companies and institutions with at least one returned questionnaire.

Data is compiled at company level. In approximately 80% of the cases we used data from employer representatives. For the remaining cases we used data from the employees to represent the company. The employer representatives tended to have a slightly (but statistically significant) higher score on the indices than the employees. The difference for the small companies is 1-2 %: For medium sized companies the difference is 1-5%. There is no significant difference for the largest companies. The questionnaire covers six working environment areas:

- Work accidents
- Psychosocial working environment
- Musculoskeletal disorders
- Noise
- Indoor climate
- Chemical exposure

Note that the two last areas are not part of the Danish working environment action programme.

Similar questionnaire studies have been carried out in 2001 and 2004. It is, though, only possible to make direct comparisons between the three studies with respect to items that are related to the legal aspects of the working environment.

Measures

Based on experiences gained in the previous questionnaire studies we constructed 3 indices for this study: a 7-item index for measuring the level of knowledge and awareness of working environment problems within an organization (see Example 1 and 2 in Figure 1), a 4-item index for assessing organizational safety climate attitudes (see Example 3 and 4 in Figure 1), and an 53-item index for measuring specific preventive activities, efforts and solutions (see Example 5 in Figure 1).

Example 1: Have you applied a job satisfaction questionnaire in your company within the last three years?
Yes; No; Do not know.

Example 2: Have you made any assessments of the nature, gravity and scope of the work environment problems identified? Yes; No; Do not know.

Example 3: Work environment health and safety is highly prioritized at the work place? 5-point scale ranging from 1 (“do not agree”) to 5 (“agree”)

Example 4 The typical attitude at the work place is that preferably the working environment should be better than prescribed by regulations? 5-point scale ranging from 1 (“do not agree”) to 5 (“agree”)

Example 5: What have you done to avoid bullying at you work place? We have done nothing; We lack information on the this topic; Prepared a bullying policy; Analyzed bullying as part of the WPA; Established simple guideline with respect to bullying; Further training of managers; Further training of other staff; Other

Figure 1: Examples of items from the different indices

We have used questionnaire filtering techniques on the proactiveness items. This is done to ensure that the items are equally relevant or experienced as equally relevant, for all size companies. For example, if no work tasks in a company require persons to do heavy lifting this question does not have to be answered by that company. We have taken filtering into account in our index calculations.

Cronbachs coefficient alpha was used to estimate internal reliability of the scales. 0,70 or larger was defined as an acceptable reliability score. We have used multi factor analysis to further scrutiny the contribution from each item in an index. In this way we aim at reducing the number of items in the different indices to ensure to measure only on a single underlying factor.

RESULTS

The 2001 and 2004 surveys did not include indices for analysing data on a meta-level. This means that we are not able to show results in terms of trends on a more general level. We have though chosen to present trends on a single parameter, namely the application of the work place assessment in the five year period. In the remaining part of the section we present results on working environment preventive actions, knowledge and safety climate attitudes based on the developed indices. The internal reliability of the indices satisfied the criteria of a Cronbachs coefficient alpha of at least 0,70.

In this paper we have chosen not to present results from applying the industrial sector variable.

Trends in the application of the WPA

Table 1. Companies which in 2001, 2004 and 2006 state that they have undertaken a work place assessment.

	2001	2004	2006	Trend *
Company size	%	%	%	Significance level
1-4 employees	30	53	75	< 0,0001
5-19 employees	67	80	87	< 0,0001
20+ employees	92	94	97	< 0,0001

In Table 1 we show a five year development trend of companies that state they have performed a work place assessment. The results are extracted from the three studies in 2001, 2004 and 2006. The proportion of companies that say they have a work place assessment routine is significantly increased in all three company size categories. A work place assessment is less frequent in the smaller the company in all three surveys.

