Healthy Performance in Small Enterprises

Studies of Organizational Determinants

STIG VINBERG

Department of Human Work Sciences
Division of Industrial Work Environment
Healthy Performance in Small Enterprises

Studies of Organizational Determinants

STIG VINBERG

Luleå University of Technology
Department of Human Work Sciences
Division of Industrial Work Environment
June 2003
Abstract

The general purpose of this thesis is to contribute to more knowledge about small enterprise organizational and health performance with respect to their relationship to such organizational factors as aspects of leadership, learning, psychosocial working environment and quality. The main focus is not on particular relations in isolation; rather it is on a whole set of factors and their relationships. Reasons for this work are the growing interest in small firm development, statements to the effect that small enterprises lack adequate resources needed for the successful management of workplace change processes, fragmented small business research, and discussions among public authorities and researchers. The studies presented in the four papers uses cross-sectional data from fifty-two enterprises that include a total of 1090 co-workers and leaders. Data was collected by the use of questionnaires, structured interviews and by register sources about economical outputs. The unit of the studies is mainly the enterprise.

Correlation and regression analyses showed strong or rather strong relationships between the outcome indicators of organizational and health performance. The relations between these outcomes and indicators of assumed determinant organizational factors resulted in a rather large number of relationships. A general result is that there are more strong relationships between determinants and organizational performance than between determinants and health performance. However, there are strong relations between, on the one hand, leadership indicators and team spirit and, on the other hand, health performance. Structural analyses in two of the papers resulted in the identification of six components. Thus, it was possible to group indicators into larger “bundles” which have similarities to some research results for larger enterprises. In one paper, analyses using multidimensional scaling resulted in a rather clear structuring in two main dimensions – “supportive and efficient organization” and “general health performance”. This dimensional analysis leads to a grouping of enterprises with high positions on both dimensions versus enterprises with low positions on both dimensions.

The studies in this thesis contain responses from both co-workers and leaders for small enterprises. However, data is mainly cross-sectional and the results should therefore be interpreted with caution and be seen as mainly explorative. The studies have identified evidence of some links between organizational factors such as aspects of leadership, learning, healthy work organization, quality and change strategy, and outcomes related to organizational and health performance. This finding, together with the findings about inter-relatedness between factors and segments of enterprises, gives credibility to change strategies oriented towards multi-purpose change processes.
Acknowledgements

This licentiate thesis can be seen as related to two research projects conducted during the period 1997 to 2002 – “Company development through increased competence and better health” and “Company development without limits” – in Jämtland County, Sweden and Trøndelag, Norway. I want to thank all those in these projects who have contributed to making my studies possible, particularly all co-workers and leaders in the different small enterprises who participated in the studies and took their valuable time to complete questionnaires and answer my many questions.

I also want to express my gratitude to the following persons:

Gunnar Gelin, co-author and statistical advisor, with whom I have worked closely during the last years in the mentioned (and other) projects. Gunnar, without your valuable support, it would have been difficult to finish this thesis; thanks.

Professor Karl W Sandberg, Mid-Sweden University, my academic advisor and friend, for professional guidance and for giving important encouragement at times when it was most needed.

Professor Kaj Frick, National Institute for Working Life and Luleå University of Technology, for great support in the latter part of this work.

Gunilla Röjdalen, for valuable comments and in helping me with the manuscript.

Jonathan Stubbs, for guidance through the English language, and for coming up with good advises.

All my colleagues at the National Institute for Working Life in Östersund for encouragement and support.

Finally, and most importantly, my children, Joanna and Anton, for their love, encouraging support and understanding.

Frösön, June 2003

Stig Vinberg
Appended papers

This thesis is based on the following four papers, which are referred to in the text by their Roman numerals.


# Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>3</td>
</tr>
<tr>
<td>Study Background</td>
<td>3</td>
</tr>
<tr>
<td>Purpose of the study and research questions</td>
<td>5</td>
</tr>
<tr>
<td>Definitions and demarcations</td>
<td>6</td>
</tr>
<tr>
<td><strong>Literature overview</strong></td>
<td>9</td>
</tr>
<tr>
<td>Leadership aspects</td>
<td>9</td>
</tr>
<tr>
<td>Healthy work organizational aspects</td>
<td>11</td>
</tr>
<tr>
<td>Human resource and learning aspects</td>
<td>14</td>
</tr>
<tr>
<td>Quality aspects</td>
<td>16</td>
</tr>
<tr>
<td>Change processes aspects</td>
<td>18</td>
</tr>
<tr>
<td><strong>Analysis model, empirical base and research methodology</strong></td>
<td>21</td>
</tr>
<tr>
<td>Analysis model</td>
<td>21</td>
</tr>
<tr>
<td>Empirical base and research methodology</td>
<td>22</td>
</tr>
<tr>
<td>Papers I and II</td>
<td>23</td>
</tr>
<tr>
<td>Papers III and IV</td>
<td>24</td>
</tr>
<tr>
<td>Quality of data</td>
<td>26</td>
</tr>
<tr>
<td><strong>Summary of papers</strong></td>
<td>27</td>
</tr>
<tr>
<td>Bivariate relations</td>
<td>27</td>
</tr>
<tr>
<td>Structures of indicators</td>
<td>29</td>
</tr>
<tr>
<td>Structure of enterprise groups</td>
<td>30</td>
</tr>
<tr>
<td>Additional results</td>
<td>31</td>
</tr>
<tr>
<td><strong>Discussion and conclusions</strong></td>
<td>33</td>
</tr>
<tr>
<td>References</td>
<td>37</td>
</tr>
<tr>
<td>Appended papers I - IV</td>
<td></td>
</tr>
</tbody>
</table>


Introduction

Study Background

The title of this licentiate thesis ‘Healthy Performance in Small Enterprises: Studies of Organizational Determinants’ refers to the concept that worker well-being and organizational performance can be fostered by a common set of organizational design characteristics (Murphy & Cooper, 2000). Although this view is attractive, there is a lack of knowledge and understanding about how we can improve both health and organizational performance. In a broad sense, this thesis is about relations between several aspects of organizational and health performance and the organizational determinants of these concepts in small enterprises. Hoped by this author is that the findings reported here will stimulate further research and at the same time provide the business community with information that can better protect workers while at the same time help operations to be more profitable. This introduction begins with a brief summary of some background material about this area that is often expressed by public authorities and researchers and concludes with a discussion of the findings.

That development of a good working environment and work organization is related to increased workplace health and organizational performance is not a new discussion. In Swedish governmental investigations such as the Working Environment Commission report (SOU 1990:49) three main reasons for increased working environment efforts are discussed – a human reason that it is unethical to expose individuals for risks that they can not control, a business economy reason (a company with low staff turnover and healthy employees is assumed to have lower costs than does one where many people quit due to work environment issues and where there are high sickness absence levels) and a national economy reason (to reduce governmental benefit programme costs). In the Swedish Productivity report (SOU 1991:82), competence development and work organization development are seen as key components in the effort to increase the national level of productivity. Also, in recent investigations such as the government’s plan for the positive enhancement of working environments (Ds 2001:28) and in a report about the increasing employee sick rate (SOU 2000:121), links between the work environment and health and organizational performance are discussed. That several of these public commission reports have proposed specific measures for work environment enhancement and workplace health in small companies can be considered as an indicator that public authorities recognize the special needs of small companies. However, it is remarkable that only a few proposals from the above-mentioned investigations

---

1 The terms “enterprise”, “firm”, and “company” are used interchangeably to describe a privately owned producer of goods and/or services. The main focus in this thesis is on small enterprises with less than 50 employees.
on the improvement of work environments, work organization and workplace health have been transformed into actions (Olsson, 2003).

Going from a national to a European perspective one can note that there is a European Commission document about a new work environment strategy for the years 2002-2006 (KOM 118/2002) where it is pointed out that a safe and secure work environment and a good work organization are factors that strengthen the economy for both society and business enterprises. Another important European initiative is the European Network for Workplace Health Promotion which states in a report about small and medium-sized enterprises (SMEs) that health and well-being at the workplace are important factors in the creation of economic efficiency in businesses (Breucker, 2001). This report goes on to note that little attention has been paid in small enterprises to questions of occupational health and workplace health promotion. When considered together, these two points make it evident that the financial soundness and, in turn, employee welfare in SMEs are threatened unless solutions are identified.

Several researchers have highlighted the relationships between work environment and work organization improvements and organizational and health performance. Karasek (1998) established that major workplace reorganization can rarely be undertaken with health concerns alone as the goal since productivity is the primary goal of a company’s workplace structures. Other researchers with a similar focus are Murphy & Cooper (2000) who argue that more empirical work about healthy work organizations is needed to test existing models and to develop new ones. One question that they raise is if there is a generic healthy work organization model applicable to all workplaces or whether some workplaces require specialized models. They also propose more research on identifying those job and organizational factors which can be used to predict both health and performance outcomes. A primary reason for the growing state interest in specific aspects of smaller enterprises is that SMEs are seen as important growth engines for the Swedish economy (Davidsson et al., 2001; Johannisson & Landström, 1999). Another reason is that state authorities recognize that SMEs have yet to develop an adequate competence and inventory of resources relative to their working environments (Ds 2001:28). In different research areas, one frequent topic concerning small firms that emerges is that it is often difficult for them to carry out development processes due to limited economic resources and a lack of knowledge about such processes (Axelsson, 2002; Bostedt et al., 1995; Frick et al., 2000; Johansson, 1998). As a consequence, this leads to an interest in research concerning which specific measures are most appropriate for different categories of small firms. This line of reasoning could also be seen as one that underscores the usefulness of the studies reported in this thesis about organizational aspects as they relate to the design of workplace processes.
In recent years sickness absence in Sweden and Norway has increased more than in other European countries (RFV 2002:11). There is no medical basis (e.g. a new disease) on which an explanation of these dramatic changes can be based (SOU 2002:62) and it is a remarkable paradox that the sickness absence figures in small enterprises are much lower than in larger ones (Bornberger et al., 2003; Lindström et al., 2000; SOU 2000:121). Interestingly small enterprises have higher injury rates and they do not systematically address work environment issues as do larger enterprises (Walters, 2001). Two contradictory explanations are 1) that the social control is higher in small enterprises and that it therefore is difficult to be off work (Bornberger et al., 2003), or 2) that work content and respectful leadership are more developed in small firms (Eakin et al., 2000).

Small business research has been a fast growing speciality during the past decade in Sweden and Europe (Davidsson et al., 2001; Johannisson & Landström, 1999; Wiklund, 1998). Some reasons for this interest are that small workplaces (with fewer than 50 workers) comprise the overwhelming majority of workplaces in most countries and employ a sizable proportion of the total workforce between one third and one half of total employment (Eakin et al., 2000). However, research has found that the majority of small firms do not grow and that many are not interested in pursuing growth. According to Wiklund (1998), contrary to what is often reported, rapid-growth firms are not concentrated in specific industries. He states that it is important to determine which factors affect the performance of individual small firms and in particular to identify which of those factors are caused small firms themselves and which by society in general.

My observation is that small business research is highly fragmented and that different research areas end up focusing on limited explanations. To achieve more knowledge about how different factors contribute to organizational and health performance in small enterprises more integrated approaches are necessary.

**Purpose of the study and research questions**

The background presented above leads to this description of the general purpose of the study: namely, to contribute to more knowledge about (1) relations between aspects of organizational and health performance, (2) between organizational factors such as aspects of leadership, learning, psychosocial working environment and quality, and (3) between these factors as related to organizational and health performance in small enterprises. Thus, the main focus here is not on particular relations in isolation, but on a whole set of factors and the relations between these.
An additional purpose behind the research projects covered by this thesis is to make this knowledge relevant to the actual development of workplace change processes in small firms and to encourage further research about small firm performance. A final purpose is also to establish starting points for my forthcoming research on how different change processes lead to different outcomes relative to health and organizational performance.

The following research questions are addressed:

1. Are there any empirical relationships between performance indicators (outcomes) such as organizational performance, health performance and sickness absence?
2. What empirical relationships can be found between outcome indicators (of organizational and health performance) and indicators of assumed organizational determinants?
3. Is there a bundling tendency, that is, a tendency for several organizational aspects to co-vary in small firms and, if so, is it possible to find groupings of co-varying indicators?
4. Is it possible to find groups of companies that are similar in the sense that they have similar indicator patterns?
5. Can some conclusions for the design of workplace change processes be drawn from the answers to the above research questions?

Definitions and demarcations

When seeking to define a small enterprise, it becomes evident that the concept of “smallness” varies and that there is no single suitable definition. According to Wiklund (1998) there are two different ways of defining enterprises. One approach could be labelled theoretical. Here the criteria for defining a small enterprise would include market share, personalised management, vulnerability to environmental conditions and the manager’s non-economic objectives. This type of definition is theoretical in the sense that small firms are presumed to be fundamentally different from large firms in these dimensions.

The second way to define may be labelled quantitative. Here, size itself is the criterion for smallness and quantitative size data regarding sales, employees or equity are normally what is used when classifying firms as large or small. The European Commission definition is based on three types of criterion: the number of employees, the size of the business in financial terms and its independence (see 96/280/EC, 1996). The workforce size criteria divides enterprises into very small or micro (0-9 employees), small (10-49 employees) and medium (50-249 employees). In this thesis only the workforce size criteria is used and the main
focus is on micro and small enterprises. In the remainder of this thesis the term “small enterprise” means both micro and small enterprises.

According to Wiklund (1998) there is no consensus on appropriate small firm performance measures and research most often collects easy to gather variable data rather than harder to gather variable data that is known to be important. In a review of research on organizational performance Greenley (1994) found that most of the studies used common financial performance measures, composite calculations and subjective measures (e.g. perceived performance). Wiklund (1998) advocates that it is advantageous to integrate different dimensions of performance into empirical studies. In this thesis different measures of organizational performance are used - profit per capita in each company, the credit worthiness rating and an indicator consisting of the mean of the indicators ‘perceived lack of efficiency’, ‘workplace adaptability’ and ‘customer satisfaction’.

In this research the definition of health performance is based on an aggregate of individual data concerning yearly sickness absence and different indicators for psychosocial and musculoskeletal ill health. This approach to defining the term is consistent with that used by Cox & Thomson (2000) who use a concept of organizational healthiness based on an analogy with individual health in their definition. Thus, health performance as used here is an organizational level concept. However, the health performance concept is an outcome concept while the organizational healthiness concept includes both what is called here determinants and outcomes.

According to Murphy & Cooper (2000) several models of healthy work organizations emphasize meaningful work that utilize in the definitions factors such as worker skills, worker autonomy/control, job security, worker involvement/participation, safe and healthy work environments, teamwork and commitment to core values. The organizational factors in the present studies are aspects related to leadership, learning, working environment and quality development - these to some extent overlap with the aspects stressed by Murphy & Cooper.

The presented quantitative studies are limited to small enterprises in Norway and Sweden. The data sets in the studies are not representative samples so no statistical inferences as they pertain to broader populations are intended. The study has a quantitative methodological approach, uses cross-sectional data and is mainly explorative. Although there is always a risk of selectivity bias (Heckman, 1996), the distribution of firms in the studies is not so divergent from the total distribution for small firms in Sweden (Antonsson et al., 2002).
Literature overview

Based on the described-above purpose and research questions, theoretical aspects and knowledge from earlier research are presented here within the following areas:

- Leadership aspects
- Healthy work organizational aspects
- Human resource and learning aspects
- Quality aspects
- Change processes aspects

The overview particularly focuses on studied organizational factors and how they relate to health and organizational performance. Research findings are partly about enterprises and organizations on a general level and partly about small enterprises. The overview is a brief summary of the studied main areas, and focuses on potential practical applications of the research.

Leadership aspects

Although there has been considerable research on leadership within a range of disciplines there remains a sparsity of knowledge about how leadership influences organizational performance and employee health; particularly in the realm of small enterprises. In his interesting dissertation about leadership and efficiency Andersen (1994) describes leadership research as being inconsistent and that it is absurd to assume (as most research does) that a small number of variables could have causal relations with so many different outcomes such as productivity, profitability, employee motivation and work satisfaction. This is in line with findings by Ogbonna & Harris (2000) that used empirical evidence to show that the link between leadership style and organizational performance is mediated by the nature and form of organizational culture.

Northouse (2000, p 3) defines leadership as “a process whereby an individual influences a group of individuals to achieve a common goal”. This definition means that leadership is a process with transactional events occurring between the leader and employees. Much leadership research has focused on the two-factor model of leadership behaviour with the dimensions employee- and production orientation (Yukl, 2002). Arvonen (2002) has from studies of different populations found evidence of a third dimension; change orientation that includes such behaviours as visionary qualities, creativity, action implementation, and risk taking. One conclusion arising out of this research is that managers in general need to be change, production and employee oriented
to be successful. Research studies indicate that relation oriented managers often produce good satisfaction in groups; especially when this is combined with a moderate or high production orientation leadership style (Yukl, 2002).

There are studies about how leadership moderates or influences health and organizational performance. In his review of more than 130 field studies of organizational change Pfeffer (1998) emphasizes that leadership with a focus on developing human resource practices is a necessary component of high organizational performance. This corresponds with the view of Cascio (1995) that leaders today need to integrate a human resource focus in with a financial focus. He mentions strategies such as developing teamwork, creating conditions where workers have the opportunity to make decisions about their jobs and have access to extensive training.

Graen & Uhl-Bein (1995) found that quality relationships between leaders and co-workers can mean lower staff turnover, increased work efficiency and more positive attitudes towards work. McGee et al. (1987) found that individuals who reported both low stress levels and a high degree of job satisfaction also described their leaders as more relation- and structure-oriented whereas individuals who reported both high stress levels and low job satisfaction were less likely to similarly describe their leaders.

That relation-oriented leaders are generally more associated with a relatively good level of satisfaction, less absenteeism and less workforce turnover among employees than are more structure-oriented and controlling leaders has been described by Bass (1994) and Evans & Johnson (1990). This is somewhat in line with results presented by Arvonen (2002) in a study of a Swedish forest company (781 employees answered a questionnaire) where it was found that both relation-oriented and the structure-oriented leadership styles reduced mental fatigue and psychosomatic load among subordinates. However, in that study the relationship between change-orientation and mental fatigue had a different orientation.

Leadership in small enterprises is often described as being of particularly importance due to company size and close leader identification with the company (Beckérus & Roos, 1985; Johannisson & Lindmark, 1996). Leaders’ of small firms are believed to have hard working conditions, high time pressures and large work demands (Persson, 1991). In a field study of stress among small business owners Mack (2000) found positive relationships between the owner’s locus of control (a characteristic of the “person”), experienced control and lower amount of stress.
Westerberg (2001) found in a study of small enterprises that leader tolerance of ambiguity and self-efficacy were important elements in overall company development. Conclusions from the study were that high values on the two dimensions enhanced ability to handle turbulent situations and facilitated growth and profitability. Smallbone et al. (1995) examined the development of 306 SMEs and found that one of the most important factors for high growth was the commitment of the leader of the company to achieving growth. In a study of 372 small firms Chaganti et al. (2002) found that the fastest growing firms had strong consideration and initiation styles of leadership.

Healthy work organizational aspects

During the past couple of decades much of the research on the relationship between psychosocial work environment, health and well-being have found that factors related to work content, work characteristics, work organization and social relations are of importance for individual health in a broad sense (see e.g. Gardell, 1982; Karasek & Theorell, 1990; Johnson & Johansson, 1991). However, in his review Walters (2001) notes that little of this research has concerned small enterprises. Eakin (1998) writes that occurrence of illness and injury associated with social and organizational factors in small enterprises is little known and explored. Lindström et al. (2000) note that the paucity of knowledge about the relationship between psychosocial factors and organizational performance is greatest when it comes to small firms.

Recent research has tended to concentrate on organizational health and models of healthy work organizations. The organizational health perspective differs from many of the traditional approaches to reducing occupational stress because it focuses on both employee well-being and organizational performance (Griffin et al., 2000). This perspective emphasizes that having satisfied employees is of little value to organizations unless the employees are performing efficiently and productively. Conversely, is the notion that having an efficient organization is of little value if it is achieved at the expense of employee well-being. The concept of organizational healthiness is based on an analogy with individual health of employees and is about the nature and viability of organizations as systems (Cox & Thomson, 2000). They use a model where staff development, goodness of task, and problem solving can affect employee health through the design and management of work systems or procedures. They then overlay on this model the notion that stress impacts upon employee behaviour. In this model, the health of employees in unhealthy organizations is assumed to be inevitably poor with employees not performing well and showing reduced commitment to work systems.
In their discussion of models of healthy work organizations Murphy & Cooper (2000) argue that although more empirical work is needed to test existing models and develop new ones there appears to be a convergence of opinion and evidence on at least some important factors. For example, most models have as necessary components of a healthy work organization meaningful work which utilizes worker skills, worker autonomy/control, job security, rewards for performance, worker involvement/participation, and safe and healthy physical work environments. Other important healthy work factors noted in recent research are teamwork and commitment to core values. These authors raise the question of how to measure organizational performance and worker health/well-being in future research. The healthy work organization concept can be seen as related to the concept of ‘development work’. Swedish researchers describe the concept of development work as an innovation that may lead to improvements in working conditions while at the same time strengthening quality and performance (Eklund, 2000; Ellström & Kock, 1999).

Work stress literature emphasises the important of addressing the issues of job complexity, autonomy, role ambiguity and work load as factors associated with well-being at work. Perhaps the most influential model within research on the psychosocial work environment and health is probably the demand-control model (also named job-strain model or decision-latitude model) developed by Karasek (1979). The model focuses on two dimensions of the work environment: job demands and job control. Job demands refer to the workload, and have been operationalized mainly in terms of time pressure and role conflict. Job control, which is sometimes called decision latitude, refers to the person’s ability to control his or her work activities. According to the model, having decision latitude over the work processes will reduce a worker’s stress and increases learning whereas psychological demands increase learning as well as stress (Van der Doef & Maes, 1999). The ‘strain hypothesis’ states that the most adverse reactions of psychological strain and physical illness are expected in a ‘high-strain’ job – a high demand-low control job. In contrast, Karasek maintains that high demands in combination with high control lead to increased learning, motivation and development of skills – a high demand-high control job. Another hypothesis is that control can buffer the potentially negative effects of high demands on health and well-being.

Karasek & Theorell (1990) maintain that the model is not limited to the individual level and that it can be applied on the organizational level as well. Work demands would then apply to the organization’s performance level and freedom of action should be seen as the organization’s decision-making processes (Eriksson, 1996). Despite the wide usage and acceptance of the model it also has its critics. One criticism has been that the model is too simplistic; that it does not include factors other than psychological demands and decision
latitude. This critique has lead additions that add a social dimension into the model - resulting in the Job Demand-Control-Support model (Johnson & Hall, 1988).

In his meta-analysis of studies on autonomy and participation Spector (1986) found that high levels of perceived control were associated with high levels of job satisfaction, commitment, involvement, performance and motivation as well as low levels of stress related symptoms and turnover. In their overview of studies Jeding & Theorell (1999) refer to the reoccurring concept that emphasizes the importance of social support both from leaders and co-workers in relation to well-being at work. They then go on to suggest that social support from leaders might have a larger impact than support from co-workers. Satisfaction with group work and team spirit has also been regarded as indicative of the effectiveness of a group (Sonntag, 1996). In recent studies concerning public workplaces, restructuring worries were found to contribute to increased sickness absence levels among employees (Szücs et al., 2003). However, studies of the importance of the relationship between organizational structure factors and employee well-being is still weakly developed (Westerholm & Marklund, 2000).

With respect to workplace psychosocial conditions, there are studies that have found that small organizations, as compared to large organizations, tend to have employees with higher job satisfaction (Kovach, 1978; Zemke, 1988). In their overview, Bornberger- Dankvardt et al. (2003) argue that positive features in Swedish small companies are good team spirit, variation in work tasks, work satisfaction due to high control and a holistic perception of work, short roads to decisions, personal commitment to work, and low sickness absenteeism. According to these authors, negative psychosocial factors in small companies are time pressure and stress, inadequate physical work environments, more hazards that can cause injuries, high sickness rates, and fewer personnel and financial resources.

In a study of 343 Finnish workplaces, Lindström et al. (2000) found that when compared to larger enterprises, workers in enterprises with less than ten employees had better job control, supervisory support, work climate and appreciation of their own work. These authors concluded that small company size, as defined by the number of employees, was a central determinant of good organizational practices and climate. Another result was that there were clear differences in many job and organizational characteristics between branches of industry. This is partly in line with the views of Johansson (1998) and Walters (2001) to the effect that comparisons within the small company sector and between small and large enterprises should be made with caution.
Human resource and learning aspects

The resource-based approach can be treated as a part of the broad concept of human resource management (HRM) where the humans in an organization are viewed as a valuable asset/resource. A brief overview of this approach is given here. The thinking behind the resource-based approach is based on the belief expressed by Hamel & Prahalad (1989) that a competitive advantage is achieved when a firm can obtain and develop human resources. When value is placed upon its workers, an organization can learn faster and apply its learning more effectively than its rivals. Barney (1991) contends that a sustained competitive advantage stems from the acquisition and effective use of bundles of distinctive resources that competitors cannot imitate. Unique talents among employees, including superior performance, productivity, flexibility, innovation, and the ability to deliver high levels of personal customer service are ways in which the human element creates a critical ingredient in the development of an organization’s competitive position (Armstrong, 2001, p. 34). The aim of a resource-based approach is to improve resource capability – achieving strategic fit between resources and opportunities and obtaining added value from the effective deployment of resources.

This approach has experienced a revival during the 1990’s as can be observed in strategic management literature and in small business research. For example, Swedish theses about small firm growth and performance (Wiklund, 1998), competence development in small firms (Ylinenpää, 1997) and small-firm network organizations (Wallenklint, 2001) are examples of the research interest. However, the theses also maintain that a resource-based perspective must be combined with perspectives that address environmental influences. Boxall (1996) summarizes this perspective by commenting that while hard-to-imitate resources and, in particular, human resources are necessary for competitive advantage that these alone are not enough to cause an organization to always be a superior competitor.