Proactivity

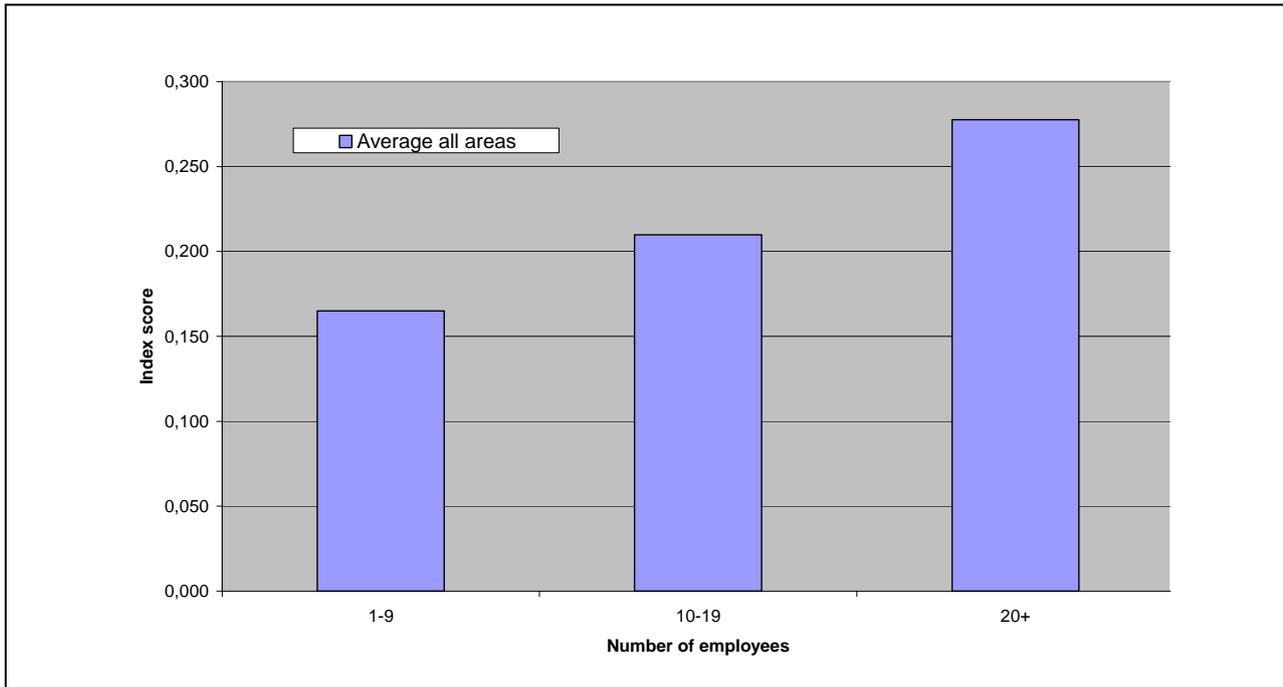


Figure 2: Average proactivity index score showed for all six working environment areas as a whole distributed by company size.. 2006 study.

Companies with more than 20 employees have the highest score on the proactive index (

Figure 2). Companies with less than 10 employees have the lowest score, while the medium sized companies (10-19 employees) have an index score which is in between the two other groups.

As seen in Figure 3, the proactivity score varies according to work environment area and company size. The occupational accident area has the highest score across size of company. At the next level we see the musculoskeletal area, followed by the psychosocial area, indoor climate and noise areas. The score for the chemical area is counted on a single parameter only.

Factor analysis showed that all 53 items had an equal statistically significant contribution to the index.