Much of the research that has focused on large organizations has demonstrated that HRM practices can improve organizational performance. Arthur (1994) investigated 30 US steel mini-mills and found that steel mills with a “high-commitment” strategy had significantly higher levels of both productivity and quality compared with those that had a “low-commitment” strategy. Huselid (1995) found in a study of 968 US firms that when firms increased their “high-performance work practices” there were significant reductions in employee turnover and significant increases in productivity and profits. He also found that: turnover is determined by employee skills and organizational structures; productivity is determined by employee motivation; and financial performance by employee skills, motivation and organization structure. In another study
focusing on 740 firms, Huselid & Becker (1996) created an index of HRM systems. They found that firms with higher values on this index, other things being equal, had significantly higher levels of positive firm performance (profit change, changes in market value).

In a study by Patterson et al. (1997) what factors that most influence business performance was investigated. Regression analysis showed that job satisfaction accounted for five percent of the variation between companies in change of profitability and sixteen percent of the variation in productivity. Organizational culture was identified as being ten percent of the variation in profitability and twenty-nine percent of the variation in productivity. Human resource management practices explained nineteen percent of the variation in profitability and eighteen percent of the variation in productivity. The overall conclusion of this research was that employee commitment and a positive psychological contract are fundamental to improving performance.

Pfeffer (1998) points out that factors like employee participation, job redesign, including team-based production systems, extensive employee training, and performance-contingent incentive compensation are widely believed to improve organizational performance. However, Delaney & Huselid (1996) maintain that substantial uncertainty remains as to how HRM practices affect organizational outcomes. They ask whether some practices have stronger effects than others and whether complementaries or synergies among such practices can further enhance organizational performance. In a study of 590 for-profit and non-profit firms Delaney & Huselid (1996) found positive associations between HRM practices such as training and staffing selectivity and perceptual firm performance measures (seven items assessing respondents’ perceptions of their firm’s performance over the past three years relative to that of similar organizations).

From the research above it is feasible to conclude that there exists an increasing body of research that identifies a relationship between the use of positive HRM practices and improved financial performance. However, there are also some studies where no correlation between HRM and financial performance, productivity and quality was found (Guest & Hoque, 1994; Storey, 1992). This difference does suggest that there may be nuances in the relationships that determine whether or not positive financial/production/quality will occur.

There has also been much attention paid to learning and competence development in both large and small organizations with little agreement about the nature of learning and relationships between learning and performance in SMEs (Beckar & Gerhart, 1996; Ylinenpää, 1999). As mentioned above, Huselid (1995) found a positive relationship between training and economic
results at a company level. Yet, not long before that work Baldwin (1994) did not find these relationships.

Several researchers point out that leadership, work organization and learning are connected to each other (Ellström & Kock, 1999; Karasek & Theorell, 1990). These same researchers also maintain that these factors promote employee wellness cause employees to believe that they have meaningful work. Other researchers have found that a working environment which stimulate learning and competence development are of fundamental importance in the promotion of employee wellness, feelings of well-being and individual competence development (see e.g. Ellström & Kock, 1999; Gardell, 1982).

Most of the existing literature about HRM and learning is based on studies of large firms. Hill & Stewart (2000) believe that there is much evidence to indicate that typical small enterprises do not have the human resource development expertise and general resources which larger organizations enjoy. They describe each small organization as being unique and that their HRM activities are essentially informal, reactive and short-term in outlook. According to these same authors it is important to understand why and how small organizations generate their own models of human resource practices and to clarify the links between such practices and levels of performance.

Quality aspects

Quality development has become important in both large and small organizations during the last decades due to customer demand and the belief that quality values increase competitiveness and long-term profitability (Garvare, 2002; Gustafsson et al., 2001; Hansson, 2003). Some researchers believe that small organizations have an advantage when it comes to implementing quality improvements due to their flexible organizational structure, fewer hierarchical positions and a strong organizational culture (Haksever, 1996). Despite these advantages, small firms have been slow to begin to work with quality improvements in a systematic way (Lee & Oaks, 1995; Noci, 1996; Nwankwo, 2000) due to limited resources, lack of financial resources and being generally ineffectual in the provision of internal training (Hellsten & Klefsjö, 1998).

The link between quality and performance in large enterprises has been studied rather extensively yet researchers have drawn different conclusions about the effects of quality improvement at the company level (Hansson, 2003; North et al. 1998; Nwankwo, 2000). Some researchers offer evidence to the effect that total quality management (TQM) implementations improve long-term profitability (Easton & Jarell, 1998; Hendricks & Singal, 1997). Hendricks &
Singhal, (1997) compared quality award recipients with a set of control companies. They found that the quality award winners had better financial performance after implementation of TQM. Also noted was that during the implementation periods there were no significant differences between the quality award recipients and control companies.

Some researchers have a more pessimistic opinion about the overall benefit of quality improvements (Bergquist & Ramsing, 1999). In a study by Powell (1995) it was found that most features generally associated with TQM such as quality training, process improvements, and benchmarking do not generally produce competitive advantages while certain tacit, behaviourally imperfect imitable resources can produce competitive advantages. In a critical review of the quality movement (Bejerot & Hasselbladh, 2002) question the uncritical acceptance of the effects of quality development. These authors point to a study by Kivimäki et al. (1997) which found an increased workload among employees when implementing TQM. In this author’s opinion a shortcoming of many studies is a focus on financial performance at the expense of ‘soft performance measures’ that concern working conditions and employee health.

As discussed in the above paragraphs, most studies about performance investigated larger organizations. There are some studies on SMEs. Anderson & Sohal (1999), in a report about a study of Australian SMEs, note that among a number of factors strong customer focus, quality systems and good information management provided the greatest positive influence on the quality of outputs. In a Swedish doctoral thesis with a focus on small organisations (Hansson, 2003) comparisons were made between profit-seeking companies that received a quality award and two control groups (i.e. competitors and branch indices). According to the author the findings indicate that there is a link between successful TQM implementation and an advantageous financial performance development (change in sales, change in total assets). This implies that TQM, as a means for systematic and holistic quality management efforts, should be profitable in the long run.

According to Goldschmidt & Chung (2001) very little research has been done on the relationship between organizational size and customer satisfaction despite the attention that each of these subjects has received in their respective fields. In one of the few studies that has been carried out Venkataraman & Low (1994) found a positive correlation between organizational size and service depth satisfaction along with a negative correlation between organizational size and response satisfaction. Service satisfaction was defined as the range, depth, and quality of services provided to the customer. Response satisfaction measured the satisfaction with the speed in which an organization responded to customer needs and changes in these needs.
Quality management systems are increasingly being integrated into management systems that also encompass health, safety and environmental issues (Frick et al., 2000; Greenan et al., 1997; Wilkinson & Dale, 1999). However, there are only a few studies about the relationships between these different areas. In one study Eklund (1995) found that work environment problems that concerned psychologically demanding work and ergonomic tension significantly increased the number of quality defectives. This is in line with studies by Axelsson (2000) in which it was found that ergonomics and quality have much in common and that in some cases more than 30-50% of improvement efforts are actually about ergonomic needs.

Change processes aspects

Although change processes and effects of workplace change programs are not exactly within the main scope of this thesis it is relevant to describe some aspects of these areas here. This is because the studied organizational factors can be seen as related to change processes and effects of such processes.

Different researchers put different emphases on the importance of processes and contents in workplace change programs. Håkansson (1995) looks at change competence as a relative concept; meaning that it is about an organization’s ability to handle change processes based on its level of development. In the same monograph change strategy is described as the workplace organizing of issues as they relate to their content and organization of change processes as concerning employee ability to participate. Ekman Philips (2002) states that participation, authority, legitimacy and cooperation are central concepts in achieving support for change processes at workplaces. This is in line with the view of Pasmore (1994) that participation limited to only accomplishing of measures without participating in planning and creating of change strategies will have a limited chance of success. Researchers such as Gustavsen (1995) and Ekman Philips (2002) also emphasize the importance of establishing a ‘development organization’ for working with change processes - this means creating arenas for dialogue and constructive discussions. Active leader participation is another element that is seen as an important condition in the driving change processes that have high fulfilment goals (Aronsson, 1995; Gustavsen, 1995). My personal observation is that small enterprises could have difficulties in meeting the above-mentioned requirements due to limited economic resources and a lack of knowledge about how to create and carry out change processes and workplace change programs.

However, there are studies concerning small enterprise workplace change programs that describe positive effects on health and organizational
performance. In the previously-mentioned study by Håkansson (1995) the effects of change programs were studied in a randomly selected group of 336 Swedish workplaces. Of particular interest were the results that, according to studied effects, there were no clear differences between workplaces of different sizes. One conclusion was that large workplaces did not use personnel resources for working with change processes to a greater extent than did small or medium-sized workplaces. Other findings of relevance to this thesis were that workplaces with strong economies were more successful in their implementation of work environment improvements, management of employee job content and engagement of employees in change processes; internal factors such as employee participation were also important in the achievement of positive outcomes.

Another example of research on change programs in small enterprises is a study by Alpenberg & Karlsson (1996) which found that investments in work environment improvements often had the side effect of increased economic efficiency. They also found that comprehensive projects tended to have the greatest potential. They noted that comprehensive projects were more likely to be subsidized. To qualify for subsidies SMEs had to clearly identify starting points, describe project size/scope and describe later elements – this had the effect of forcing the consideration of critical details which then involved/committed everyone. In a study of learning strategies (NUTEK, 2000) it was determined that there are relationships between decentralization of work organization, increased employee decision latitude, geographical cooperation, information technology and competence development, and positive efficiency and productivity outcomes. The clearest differences between studied enterprises were for competence development: enterprises that emphasized competence development were found to have better profitability than those enterprises that did not focus on competence development. A more recently study (Bager-Sjögren et al., 2003), found that 280 small enterprises that had taken part in competence development programs significantly increased their productivity level and financial performance when compared to a control group of 200 enterprises.

Despite the mentioned studies about workplace change programs Jeding et al. (1999) concluded in an overview of research studies that there is a lack of knowledge about health effects of workplace intervention programs; particularly with respect to small enterprises and measures concerning their organizational and psychosocial factors.
Analysis model, empirical base and research methodology

Analysis model

Drawing upon the literature overview of theoretical approaches and research findings, Figure 1 depicts an explorative analysis model that was constructed to provide a broad, interpretative overview of the studies presented in the four papers around which this thesis is based. The model attempts to integrate an important set of organizational factors found to contribute to organizational and health performance. Organizational and health performance are the two outcome concepts. The indicator sickness absence as shown in Figure 1 is seen as belonging to the outcome indicator health performance even though it is treated as a separate outcome variable in Paper IV. All other indicators, except the indicators concerning change processes and context, represent assumed organizational determinants. To some extent, all indicators except the indicator change processes are linked to empirical analysis in the papers. The variable definitions are described in Papers II and IV.

A model is by definition a simplification of a complex reality and there is always a compromise as to whether to include some factors or to leave them out. Simplicity and complexity need to be balanced (Ruist, 1990). This model seeks to group the indicators for the studied main areas in the thesis. Some indicators can just as easily be seen to fit into other areas than which they have been assigned. The indicator, change processes, is introduced into the model to indicate that relations between determinants and outcomes are often mediated by change processes. However, data about change processes is not used in this thesis.
Empirical base and research methodology

The studies presented in Papers I and II were parts of the project Company development through increased competence and better health (Vinberg et al., 1998). This project was a cooperative project between Försäkringskassan (the National Social Insurance Office), Länsarbetsnämnden i Jämtlands län (the County Labour Board of Jämtland) and the Företagarnas riksorganisation (The Swedish Federation of Private Enterprises) between 1997 and 1998. The overall aim was to develop models for increased competence concerning work environment, work organization and health in small enterprises in Jämtland County in Sweden. A group of ten small enterprises from the manufacturing, wood and service industries participated. The number of employees in the companies varied from 5 to 23.
The studies presented in Papers III and IV are from another project called *Company development without limits – the SWENOR project* (Vinberg, 2001). This project was a cooperative effort involving Arbetslivsinstitutet (the Swedish National Institute for Working Life), Nord-Trøndelagsforskning (the Nord-Trøndelag Research Institute), consultants from Försäkringskassan and Trygdeetaten (the Swedish and Norwegian social insurance offices), and Länsarbetsnämnden i Jämtlands län (the County Labour Board of Jämtland) between 1999-2001. The overall aim was to generate networks between participating enterprises and public organizations to influence change programmes at the company level. In total, 53 Swedish and Norwegian companies representing the industries of manufacturing, wood products, construction, retail trade and consulting participated. The number of employees varied between 3 and 95. Approximately 70% of the companies employed 10 to 30 persons.

The enterprises that participated in the projects described above were jointly recruited by Företagshälsovården (Occupational Health Services), Försäkringskassan (the Swedish National Social Insurance Office) and Arbetslivsinstitutet (the Swedish National Institute for Working Life). For both projects the goal was to obtain a sample of small and medium sized companies from different sectors; particularly from those sectors that are dominated by small enterprises (Antonsson et al., 2002). There may have been a tendency to recruit companies with, for instance, more or less interest in, and resources for, workplace development. It must therefore be stressed that the companies studied for this thesis are not a representative probability sample; no inferences to a population are intended. The studies presented in all four papers are based on cross-sectional survey data. However, the studies in Papers III and IV are part of a longitudinal study with a second phase running from 2002 to 2003; here data from only the first phase is used.

**Papers I and II**

The unit of the study in these papers is the enterprise. The data used in Papers I and II were collected during the period September-October 1997 in a study of 10 small enterprises with 20 leaders and 82 co-workers. Data was collected through individual survey questionnaires that were distributed by the researcher at group meetings, individually filled in and collected at the workplaces. The response rate was 88 percent. During the same period semi-structured interviews with leaders and co-workers provided information about competition level, organization structure and degree of network integration. Data concerning economic outcome and economic analysis of human resources was also collected. From human resource accounting analyses (Aronsson & Malmquist,
2002) in each company it was possible to get the profit per capita. The individual survey data was aggregated into company means which was used in the analysis.

To gain an understanding of physical and psychosocial work environment conditions a questionnaire used in several national-wide surveys was used (Wikman, 1991). In total, 72 questions were used to develop a picture and then to estimate the frequency/duration of different problems. An established method for measuring competence aspects was used (Anntila, 1997). Both leaders and co-workers answered a questionnaire in which they rated themselves in areas such as competence for change, work environment, work organization and health. They also rated each other’s ability in the mentioned areas and motivation to increase competence. In total, the employees answered 69 questions and the leaders 81 questions that concerned the area of competence.

The papers use two-level data with organizational level data for the ten companies and individual level data for the leaders and co-workers. Scales and indices were based on an earlier knowledge of the questions used. The resulting set of questions was used as input for an explorative principal component analysis. In Study I we used descriptive profiles for the enterprises and correlation analysis between organizational factors and outcomes that covered economy and health aspects. In Study II we used principal component analysis, correlation analyses and regression analyses with four assumed outcome variables: profit per capita, musculoskeletal ill health, high stress demands (job stress) and meaningful work.

**Papers III and IV**

Paper III is based on the Swedish part of the first phase of the SWENOR project where data was collected during the period November 1999-February 2000 from 25 workplaces (19 small firms), 27 leaders and 521 co-workers. Paper IV uses data collected in November 1999-May 2000 from both the Swedish and the Norwegian part of the SWENOR project with 42 small enterprises employing a total of 1177 persons in the year 2000. The total response rate was 84%.

In Paper III the unit of study is the workplace depicted in Figure 1 (as shown in paper III) and the workplaces and individuals described in Table 1 (as shown in paper III). A total of 25 workplaces were identified out of 19 enterprises. Data was collected by individual survey questionnaires, distributed, filled in and collected in the same way as described for Papers I and II. However, one difference was that consultants from the social insurance office and occupational health services assisted the researchers. Data was also collected from register
sources (Dun & Bradstreet credit rating system) and through a leader survey concerning sector classification, ICT level, change program goals, and use of systems for quality, environment and the work environment. The unit of study in Paper IV is the firm. The data capture description for Paper 3 also applies to this paper.

To gain an understanding of how both leaders and co-workers in the companies perceived aspects concerning work environment conditions, leadership, learning and quality development we used one questionnaire, the ‘Organization Profile’, developed by the Stress Management Center (Setterlind & Larsson, 1995), one questionnaire developed by Töres Theorell, and one questionnaire developed by Nord-Trøndelag research (Sletterød & Lysø, 2001). In total, 170 questions were used.

In Study IV 22 indicators based on substantive considerations and factor analyses were used. From the individual data an indicator data file was constructed with indicator means for the 42 firms in the project. The reason for this was that the focus here was on organizational level aspects, not individual ones (Klein & Kozlowski, 2000). The goal of variables and indices chosen for use in the analysis was to provide a comprehensive picture related to the model in Figure 1 in this thesis.

The statistical methods in Study III are descriptive data concerning psychosocial conditions and learning aspects at an individual level, correlation analyses using Pearson’s correlation (r) and regression analyses. In Study IV we used descriptive data for mean sickness absence for firms in different branches, correlation analyses using Pearson’s correlation (r), and structural analysis. For the later study, we applied two rather different perspectives in the analysis. In one perspective we made a distinction between determinants and outcomes, integrating possible determining relations between the main concepts in a model. The second perspective takes a structural view with an aim to find groups of variables or indicators that tend to covary and form broader aspects or latent dimensions and also an aim determine if there are groups of companies with similar positions.

25
Quality of data

Below follows a summary of some data quality aspects for the four papers.

Table 1. Data quality aspects for the four papers.

<table>
<thead>
<tr>
<th>Type of sample and representativeness</th>
<th>Not random sample, but rather similar sector distribution to the whole small company population in Sweden. Possible selectivity bias, for example via prior interest for organizational change.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit of study, sample size</td>
<td>10 companies in Studies 1 and 2. In Study 3 the units are the 25 workplaces and 558 persons. In Study 4 the units are the 42 enterprises.</td>
</tr>
<tr>
<td>Non-response</td>
<td>12 % in Studies 1 and 2 and 16 % in Studies 3 and 4</td>
</tr>
<tr>
<td>Internal non-response</td>
<td>Generally low, ranging from no internal non-response to 5-15 % internal non-response for some more sensitive questions</td>
</tr>
<tr>
<td>Indicator reliability</td>
<td>For Studies 1 and 2, the indicator &quot;leader change competence&quot; is a composite indicator of four scales for which the Cronbach alpha reliabilities are between .837 and .954. The alpha values for the other competence indicators are in a similar range. For the indicators of determinants in study 4, the alpha values are between .551 and .909; eight of the thirteen indicators have alpha values above .8. The alpha value for organizational performance is .771 and for health performance .759.</td>
</tr>
<tr>
<td>Questionnaires used</td>
<td>In Studies 1 and 2, the questions are from Wikman (1991) and Anntila (1997). In Studies 3 and 4 the questions are from the Stress Management Center 'Organizational Profile' (Setterlind &amp; Larsson, 1995), the original Karasek-Theorell questions on demand-control², and from questionnaires developed by Nord-Trøndelag Research Institute (Sletterød &amp; Lyse, 2001). In Study 3 data from a workplace survey to the leaders was also used. This was based on questions from a number of sources; the indicator used here is from questions developed in the project.</td>
</tr>
</tbody>
</table>

The use of aggregated data together with individual data may create problems, as mentioned on page 190 in Paper 3. As for Paper 3, the possible bias arising from this level mix may be judged to be quite small. A more straightforward approach here would have been to use multi-level hierarchical data analysis, but this was a too resource-demanding an approach for this paper. Since we have cross-sectional data we could not test if a causal hypothesis was empirically supported without introducing several external assumptions. Thus, the results from this approach are mainly explorative and correlational/structural.

² These questions were given to the project through personal communication with Annika Härenstam of the Swedish National Institute for Working Life.

26
Summary of papers

In this section the results from the four papers are summarized. The results are grouped into four subsections. The first is about bivariate relations, the second is about structures of indicators (bundles), the third is about structures of enterprise groups and the fourth gives some additional results.

Bivariate relations

A summary table of the correlation and regression analysis results is given below in Table 2. In the table, those coefficients that represent strong or rather strong relations found in the four papers are noted. The table shows relations between the two outcomes indicators - health and organizational performance and between different determinant indicators and the outcome indicators. The detailed levels for the coefficients are specified below the table. A capital R indicates a regression coefficient and a capital C a correlation coefficient. The number after the letter refers to one of the four papers, for instance R3 indicates a regression coefficient found in Paper III.
Table 2. Overview of the correlation and regression analysis results.

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Health performance</th>
<th>Organizational performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational performance</td>
<td>R3, C4</td>
<td>R3, C4</td>
</tr>
<tr>
<td>Health performance</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Leadership</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respectful leadership</td>
<td></td>
<td>C4</td>
</tr>
<tr>
<td>Leader development competence</td>
<td>R3</td>
<td>C1, C1, R2</td>
</tr>
<tr>
<td>Leader change competence</td>
<td></td>
<td>C1, R2</td>
</tr>
<tr>
<td><strong>Learning</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adequate competence</td>
<td></td>
<td>C4</td>
</tr>
<tr>
<td>Learning problems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creative work</td>
<td></td>
<td>C4</td>
</tr>
<tr>
<td>Job meaningfulness</td>
<td>R2</td>
<td></td>
</tr>
<tr>
<td>Competence demands</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Healthy work organization</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work intensity demands</td>
<td></td>
<td>-(C4)</td>
</tr>
<tr>
<td>Working pace problems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychosocially demanding work</td>
<td>-(C4)</td>
<td>-(C4)</td>
</tr>
<tr>
<td>Demands higher than control</td>
<td></td>
<td>-(C4)</td>
</tr>
<tr>
<td>Data stress</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem solving intensity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decision latitude-Self determination</td>
<td>C1, R2</td>
<td>R2</td>
</tr>
<tr>
<td>Job content</td>
<td>R3</td>
<td></td>
</tr>
<tr>
<td>Team spirit-social support</td>
<td></td>
<td>C4</td>
</tr>
<tr>
<td>Restructuring worries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flat structure-hierarchy</td>
<td></td>
<td>R2</td>
</tr>
<tr>
<td><strong>Quality</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customer oriented practices</td>
<td></td>
<td>C4</td>
</tr>
<tr>
<td>Knowledge of workplace goals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Efficient use of technology</td>
<td></td>
<td>C4</td>
</tr>
<tr>
<td>Use of quality systems</td>
<td></td>
<td>C3</td>
</tr>
<tr>
<td><strong>Change strategy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ongoing programs</td>
<td>C1</td>
<td>R2</td>
</tr>
<tr>
<td>Change competencies</td>
<td>C1</td>
<td>R2</td>
</tr>
<tr>
<td>Change motivation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Key to signs used ("stand b" below means standardized regression coefficient):
- C = absolute value of r >= .7 or p(r) < .01
- R = p (absolute value of (stand b)) = < .01
- C = .7 < absolute value of r >= .6 or p(r) < .05
- R = .01 < p (absolute value of (stand b)) = < .05
- C = .6 < absolute value of r >= .4
- R = .05 < p (absolute value of (stand b)) = < .10
- (C) = .4 < absolute value of r >= .3

3 The C3 value refers to the non-ICT-companies in Fig 1 in Paper III.
In Papers I and II, no research questions were formulated about possible covariation between the two outcome indicators of health performance and organizational performance. According to the results in Papers III and IV, there are strong relations between these two indicators.

Paper IV is the only paper where a systematic investigation has been made with all possible relations between, on the one hand the determinants and on the other hand the outcomes. Thus, Table 2 is not to be read as a summary of a systematic investigation made in the same way in all papers. Sickness absence is analyzed only in Paper IV, but in the summary here it has been integrated in with the outcome variable of health performance; the results substantially coincide for these two indicators.

With health performance as an outcome indicator there are strong or rather strong positive relations with the determinant indicators of leader development competence, leader change competence, job meaningfulness, self determination, job content, team spirit, ongoing programs and change competencies. There is a rather strong negative relationship with psychosocially demanding work.

For organizational performance as an outcome indicator, there are strong or rather strong positive relationships with the determinants of respectful leadership, leader change competence, adequate competence, creative work, self determination, team spirit, organizational (flat) structure, customer oriented practices, efficient use of technology, use of quality systems, ongoing programs and change competencies. There are strong or rather strong negative relationships with work intensity demands, psychosocially demanding work, demands higher than control and data stress.

**Structures of indicators**

In Papers II and IV results from structural analyses are presented showing covariation between indicators in the studies. The method used is principal factor analysis (varimax rotation in Paper II, oblimin rotation in Paper IV). In both papers six components emerged using the eigenvalue 1 criterion. Since two quite different questionnaires and sets of indicators were used in the two studies a discussion comparing the emerging components in the two papers is difficult.

However, some similarities can be pointed out. Component 1 in Paper IV, high work demands, roughly corresponds to component 3 in Paper II, stress and high work demands. Component 2 in Paper IV, performance drivers, has some correspondence to components 1, high performance organizational aspects and component 4, change propensity in Paper II. Component 4 in Paper IV, general

As a comprehensive comment one might say that the analysis in both papers shows that indicators tend to group into larger bundles; although the content of these bundles varies due to differences between the sets of input variables.

**Structure of enterprise groups**

The results discussed in this section are between similarities-differences between enterprises, while the former section was about similarities between variables.

Figure 6 which is in Paper II shows an example of an explorative grouping of companies with a tendency for profit per capita to co-vary with structure and leader change competence and the interaction between these two variables. Table 1 and Figure 2 which is in Paper I give examples of structural differences between companies concerning sector, competition level, structure, network integration, if the companies have an ongoing program, use of quality systems and credit rating worthiness.