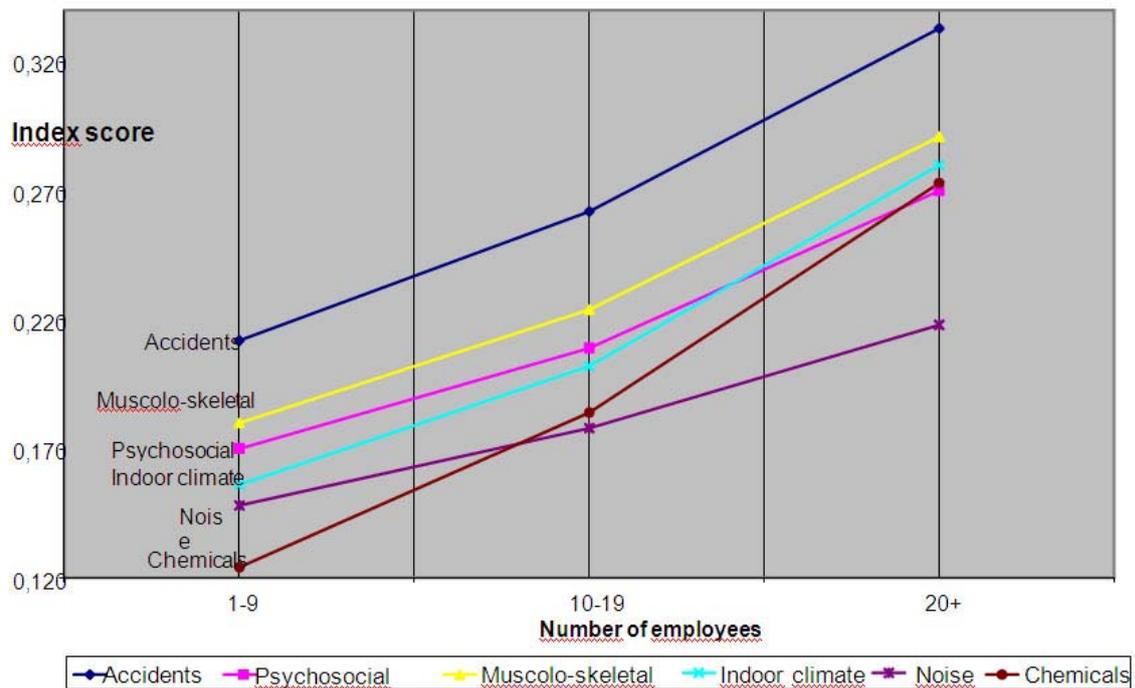


Figure 3: Average proactivity index score showed for the six working environment areas independently distributed by company size. Note that the x-axis does not cross at zero. 2006 study.

3.3 Knowledge and attitudes

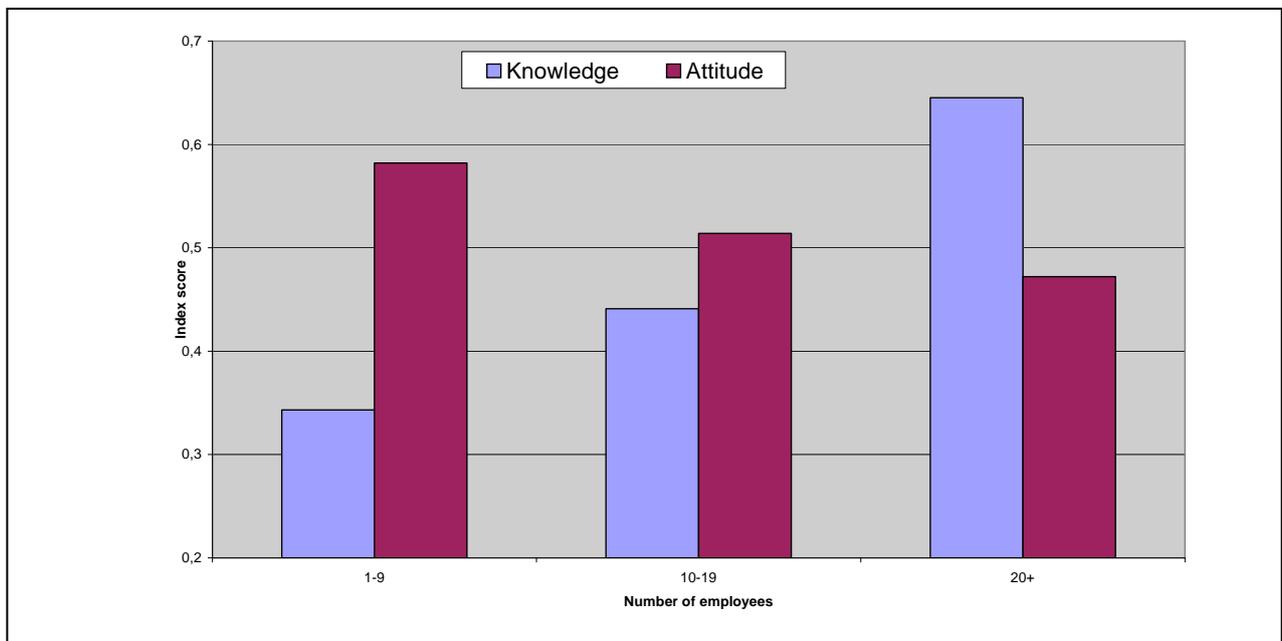


Figure 4 Results from the analysis of knowledge and safety climate attitudes have been coupled in this graph. The graph shows the relation between company size groups and the attitude and knowledge indices. Note that the x-axis does not cross at zero. 2006 study.