In Paper IV a more comprehensive analysis is performed concerning grouping of enterprises, using multidimensional scaling (MDS). An assumption for the MDS analysis is that the emerging dimensions are uncorrelated; this is contrary to the assumptions contained in the first part of Paper IV where one of the research questions is whether there is a correlation between the outcome indicators. The MDS analysis gives a rather clear structuring in the two main dimensions, "supportive and efficient organization" (a combination of the indicators respectful leadership, team spirit, customer satisfaction and workplace adaptability, and in the opposite direction, demands higher than control, perceived lack of efficiency and sleep problems) and "general health performance" (a combination of the same indicators as on component 4 in the principal component analysis - that is, physical health, psychological well-being, mean sickness absence days per year, depressed mood-worries and musculoskeletal symptoms). This result could be useful for classification or grouping purposes but can not be used in a discussion about correlation between these dimensions since this correlation is close to zero as a method artefact.

This analysis shows that many aspects related to organizational performance – or a "supportive and efficient organization" as the dimension is named here - are
inter-related and also that several health aspects co-vary forming the dimension called “general health performance” which is very similar to the component with the same name in the principal component analysis. This dimensional analysis leads to a grouping of enterprises and, for instance, an identification of enterprises with high positions on both dimensions versus enterprises with low positions on both dimensions.

**Additional results**

In Paper I an interesting finding regarding relations between determinants is that there are strong or rather strong assumed relationships between leader change competence and the amount of learning problems perceived by the employees, perceived ergonomic tension, stress, musculoskeletal and psychosocial ill health. Another interesting finding is that there is a strong correlation \( (p = 0.026) \) between leader change competence and co-worker change competence. In the companies with high psychosocial ill health the leader’s self-estimated change competence is much higher than the co-worker judgments of this competence. There is less psychosocial ill health in companies where the competence judgments are more corresponding. The same tendency, although less clear, is seen concerning musculoskeletal problems. There is a strong correlation \( (p = 0.005) \) between competence difference as described above and self-determination of working pace problems. There is also a rather strong correlation between self-determination of working pace and psychosocial health. For the companies in this study, the relationship is significant at the 5%-level.

In Paper III leaders in the studied companies consider that the most important areas for change are: quality aspects, psychosocial conditions, educational investments, working environment, work organization and leadership.
Discussion and conclusions

In this final section the results of the four empirical studies will be discussed in the light of the purpose and research questions addressed in the thesis. The results will also be related to some theoretical aspects and other research of relevance for “healthy performance” in small enterprises.

The first question in the thesis was if there are there any empirical relationships between performance indicators (outcomes) such as organizational performance, health performance and sickness absence. Three types of answers are given to this question. In Paper IV a bivariate correlation analysis showed a rather strong correlation ($r=.33$, $p=.031$) between the outcome indicators organizational performance and health performance. In Paper III a multiple regression analysis showed that a company’s credit rating is negatively related to musculoskeletal tension ($\beta=-.211$, $p=.000$). In Paper IV (Table 3 of Paper IV) the component respectful leadership and creativity correlates strongly ($r=.387$, $p<.05$) with general health performance. Taken together these three findings may be interpreted as evidence of a rather strong relationship between the two outcomes in the analysis model in Figure 1 contained in the analysis model section of this narrative. As pointed out in the above section on the summary of the papers, the pattern of the findings for sickness absence are similar to findings for health performance.

However, much discussion among researchers and practitioners is focused on possible causal relations. One argument is that “richness creates health”- economically well-performing companies allocate resources for investments that lead to personnel health (Håkansson, 1995; Lindström, 2000). Another way of thinking (represented by, for instance, Pfeffer, 1998) is that employee and workplace health development leads to more productive employees which in turn leads to better organizational performance. Thirdly, one might also consider the two outcomes to be interdependent. To give an answer as to which of these three possible causal relations is most adequate other types of data than what is in this thesis is needed. At least these results do not refute the ideas about a link between health and organizational performance as discussed in the introduction section.

The second question is about what empirical relationships can be found between outcome indicators (of organizational and health performance) and indicators of assumed organizational determinants. A general result is that there are more strong relations between determinants and organizational performance than between determinants and health performance. Another comprehensive observation is that several indicators from the five groups (leadership, learning,
healthy work organization, quality, change strategy) of determinants correlate strongly with organizational performance while there are fewer correlations with health performance.

A remarkable pattern is that many healthy work organizational indicators have strong relations with organizational performance while only a few correlate strongly with health performance. That there are no strong relations between several of the healthy work organizational indicators and the indicator health performance is somewhat contrary when compared with many earlier research studies. Here some further comments are offered concerning this point. Much of the conceptual and empirical research on healthy work indicators has had its focus on larger companies. However, as has been noted in the literature overview, small firms seem to have other patterns than larger ones. One example of this is the “low sickness absence paradox” mentioned in the introduction section – although small companies have relatively high levels of injuries and small resources for work environment development the sickness absence levels are much lower than in larger companies. In a similar way, it is possible that the relationships between many healthy work organization indicators and health performance would be lower in small companies. A clarification of this issue would demand studies about processes and mechanisms in this area which is out of the scope of this thesis. However, the findings here might be seen as openings for further research.

The findings on strong relations between, on the one hand, leadership indicators and team spirit and, on the other hand, health performance, are compatible with the research about the specific importance of these factors in small companies (Beckérus & Roos, 1985; Bornberger et al., 2003). The findings on rather strong relations between quality indicators and organizational performance are in line with other studies about quality development in small enterprises (Anderson & Sohal, 1999; Hansson, 2003). The finding that there are no strong relations between quality indicators and health performance open possibilities for further research in this area and might also be seen as (partly) in line with the views of Axelsson (2000) and Bejerot & Hasselbladh (2002).

As a summary comment it might be said that the rather large number of strong relationships found with organizational performance is compatible with most of the findings regarding the central areas mentioned in the literature overview. That these results apply to small companies here might be seen as a contribution to the rather small amount of studies concerning these areas in SME research.

On the third question, “Is there a bundling tendency, that is, a tendency for several organizational aspects to co-vary in small firms and, if so, is it possible to find groupings of co-varying indicators?” The principal component analysis
results give a clear affirmative answer. Thus, these results complement recent studies by, for instance, McDuffie (1995), Whitfield (2000) and Wood & Albanese (1995) – it is noteworthy that the results here for small companies have similarities with the earlier research results for larger companies.

On the fourth question, “Is it possible to find groups of companies that are similar in the sense that they have similar indicator patterns?” the multidimensional scaling results give a clear affirmative answer. This finding relates to recent research by, for instance, Way (2002) and Lepak & Snell (2002) about configurations of companies. The finding is also in line with empirical results about differences between small companies concerning network intensity and goals for workplace change processes (Gelin & Vinberg, 2000).

The findings regarding questions three and four have a bearing for the fifth question on conclusions for the design of workplace change processes. These findings may give some support to actors working with a concept-driven or holistic approach integrating several aspects instead of focusing on a particular process in isolation. They also complement, for small companies, McDuffie’s (1995) point that innovative HR practices affect performance not individually but as interrelated elements in an internally consistent HR “bundle” or system. The findings also coincide with findings by Gustavsen (1995) about the importance of holistic concept-driven change strategies and change programs. The bivariate results also support this holistic view.

The studies here are innovative in the sense that they contain responses from both co-workers and company leaders for small enterprises. But, some data are cross-sectional and the results should therefore be interpreted with caution and be seen as mainly explorative. Outcomes are mainly measured by survey questions. The measurement problems, which may have been created by the use of such survey questions, have to some extent been remedied by the rather detailed multivariate indicator construction work. In future research however, financial and other performance information as well as health outcome data from registers and other systems should be used as a complement. We have tried to avoid a causal language and instead used a grouping of indicators into determinants and outcomes and also applied a structural perspective and structural analysis methods instead of cause-effect reasoning. The studies reported in Papers III and IV used data from the first phase of a longitudinal project. When data from the second phase will be available for analysis it will be possible to go a bit deeper into discussion about mechanisms and consequences of change programs.

In summary, this study has given evidence of some links between organizational factors such as aspects related to leadership, learning, healthy work
organization, quality and change strategy, and outcomes related to organizational and health performance in small enterprises. The fields covered here are in much need of conceptual development and integrative analysis to guide more specific analyses. Using different methods we have also found some evidence of interest for practitioners working with SME workplace health promotion and organizational development. The most important finding in this respect seems to be the inter-relatedness of a large number of factors. The fact that it was possible to single out enterprise segments with similar positions on general dimensions gives credibility to change strategies oriented to multi-purpose change processes.
References


Models for Competence and Health Development in Small Business Enterprises

Stig Vinberg, Gunnar Gelin and Karl W Sandberg
National Institute for Working Life, Östersund, Sweden
Mid Sweden University, Östersund, Sweden

Abstract

The focus in this study is to investigate conditions and analyze relationships between factors in ten small companies related to organizational change using an integrated conceptual model. The results point in the same direction as other small company research on the need for competence and health development in companies of this type. Interesting findings are that there is a statistically significant positive correlation between leader change competence and profits, and a rather strong but not significant negative correlation between leader change competence and the amount of learning problems perceived by the employees. Companies with a high leader change competence also tend to have a low level of perceived ergonomic tension. This tendency is statistically significant at the 1% level. There is also a rather strong correlation between leader change competence and coworker change competence. This may be due to the leader’s influence on the personnel but may also be the result of a common factor: more change prone companies tend to have more change competence both on the leadership and coworker level. The analysis model seems to give a good integration of the results but, in forthcoming studies, underlying mechanisms must be addressed.

Keywords: Small enterprises, Competence, Ergonomics, Workplace program, Leadership.

1. Introduction

In recent years small enterprises have attracted an increasing attention. Integrated networks of small companies are often seen as promoting economic growth and new jobs (Castells 1996). Investments in competence development are looked upon as a key factor for increasing enterprise productivity, innovation ability and competition power (Adler 1992; Anttila 1997; Ellstöm & Nilsson 1997). The increasing importance of learning in working life is related to productivity economy issues, working environment and pedagogy aspects (Ellström 1996). Extensive research shows that a working environment which permits and stimulates learning and competence development, is of fundamental importance for employee health, well-being and individual development (Gardell 1976; Aronsson 1987). Health related costs, which in many cases can be a considerable burden for business, can be lowered by improved organizational structures, increased change competence, ergonomic measures and healthier personnel (Vinberg et al. 1998; Landstad 1999). Recent research has shown that the type of change strategy is fundamental in influencing the outcomes of a workplace oriented change project (Gustavsen 1998).
2. Aims, methods and study design

The purpose of the study is to investigate conditions and analyze relationships between factors in small companies related to organizational change using an integrated conceptual model (Figure 1).

A test group of ten small enterprises from both the industrial and service sectors participated, 20 leaders and 82 coworkers. The leaders' and co-workers' competence within certain critical areas, such as competence for change, organizational competence for working environment, work organization, and health were mapped. Both groups answered a questionnaire in which they rated each other's ability in the mentioned areas. Statistical data analysis resulted in different competence and health indices. Data concerning economic outcome and economic analysis of human resources was carried out in each of the ten companies. Semi-structured interviews with the leaders and co-workers provided information about competition levels and organizational aspects and networking interactions. Empirical measures corresponding to the different concepts are discussed in Vinberg et al. (1998).

3. Empirical results

In the table on the following page, descriptive profiles for the companies are shown. As regards profit, interesting differences can be seen, particularly between companies with a flat organization structure and more hierarchical companies. Service sector companies also seem to have a higher profit level compared with industry companies. The figures for the educational investments per employee refer to the year before the intervention and are at a medium level compared to other small companies in Sweden.
Table 1. Descriptive profiles for the companies in the sample.

<table>
<thead>
<tr>
<th></th>
<th>Yearly profit per employee, thousands of skr</th>
<th>Educational investments per employee, thous. of skr</th>
<th>Mean number of employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sector</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry</td>
<td>23.25</td>
<td>3.79</td>
<td>12</td>
</tr>
<tr>
<td>Service</td>
<td>51.85</td>
<td>2.46</td>
<td>14</td>
</tr>
<tr>
<td>Competition level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>38.28</td>
<td>3.69</td>
<td>13</td>
</tr>
<tr>
<td>High</td>
<td>42.54</td>
<td>2.29</td>
<td>14</td>
</tr>
<tr>
<td>Structure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More flat</td>
<td>76.51</td>
<td>2.26</td>
<td>7</td>
</tr>
<tr>
<td>More hierarchical</td>
<td>16.35</td>
<td>3.48</td>
<td>17</td>
</tr>
<tr>
<td>Network integration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>31.86</td>
<td>3.03</td>
<td>11</td>
</tr>
<tr>
<td>High</td>
<td>48.96</td>
<td>2.95</td>
<td>15</td>
</tr>
</tbody>
</table>

Ill health indices based on measurements made before the intervention started show that the companies starting workplace programs tended to have less ill health than those not starting such programs (figure 2). A possible mechanism behind this may be that companies with a high change propensity at the same time have a lower level of ill health and an interest for change.

Figure 3. Leader change competence, profits and perceived learning problems.
There is a statistically significant positive correlation between leader change competence and profits, and a rather strong but not significant negative correlation between leader change competence and the amount of learning problems perceived by the employees. This might be seen as different aspects of “learning organization” concepts (figure 3).

Figure 4. Leader change competence, perceived ergonomic tension and stress.

Companies with a high leader change competence also tend to have a low level of perceived ergonomic tension (figure 4). This tendency is statistically significant at the 1%-level. The same tendency although less strong is seen with stress. High leader change competence may be more prevalent in companies with less working environment problems, but there may also be a direct influence on the work environment from leaders. It is not possible from this study to say which of these or other possible causal relations that are dominating.

Figure 5. Leader change competence, musculoskeletal and psychosocial ill health.

As in Figure 4, leader change competence is negatively related to musculoskeletal and psychosocial ill health, in the former case significantly (figure 5).
An interesting finding is that there is a rather strong correlation \( (p = 0.026) \) between leader change competence and coworker change competence (figure 6). This may be due to the leader’s influence on the personnel but may also be the result of a common factor: more change prone companies tend to have more change competence both on the leadership and coworker level.

In the companies with high psychosocial ill health, the leader’s self-estimated change competence is much higher than the coworker judgments of this competence, while there is less psychosocial ill health in companies where the competence judgements are more corresponding (figure 7). The same tendency, although less clear, is seen concerning musculoskeletal problems.
Self determination of working pace problems

- The diagram to the left, in figure 8, shows that there is a strong correlation ($p = 0.005$) between competence difference as described above and self-determination of working pace problems. Thus it seems that not only ill health but also other work environment aspects are related to this competence difference. The tendency in the diagram to the right is in line with much other research on relationships between decision latitude at work and psychosocial well being (Karasek and Theorell 1994). For the companies in this study the relationship is significant at the 5%-level.

4. Discussion and conclusion

The present study is small and even if it may be seen as “fairly” representative of small companies in these sectors in Jämtland County, Sweden, the results should be interpreted with caution.

The results point in the same direction as much other small company research on the need for competence and health development in companies of this type. Since there seems to be reinforcing mechanisms causing active companies to start change processes more often than others, possible reinforcements for inactive companies should be investigated.

The findings on the strong relations between leader change competence and profit, stress, ergonomic tensions, perceived learning problems and health point to the importance of action towards increasing leader change competence. On the other hand one must also study the determinants of leader change competence.

Differences between self-estimated leader change competence and coworker judgements covary with both working environment factors and health. The mechanisms behind this will be studied in more detail in forthcoming research.

The analysis model seems to give a good integration of the results but underlying mechanisms must be dealt with.
5. References


Information technology levels, competence development and performance in Swedish small business enterprises

STIG VINBERG†, GUNNAR GELIN‡ and KARL W. SANDBERG*

†National Institute for Working Life, Ostersund Branch, Sweden; e-mail: stig.vinberg@niwl.se
‡Private statistical consultant, Sweden; e-mail: gunnargelin@hotmail.com
*National Institute for Working Life, Ostersund Branch and Luleå University of Technology, Sweden; e-mail: karl.w.sandberg@niwl.se

Abstract. This paper analyses relations between leaders' and co-workers' competence, IT-levels and organizational aspects within ten small business enterprises in Sweden. Data from questionnaires and semi-structured interviews were used for statistical data analyses organized in four steps. A result is that IT-levels and change competence go together with higher levels of educational investment, and that companies with high levels on these aspects also tend to have a proneness for joining change programs. Another finding is that the higher the rate of IT in a company, the lower the incidence of musculoskeletal problems among employees. The study shows that an increase in leader change competence, a flat organization, a higher leader than co-worker change competence, and an ongoing program contribute significantly to profit per capita at the company level. The analysis model seems to give a good integration of the results, but underlying mechanisms must be dealt with in future research.

1. Introduction

Today's economies are increasingly based on knowledge, which is codified in systems, manuals and information technology soft/hardware or situated in more macro factors such as organizational learning, communities of practice and organizational cultures. In the Organization for Economic Co-operation and Development (OECD), the GDP share of knowledge based industries is now more than 50%, up from 45% in 1985. In the Nordic countries, investment in research and development, software and public spending on education is 9–10% of GDP, a figure similar to investment in physical equipment (OECD 1999). Another tendency is that boundaries between organizations are becoming more diffuse, while inter-organizational relations and networks grow in importance (Håkansson and Johanson 1993, Castells 1996, Araujo 1998). These tendencies have led to an increased interest in analysing and developing small and medium-sized enterprises (SMEs), and also to research into the antecedents and consequences of investments in SME competence development (Ylinenpää and Havenga 1997, Rantakyrö 1998, Stymne et al. 1999), information technology sophistication (Pollard and Hayne 1997, Fink 1998, Silliance et al. 1998, Andersson 1999) and organizational—human resource development (Barth 1999, Pfeffer 1998).

In recent years, many researchers have focused either on 'organizational learning' i.e. studies of the nature of the learning process (Lave and Wenger 1991, Hedlund and Nonaka 1993, Easterby-Smith and Araujo 1999) or on the 'learning organization', that is action oriented approaches, geared to promoting learning processes inside organizations (Garvin 1993), with little agreement between researchers about the nature of learning within organizations or of facilitating/inhibiting factors. In this article we will concentrate on three learning organization aspects, namely:

- Leader and co-worker change motivation.
- Change competence.
- Differences between leaders' and co-workers' learning processes.

Leaders' learning has attracted research attention (e.g. Antonacopoulou 1999), and results demonstrate the impact of both individual and organizational factors on
leaders' learning. Learning seems to be most effective when managers themselves recognize a learning need and when they are motivated to engage in this process (Lloyd 1990).

Increasing information technology levels in learning organizations is looked upon as an enabling factor for strengthening productivity, innovation and competitive power (Adler 1992, Anttila 1997, Ellström and Nilsson 1997). Information technology support is both an important condition for higher employee participation in problem solving and product development, and a factor in creating structural change and organizational redesign. Historically, small enterprises have not adopted IT as much as larger companies, but in the 1990s SME executives seem to have become more interested in IT systems (Igbaria et al. 1998, Sillince et al. 1998).

Regarding Human Resource Management (HRM) and Human Resource Development (HRD) aspects, including health and working environment issues, research has shown clear relationships between these aspects and organizational structures, which permit and stimulate learning and competence development (e.g. Aronsson 1983, Huselid 1995). Comparisons between small and large companies or studies of specific conditions in SMEs have been made by Becker and Gerhart (1996), Antonsson et al. (1998), Wagar (1998) and Lindmark (1999). Another related question of interest is whether the so-called ‘bundling tendency’ (MacDuffle 1995) — where several organizational factors tend to appear together — also exists in small firms.

In an earlier study (Vinberg et al. 1999), we looked at relationships at company level between competence indicators, and profit and health levels in a research project aimed at small business enterprises. Concerning leader change competence and profits we found a strong positive correlation, while there was a negative correlation between leader change competence and learning problems experienced by employees. Co-worker and leader change competence co-varied strongly. In this article, using both company and individual level data, we will develop those initial findings presented in our earlier pilot study.

2. Purpose, data, study design and statistical data analysis

2.1. Purpose

This study analyses relations between IT-levels, competence development, change programmes and different outcomes in small companies guided by an integrated conceptual model (figure 1).

The following main questions are studied:

- Is there a bundling tendency in SMEs? That is, does the co-variation found in studies of large companies, with different organizational factors forming integrated ‘wholes’, also show up among small enterprises?
- What empirical relationships can be found between outcomes or performance indicators such as profit, ill-health, stress, meaningful work and certain determinant factors or ‘drivers’ such as IT-levels, change competence levels and time given to problem solving at work?
- What impact might perceptional differences in competence and motivation between leaders and co-workers have on different outcomes?

2.2. Data and study design

A group of ten small enterprises from both the industrial and service sectors participated in the study. In total, there were 20 company leaders and 82 co-workers. The leaders' and co-workers' competence within certain critical areas, such as competence for change, working environment, work organization, and health was mapped. Both groups answered a questionnaire in which they rated each other's ability in the above areas mentioned. Indices of basic competence and health were constructed. Data concerning economic outcome and economic analysis of human resources was also collected in each of the ten companies. Semi-structured interviews with the leaders and co-workers provided information about IT levels, competition levels and organizational aspects. Empirical measures corresponding to the concepts are discussed in Vinberg and Malmquist (1998). A summary is also given in the appendix.

2.3. Statistical data analysis

The analysis was organized in four steps. First, scales and indices were constructed based on earlier knowledge.
of the questions used (see appendix). Then the resulting set of questions, indices and scales was used as input to an explorative principal component analysis. The dimensions emerging from this step are discussed in section 3. In the third step, regression analyses were carried out with four outcome variables or performance indicators: profit per capita, musculoskeletal ill-health, high stress demands and meaningful work as dependent variables, and relevant indices or single variables as independent variables. The explanatory models which emerged from the application of these steps are presented and commented upon in section 3.2. In the fourth step, scatterplots are used to illustrate and reflect on some interesting bivariate relationships.

3. Analysis results

3.1. Interrelationships and bundles

The variables and constructed indices used in the study are presented in detail in the appendix. Table 1 shows the results of a principal component analysis with the 19 measures used in the study as inputs. Six components emerge.

The factors that are strong indicators of the first component are high profit per capita (PROFCAPI), leader change competence (LEADCHCO), a flat (in contrast to a hierarchical) organization (HI), leader change motivation (LEDMO16) and the difference between leader change motivation and co-worker change motivation (DIFFMOTI). This component is here labelled High performance organizational aspects.

The next component is described as information technology level and competence drive and consists of company educational investments per employee (EDUCAPI), an ongoing program of company change (ONGPROG) and IT-levels (ITLEVEL) as strong indicators.

The variables with high loadings on the third component are related to stress and high work demands: how much working time is devoted to hard problem solving (PROBSOLV), a job stress index (STRESSPR), an index measuring support and encouragement (SUPPORT), a measure of educational job demands (EDUCDEMAN), and an index measuring psycho-social ill-health (UNHPSYR).

Component four is about change propensity, with two high loading indicators: co-worker change motivation (MOTIVUTV) and the difference between the leaders' own perception of their change competence and co-workers' assessment of their leaders' change competence (DIFFCOMP).

Component five is about ergonomic and musculoskeletal problems (ERGOPR and UNHMUSR). The two variables loading high on component six measure job meaningfulness and self-determination (MEANING and SJALVDET).

The principal component analysis resulted in a pattern of input variables, which showed a number of interrelated organizational aspects forming 'bundles' in a similar fashion to results presented by, for example

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profit per capita (PROFCAPI)</td>
<td>0.826</td>
<td>0.088</td>
<td>0.079</td>
<td>0.156</td>
<td>0.270</td>
<td>-0.218</td>
</tr>
<tr>
<td>Leader change competence (LEADCHCO)</td>
<td>0.753</td>
<td>0.277</td>
<td>0.222</td>
<td>0.016</td>
<td>0.333</td>
<td>-0.036</td>
</tr>
<tr>
<td>Flat versus more hierarchical organization (HI)</td>
<td>-0.748</td>
<td>0.452</td>
<td>0.131</td>
<td>0.161</td>
<td>0.096</td>
<td>-0.004</td>
</tr>
<tr>
<td>Leader minus co-worker change motivation (DIFFMOTI)</td>
<td>0.721</td>
<td>0.150</td>
<td>-0.215</td>
<td>0.237</td>
<td>-0.129</td>
<td>0.472</td>
</tr>
<tr>
<td>Leader change motivation (LEDMO16)</td>
<td>0.606</td>
<td>0.018</td>
<td>-0.313</td>
<td>0.459</td>
<td>-0.215</td>
<td>0.433</td>
</tr>
<tr>
<td>Educational investments per employee (EDUCAPI)</td>
<td>0.093</td>
<td>0.870</td>
<td>0.087</td>
<td>-0.035</td>
<td>0.154</td>
<td>0.034</td>
</tr>
<tr>
<td>Ongoing program of company change (ONGPROG)</td>
<td>-0.104</td>
<td>0.802</td>
<td>-0.170</td>
<td>-0.237</td>
<td>-0.079</td>
<td>-0.017</td>
</tr>
<tr>
<td>Information technology level (ITLEVEL)</td>
<td>0.536</td>
<td>0.710</td>
<td>0.111</td>
<td>0.159</td>
<td>0.290</td>
<td>-0.038</td>
</tr>
<tr>
<td>Problem solving intensity at work (PROBSOLV)</td>
<td>0.138</td>
<td>-0.036</td>
<td>0.823</td>
<td>0.071</td>
<td>0.162</td>
<td>0.201</td>
</tr>
<tr>
<td>Job stress problems (STRESSPR)</td>
<td>-0.082</td>
<td>-0.117</td>
<td>0.732</td>
<td>0.113</td>
<td>-0.328</td>
<td>-0.054</td>
</tr>
<tr>
<td>Amount of support (SUPPORT)</td>
<td>0.168</td>
<td>-0.098</td>
<td>0.644</td>
<td>0.183</td>
<td>0.227</td>
<td>0.087</td>
</tr>
<tr>
<td>Educational job demands (EDUCDEMAN)</td>
<td>0.064</td>
<td>0.369</td>
<td>0.426</td>
<td>-0.014</td>
<td>0.391</td>
<td>0.178</td>
</tr>
<tr>
<td>Psycho-social ill-health (UNHMUSR)</td>
<td>0.215</td>
<td>0.079</td>
<td>0.406</td>
<td>0.257</td>
<td>-0.331</td>
<td>-0.007</td>
</tr>
<tr>
<td>Co-worker change motivation (MOTIVUTV)</td>
<td>-0.131</td>
<td>-0.165</td>
<td>-0.129</td>
<td>0.879</td>
<td>-0.111</td>
<td>-0.040</td>
</tr>
<tr>
<td>Leader change competence minus co-worker conception of leader change competence (DIFFCOMP)</td>
<td>0.114</td>
<td>-0.005</td>
<td>0.191</td>
<td>0.843</td>
<td>0.227</td>
<td>-0.145</td>
</tr>
<tr>
<td>Ergonomic problems (ERGOPR)</td>
<td>-0.115</td>
<td>-0.078</td>
<td>0.087</td>
<td>-0.030</td>
<td>-0.660</td>
<td>-0.022</td>
</tr>
<tr>
<td>Musculoskeletal ill-health (UNHMUSR)</td>
<td>-0.038</td>
<td>-0.111</td>
<td>0.163</td>
<td>-0.034</td>
<td>-0.642</td>
<td>-0.099</td>
</tr>
<tr>
<td>Self-determination in job (SJALVDET)</td>
<td>-0.054</td>
<td>0.106</td>
<td>0.063</td>
<td>-0.096</td>
<td>0.064</td>
<td>0.806</td>
</tr>
<tr>
<td>Job meaningfulness (MEANING)</td>
<td>0.027</td>
<td>-0.288</td>
<td>0.129</td>
<td>-0.037</td>
<td>0.466</td>
<td>0.630</td>
</tr>
</tbody>
</table>
Huselid (1995) and MacDuffle (1995). The first three components were particularly interesting.