As seen in Figure 4, the smallest companies have the lowest score while the largest companies have the highest score, with medium sized companies place in between these. The internal reliability of the index satisfied the criteria of a Cronbachs coefficient alpha of at least 0,70. However factor analysis showed that the strongest contribution came from items related to gathering working environment information internally in the company as well as from externally based sources (4 items). We are still working to refine this index, since the parameters we have included might have a bias that could favour large companies a point which may, perhaps, also apply to medium sized companies.

The attitude index contrary to the other indices shows an inverted pattern where the smallest companies get the highest score - they show the most positive attitude towards working environment safety (Figure 4). The medium sized companies are slightly less positive, while the largest companies are the least positive.

Factor analysis showed that the statistically significant contribution to the index came from 2 out of the 4 items (Example 3 and 4 in Figure 1).

DISCUSSION

In a five year period there has been a significant improvement in the application of work place assessments in all three company size categories. The smallest companies are, though, still behind the larger companies.

Since the undertaking of WPA's is required by law, not having performed one is not necessarily something that will be readily admitted.. This means that analysing a questionnaire addressing this issue, it is important to recognise that positive response rates are likely to be inflated. Could systematic bias when comparing companies of different sizes be suspected? We have looked into these matters in another study where we have compared questionnaire data with audit data. The preliminary result, however, is that different companies of all sizes show an equal, statistically significant, tendency to overestimate or underestimate their WPA-performance. Perhaps in smaller companies the more formal activities are not in focus as much as the more informal day-to-day handling of the working environment.

Alternatively, small companies also obtained the lowest score with respect to the degree of proactiveness. That is, even very small companies might benefit from applying formalised systems for managing occupational health. In this sense it is somewhat surprising that small companies seem to have better attitudes towards safety at the workplace. This may, of course, suggest some sort of compensation mechanism. When the formal systems and working environment knowledge lag behind and fewer preventive actions are undertaken it is a necessity to cope with occupational safety in other ways – safety climate attitudes being one of those ways. Further research is needed to test this hypothesis.

With some exceptions (for example regarding work place assessment parameters) data from the three surveys in 2001, 2004 and 2006 is not directly comparable. It is, therefore, not possible to analyse developmental issues on several variables. Neither are we able to evaluate whether or not a given score on one of the indices is satisfactory or not. Nevertheless the indices are valid for making comparisons across company sizes and working environment areas in the 2006 study. There is no doubt that the index measures will be even more interesting when we finish the next survey in 2011. Hopefully we will then be able to show eventual trends based on the analysis of the aggregated data. Furthermore, working with the analysis of data, and in particular the validation of the indices has shown that in some cases there is a need for improvement to be able to better describe the conditions in an exhaustive way.

The knowledge index is probably the most difficult to construct. The factor analysis showed that we need to look closer at what constitutes “true” working environment knowledge in a company. We need to improve the index and to ask questions that are more sensitive for measuring such knowledge. In addition, it could be interesting to establish more insights into how knowledge can be turned into proactive working environment practises.

CONCLUSION

We have tested the validity of a proactivity index, a working environment index and a safety climate attitude index. The internal reliability of the indices satisfied the criteria of a Cronbachs coefficient alpha of at least 0,70. With respect to the knowledge index factor, analysis show that the statistically significant contribution came from items related to gathering working environment information internally in the company as well as from externally based sources. All 53 items of the proactivity measure showed an equal statistical contribution to the index. 2 items out of 4 items showed a significant contribution to the safety climate attitude index. In addition we

have used the indices for examining the relationships between organizational size, proactivity, working environment knowledge and safety climate attitudes. A score on the proactivity index correlates with organizational size and type of working environment area. A score on the safety climate attitude and knowledge index correlates with organisational size. The smallest companies got the lowest score on the knowledge and proactivity indices, while they got the highest score on the safety climates attitude index. There is a need for improving the knowledge and safety climate attitude indices.

Looking at the trends from three questionnaire based studies (2001, 2004 and 2006), we found a significant improvement in the application of the Danish work place assessment in the three company size categories, albeit with the smallest companies lacking behind the larger companies. It is important to recall, however, that there is a legal requirement to undertake WPA. This means that positive response rates regarding WPA performance could be inflated, which again means that there is a risk of systematic bias within the identified trends.

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