The high performance organizational aspects component implies that a flat organization, leader change competence and leader change motivation are interrelated and that such factors are also related to high profits, which is in accordance with organizational development research findings compiled by, for example Pfeffer (1998: 31–63). Since the main part of this research was carried out in large companies, it is noteworthy that this study has reached similar findings, based on a sample of small enterprises.

The information technology level and competence drive component indicate that high information technology levels go together with higher levels of educational investment and that companies of this type also tend to introduce programs of company change.

The stress and high work demands component seems to capture important parts of this much debated problem area.

3.2. Regression analyses with four performance indicators as dependent variables

In this analysis phase four outcome measures, or performance indicators, were used:

- **Profit per capita**, which can be seen as a goal or performance indicator for company stakeholders or owners and in most cases also for company leaders, especially in small business enterprises, and also, in those with profit sharing programs for employees.
- **Physical ill-health**, an inverted performance indicator for employee health promotion and also in varying degrees for almost all employees.
- **High stress/demands in jobs**, an inverted performance indicator to which public attention is rising rapidly as an increasing part of the labour market seems to contain stressful jobs.
- **Meaningful jobs with self-determination**, an outcome or performance indicator in visions of 'good work', potentially relevant for all employees.

Separate stepwise multiple regressions ($p_{in} = 0.05$, $p_{out} = 0.10$) have been made for each indicator with all other nonredundant variables in the factor analysis list as potential independent variables in the first step. The risk for multicollinearity problems seems to be low, with low intercorrelations between explanatory variables and no instances with high VIF-values. The results are summarised in the figures below, with standardised beta-values to facilitate comparisons. Only variables with coefficients significant on the 0.05 level are included. The adjusted $r^2$-value, showing the explained share of the total variation in the dependent variable, adjusted for the number of explanatory variables, is shown to the right. In the first analysis, with profit per capita as the dependent variable, two more variables were included in steps five and six, but since the interpretation of these models is complicated we have chosen to present a more robust model with four explanatory variables. Detailed computer output is available upon request from the first author.

As figure 2 shows, four variables explain 79% of the company variation in profit per capita. An increase in leader change competence, a flat organization, a higher leader than co-worker change competence, and an ongoing change program contribute significantly to profit per capita at the company level.

Three variables explain 26% of the physical ill-health variation among the employees (see figure 3). An increase in enterprise information technology level and more meaningful jobs both tend to lower physical ill-health, while stress problems co-vary with physical ill-health.

Figure 4 shows that a large share of the variation in high job demands and stress remain unexplained in this analysis. However, leader change competence co-varies with this outcome, so a rough summary of the results in figure 2 and figure 4 regarding these aspects might be that a high level of leader change competence is
associated with both high profit levels and high stress levels. As figure 5 shows, four variables explain about 24% of the employee variation in the index measuring self-determination and meaningful job, with level of problem solving demands having the largest coefficient. A higher leader than co-worker motivation level is positively associated with this outcome, while profit per capita and stress problem level are negatively related, indicating that contradictory situations may exist in some firms.

3.3. Illustrations and comments on three particular findings

Here we will comment on three relationships of particular interest found in the regression analyses, and also present illustrative scatter-plots (sometimes such plots may give slightly distorted and simplified views compared with the regression results, sometimes they may give a more accurate description).

Figure 6 shows that there is a clear relationship between mean leader change competence and profit per capita at the company level, and that this co-variation is stronger for companies with a flatter structure than for companies with a more hierarchical structure. There thus tends to be an interaction between flat-hierarchical structure and leader change competence; when a company has both a flat structure and a leadership with a high level of change competence, profit levels tend to be higher than the sum of the two effects.

Figure 7 illustrates the strong negative relationship between IT-level and level of musculoskeletal problems. Current discussions of health problems in the IT-sector, for example on new forms of loading injuries associated with computer work, have tended to focus on particular sectors and neglect the fact that information technology penetrates almost every economic sector. The figure shows that in this sample of small firms with a broad sectoral variation, the higher their IT-level, the lower is their mean level of musculoskeletal problems. In the absence of more information, the correlation shown above may of course not be interpreted as the result of a direct causal path, from increasing IT-levels to lowering of musculoskeletal problem levels. Instead, it is prob-
ably more reasonable to interpret the tendency shown as being due to other organizational and/or technological factors determining both the IT-level and the level of musculoskeletal problems in a company.

Figure 8 shows the values for all employees’ perceived levels of self determination and their problem solving intensity at work. It also shows smoothed points (the filled circles) according to the equation $S = a + b_1P + b_2P^2$ (where $S$ is perceived self determination level and $P$ is problem solving intensity at work). An inverted u-curve emerges, with a maximum for problem solving intensity level around four. A possible interpretation of this is that there may be an ‘optimal stress level’, here indicated by the level four on the problem solving intensity measure, which may also be in line with some research on negative and positive stress, done in large companies (Karasek and Theorell 1990, De Jonge and Kompier 1997).

4. Discussion

The present study is limited in scale and the results should be interpreted with caution. The main emphasis of the study, guided by an integrated conceptual model, focused on analysing the relationship between IT-levels, leaders’ and co-workers’ change competence and different outcomes at both individual and organizational levels. The analysis model seems to provide a satisfactory integration of the results, but underlying mechanisms must be dealt with in more detail in future research.

Since we in this study sometimes mix organizational and individual data, there is a risk for ecological and/or atomistic fallacies, to use the terminology introduced by Diez-Roux (1998). For instance, when organizational data are used in individual level data analyses, the lack of intra-company variation may bias the estimates. Results from some small sensitivity analyses indicate that the possible amount of such bias may be small. However, in forthcoming research with larger data sets we will use hierarchical multilevel regression methods (Bryk and Raudenbush 1992) as well as structural equation modelling of relations between several outcomes, since we believe these methods to be more adequate.

Much of the public discussion in Scandinavia on the possible consequences of information technology on job content and employee health has been about rather sharply demarcated IT-sector companies in the info-com and system development sectors. A general segregated picture is given, with extreme growth, stress and burn-out tendencies in the advanced IT-companies and dull, low competence jobs with musculoskeletal problems in the not so advanced companies. In this paper we have taken another perspective, looking on relations between the use of Information Technology and other organizational and competence aspects in small companies outside of the specific IT-sectors. Some points coming out of this analysis are briefly summarized here.

- A clear result in the principal component analysis (component two) is that information technology levels and competence drive (indicated by the company having an ongoing program) go together with higher levels of educational investments.
- The high performance organisational aspects component implies that a flat organizational structure, leader and co-worker change competence and leader change motivation are interrelated, and that these are also related to company profits. These findings are similar to other research on organizational development in large companies (Pfeffer 1998, MacDuffie 1995). Thus, it seems that at least some high performance aspects operate in an integrated way both in large and small companies.
- The interaction tendency found, that the correlation between leader change competence and profit level is stronger in organizations with a flat structure than in organizations with a more hierarchical structure, is also in agreement with some other organizational research, for instance the findings summarized in Pfeffer (1998).
- Another interesting finding is that the higher the IT-level in a company, the lower the incidence of musculoskeletal problems among employees. The
The mechanisms behind the relationship must be studied in more depth, for instance trough case studies of particular work designs and technologies, before evidence-based conclusions can be made.

- The relation between perceived levels of self-determination and problem solving intensity among co-workers indicates that the relationship has the shape of an inverted u-curve. Thus, there may be an optimal stress level at a medium level of problem solving intensity.

- We also find it remarkable that as much as 79% of the variation in profit level is explained by four aspects which may be said to belong to the 'high performance organization bundle'.

The findings of a strong relationship between leader change competence and profit, stress, ergonomic tensions, perceived learning problems and health point to the importance of action towards increasing leader change competence, and that one must also study the determinants of leader change competence. Differences between self-estimated leader change competence and co-worker judgements of this competence co-vary with both working environment factors and health. The mechanisms behind this will be studied in more detail in forthcoming research.

References


BARTH, H. 1999, Barriers to Growth in Small Firms: Licentiate Thesis, Luleå University of Technology, Department of Business Administration and Social Science.


Appendix: Variable definitions and data collection methods

The study is two-level, using both organizational level data for the ten companies and individual level data for the leaders and co-workers in these companies. Reversals have been made when appropriate so that all indices go in the same direction.

A. Direct organization measures: profit level, IT-level, flat structure, educational spending and change activity

Some data for the organization level variables were collected through company visits, interviews with leaders and accountancy figures. The variables used in this article are:

Profit per capita (PROFCAPI): (net profit for the year 1997 in SEK/number of employees including leaders)

Information technology level (ITLEVEL): Composite summation index based on eleven indicators.

One point is added if company has...

Fax
PC
Hand/pocket computer/s
Mini or larger computer system
e-mail
Local area network/similar system
Intranet
Internet
Own home page
Computer system for customer contacts/data base profiling
Knowledge management system

Flat versus more hierarchical (HI):
0 if company has two levels (leaders versus employees/teams), 1 if company has more levels.

Educational outlays per capita (EDUCAPI):
(Amount on co-worker education 1997 in thousands of SEK) / number of employees including leaders.

Ongoing change program (ONGPROG):
1 if the company was pursuing a change program during 1998-99 (involving competence development and or technical/process change and/or organisational/leadership development), 0 else.
B. Company means: measures of competence, leadership and motivation

An established questionnaire, which has been applied in several, mainly large, European companies (see Anttila 1997), was used to get company level measurements of competence, leadership and change motivation. Partly separate versions of the questionnaire were used for leaders and co-workers respectively, which made it possible to create indices of leader change competence and leader change motivation, to compare the leaders' conception of their own change competence with co-worker conceptions of leader change competence on the company level, and to create separate indices of leader and co-worker change motivation. These individual level data have been aggregated to get mean values for the company. Variables of this type that are used in this article are listed below. All answers were given on a scale like this: low -> ability -> high

1 2 3 4 5 6 7 8 9 10

Leader change
competence index
(LEADCHCO)

A summation of answers on fourteen questions.
Example: How do you view your ability to create readiness for change by following changes in customer demands/expectations and if needed adapt your work accordingly?

How do you view your ability to take part in developing work processes and yourself by taking initiatives for trying new areas of work?

In the co-worker questions on leader conceptions typically 'your' was changed to 'your leaders'.

Mean leader change competence — index of mean co-worker conceptions of leader change competence. The latter index is a summation of answers on similar questions, as described above.

Difference between
leader conception of
change competence and
co-worker conceptions of
leader change competence
(DIFFCOMP)

A summation of answers on five questions.
Example: State to what degree you want to increase your ability to create a readiness for change.

Not at all -> To a high degree
1 2 3 4 5 6 7 8 9 10

A summation of answers on five questions, similar to the leader change motivation ones.

Difference between the two indices above.

Co-worker change
motivation index
(MOTIVUTV)

Difference between leader
change motivation index
and co-worker change
motivation index
(DIFFMOTI)

The questions in the leader change versus the co-worker conceptions competence indices were very similar, so inclusion of the co-worker conceptions index would have created redundancy in the principal component analysis. The questions in the two motivation indices were rather similar, but with some differences in wordings, so the difference is more approximate and thus both the indices and the difference are included in the principal component analysis.
C. Individual level measures: work conditions, psychosocial and ergonomic aspects, ill-health

A standard questionnaire created by Anders Wikman (1991) at Statistics Sweden and used in several nation-wide surveys gave individual level data on the following aspects used in the article. We refer to this book for details, and just state the indexes here, with some examples.

<table>
<thead>
<tr>
<th>Psycho-social ill-health index (UNHPSYR)</th>
<th>An index with six questions.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Musculo-skeletal ill-health index (UNHMUSR)</td>
<td>An index with six questions.</td>
</tr>
<tr>
<td>Ergonomic problems index (ERGOPR)</td>
<td>An index with four questions.</td>
</tr>
<tr>
<td>Stress problem index (STRESSPR)</td>
<td>An index with five questions.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Job competence demands (EDUDEMAN)</th>
<th>Does your job demand recurrent education/learning (information and/or instructions) for you to be able to manage it?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem solving intensity at work (PROBSOLV)</td>
<td>Is part of the working time spent on understanding or solving demanding problems?</td>
</tr>
<tr>
<td>Amount of support given (SUPPORT)</td>
<td>Almost the whole time, About 3/4 of the time, A little (say 1/10 of the time), Not at all.</td>
</tr>
<tr>
<td>Perceived level of self-determination in job (SJALVDET)</td>
<td>If the work tasks feel hard, do you have a possibility to get advice or help? (Always, Most of the time, Not most of the time, Never).</td>
</tr>
<tr>
<td>Perceived job meaningfulness (MEANING)</td>
<td>How do you perceive (look upon) your work:</td>
</tr>
<tr>
<td></td>
<td>Neither/nor Dull work 1 2 3 4 5 Changing</td>
</tr>
<tr>
<td></td>
<td>Very meaningless 1 2 3 4 5 Very meaningful</td>
</tr>
</tbody>
</table>
ICT-development, job content and economic indicators in small and medium sized enterprises

Stig Vinberg¹, Gunnar Gelin², Karl W. Sandberg³
National Institute for Working Life¹, Daphne Research², National Institute for Working Life and Mid Sweden University³
stig.vinberg@niwl.se, gunnargelin@hotmail.com, karl.w.sandberg@niwl.se

This paper focuses on conditions and relationships between factors in small and medium sized enterprises related to information technology levels and economic indicators. Data comes from an ongoing research and development project including about fifty small enterprises in the northern part of Norway and Sweden. Concepts and data analysis are multi-level – an individual level with leaders and co-workers in the enterprises as units of study, and an organisational level, with the enterprises as units of study. Some empirical results of company quality efforts, economic indicators, leadership, job content, and musculoskeletal problems are presented and discussed for ICT and non-ICT workplaces.

1. Introduction
Small business research has demonstrated that small enterprises are different from larger corporations concerning organisational structure and management, and that small firms do not represent homogenous categories (Storey 1994, Ylinenpää 1997, Vossen 1998). Some studies suggest that there is a critical cut-point around 20 employees, which has implications for how the firm is managed, organised and operated (Barth and Höfte 1999, Cagliano et al. 1999).

In recent years many researchers have focused on competence development and learning processes inside organisations, with little agreement between researchers about the nature of learning or of facilitating/inhibiting factors. Competence development is often regarded as a condition for improved competitiveness (Bartel 1994, Ferligoj et al. 1997), but some empirical studies show that business performance is negatively correlated with investments in developing a firm’s competence (Baldwin et al. 1994).

Workplace size is related to the incidence of occupational injuries, with workers in SMEs experiencing higher rates of major injuries than those in larger enterprises. Workplace size is also a strong determinant of the effectiveness of health and safety representation (Frick & Walters 1998). Research has also shown that there is a positive relation between work environment and quality development (Axelsson 1994, Eklund 1995). Axelsson (2000, p. 356) points out that ‘integrating ergonomics in continuous improvement activities can make a major difference for quality and may even act as a driving force for further improvements’.

Information technology levels in learning organisations are considered to be an enabling factor for strengthening productivity, innovation and competitive power (Adler 1992). Information technology support is both an important condition for higher employee participation in problem solving and product development, and a factor in creating structural change and organisational redesign. Historically, small enterprises have not adopted IT as much and as fast as larger companies. In the 1990s SME executives seem to have become more interested in IT systems (Igbaria et al. 1998, Silliance et al. 1998).

In two earlier studies (Vinberg et al. 1999, Vinberg et al. 2000), we looked at relationships at company level between competence indicators and profit and health levels in a research project studying small business enterprises. Concerning leader
change competence and profits we found a strong positive correlation, while there was a negative correlation between leader change competence and learning problems experienced by employees. Other results were that information technology levels and competence drive (indicated by the company having an ongoing program) go together with higher levels of educational investments.

Another finding was that a flat organisational structure, leader and co-worker change competence and leader change motivation are interrelated, and that these aspects also are related to company profits. These findings are similar to other research on organisational development in large companies (MacDuffie 1995, Pfeffer 1998).

In this article we will develop these findings by using both individual and organisational level data from an ongoing research and development project including fifty small and medium sized enterprises. Data used here are part of the first measurement in a before-after design with a reference group. Interventions and a second measurement period will give a quasi-experimental database in the autumn 2002.

2. Purpose, data and study design
The main purposes of this part of the research project is 1/ to analyse relationships between ICT-levels, change competence, health, psychosocial and ergonomic tension and economic indicators, 2/ to find out what empirical support a conceptual model may have, and also 3/ to contribute to the growing research literature concerning small enterprises.

A group of 25 small Swedish workplaces (19 enterprises) from the IT-, manufacturing- and service sector participated in the study. In total, there were 37 leaders and 521 co-workers. Data was collected by questionnaires, interviews with leaders and register information. Concepts and data analysis are multi-level – an individual level with leaders and co-workers in the enterprises as units of study, and an organisational level, with the enterprises as units of study. In analyses on the organisational level, summary measures of individual data for the enterprises are used (for instance median or percentage levels of ergonomic and psychosocial tension and competencies) as well as genuine organisational level concepts such as rating (Dun & Bradstreet's credit rating system) and number of organisational levels. Some empirical measures and statistical data analysis corresponding to the concepts are discussed in Vinberg et al. (2000).

Since we sometimes mix organisational and individual data in this study, there is a risk for ecological and/or atomistic fallacies, to use the terminology introduced by Diez-Roux (1998). For instance, when organisational data are used in individual level data analyses, the lack of intra-company variation may bias the estimates. In forthcoming research with larger data sets we will use hierarchical multilevel regression methods (Bryk and Raudenbush 1992) as well as structural equation modelling of relations between several outcomes, since we believe these methods to be more adequate.

3. Results and discussion
In this section, some empirical results from the first measurement period are given.

Key persons in studied workplaces consider that the most important areas for change and improvements are: quality aspects, psychosocial conditions, educational investments, working environment, work organisation and leadership. Results from questioning the individuals (n=558) at the workplaces show that the working conditions can be improved: 91% say that the job sometimes or often demands working very fast, 57% say the job demands too great a work effort, 43% feel that work often or sometimes holds contradictory demands, 20% say that work does not give opportunities to learn, 48% feel that work is monotonous and 49% feel that work is psychologically demanding. These results indicate that the share of employees in this study exposed to heavy demands in their work is relatively high compared to results from surveys of
the working conditions in Sweden (Statistics Sweden and the National Board of Occupational Safety and Health 2000).

The mechanisms relating quality assurance efforts in a company and its economic or product quality results have been put in focus in recent ergonomic research, e.g. Axelsson (2000). Going further, one might ask if empirical relations between quality and economic outcomes found in large companies would tend to be similar or different in smaller companies. As a starting point in order to explore this research area we are studying correlations between summary indices of company quality efforts (ISO 9000 type efforts, TQM type efforts, work environment, environment) and different measures of the company's economic well-being (profit level, credit rating). The two diagrams in figure 1 show the relationship at company level between the degree of use of quality systems and the company's credit rating. For small non-ICT companies (mostly traditional service- and industry businesses) the correlation is significant on the 5% level ($r = 0.637$, $p = 0.048$, $n = 10$), while it is not significant for small ICT companies ($r = 0.208$, $p = 0.458$, $n = 15$).

The relations between ergonomic tension and organisational aspects such as job content, organisational learning, quality efforts and leader competence is another related area where ergonomic research interest is growing. To explore these relations on the individual level (558 persons), a number of regression analyses have been done in the project.

![Diagram](image)

Figure 1. Correlation between credit worthines rating and use of quality systems in ICT and non ICT companies.

Table 1. Determinants of musculoskeletal tension.

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$B$</td>
<td>Std. Error</td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>3.619</td>
</tr>
<tr>
<td></td>
<td>JOBCONT</td>
<td>-.289</td>
</tr>
<tr>
<td>2</td>
<td>(Constant)</td>
<td>4.047</td>
</tr>
<tr>
<td></td>
<td>JOBCONT</td>
<td>-.294</td>
</tr>
<tr>
<td></td>
<td>RATING</td>
<td>.000</td>
</tr>
<tr>
<td>3</td>
<td>(Constant)</td>
<td>4.189</td>
</tr>
<tr>
<td></td>
<td>JOBCONT</td>
<td>-.223</td>
</tr>
<tr>
<td></td>
<td>RATING</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>DEVELEAD</td>
<td>-.128</td>
</tr>
</tbody>
</table>

*a. Dependent Variable: MUSCULO*
Table 1 shows the results from one of these exploratory analyses with an index measure of musculoskeletal tension (six questions) as the dependent variable.

The three explanatory variables JOBCONT (an index measuring the job content), RATING (the Dun & Bradstreet credit rating for the companies) and DEVELEAD (an index measuring the leader's development competence) have significant coefficients in the assumed negative direction. This means that the more developing content the job has, the better the company credit rating is, and the more development competence the leader has, the less musculoskeletal tension there is among the co-workers. This finding is in line with similar results for large companies (see e.g. MacDuffie 1995), summarised for instance by Pfeffer (1998). The three variables in the analysis shown here explains about 12% of the variance in musculoskeletal tension, which may be seen as a rather large amount.

The results in this study shows that contextual differences may be important: the relationships in the ICT companies seem to be different from the relationships in other companies. In forthcoming research we will try to explore the mechanisms behind these results. Based upon this we will try to develop an integrated model for small and medium sized enterprises.

References
Organizational and health performance in small enterprises in Norway and Sweden

Stig Vinberg\(^a\) and Gunnar Gelin\(^b\)

\(^a\)National Institute for Working Life,
Corresponding author: Studentplan 3, S-831 40 Östersund, Sweden
Tel: +46 63 55 13 07, Fax: +46 63 55 13 20, E-mail: stig.vinberg@arbetslivsinstitutet.se
\(^b\)Daphne Research

Abstract

This article focuses on relationships between organizational factors such as leadership, learning, psychosocial work environment and quality aspects as they relate to organizational and health performance outcomes in 42 small enterprises in Norway and Sweden. A rather explorative analysis model was created using indicators that were based on theoretical concepts from a literature review and questionnaire data, concerning 988 employees and leaders. These indicators were then used for correlation analysis. The enterprise is the unit of analysis. Some strong links between organizational factors and organizational and health performance were found. There was also a strong relation between health performance and sickness absence. From a structural analysis a structure containing six general components was found. Using another methodology, this analysis also found strong interrelationships between some indicators of organizational performance and health performance. It was also possible to position the enterprises according to two general dimensions. As a general guideline for action, the results tend to support the perspective that positive organizational development is related to health performance and a lowering of sickness absence. The findings support the strategies of practitioners who use a concept-driven or holistic approach that integrates several facets of workplace development.

Keywords: organizational performance, sickness absence, organizational development, leadership, learning, psychosocial work environment.

1. Introduction

Considerable research in the Nordic countries is focusing on the identification of key workplace health determinants. The most important reason for this research emphasis is that healthier workplaces are increasingly seen as the most effective counteractant to rising sick leave rates and the increasing number of employees needing vocational rehabilitation. This article focuses on Norwegian and Swedish small enterprise\(^1\) organizational and health performance and the influences of organizational factors such as leadership, learning, psychosocial work environments and quality development. The approach is explorative, and we also study interrelations between different organizational aspects and how similar firms may group together on general dimensions. A general assumption is that worker well-being and organizational effectiveness can be fostered through a common set of job and organizational design characteristics [37].

The primary reason for selecting this focus is that both researchers and practitioners working in the area of workplace development can benefit from a greater understanding of the

\(^1\) The terms “enterprise”, “firm” and “company” are used interchangeably to describe a privately owned producer of goods and/or services. The main focus in this study is on small firms with less than 50 employees.
different factors that contribute to organizational and health performance in small firms. A second reason is that over the last decade researchers and policy makers have come to recognize that sound small enterprise organizational performance helps to ensure stable (or increasing) employment levels [8, 12, 46]. However, the explanations as to how small enterprises of different company sizes contribute to the overall employment picture differ between studies. A third reason is the paradox that hazardous working conditions and injury rates in small enterprises are higher at the same time that their sick leave rates are lower than in larger enterprises [14, 50]. Finally, we note that small firms have not been as active as larger ones in organizational development and occupational health and safety issues, usually because they lack the expertise, time and economic resources [14, 32].

2. Theoretical approaches and previous research

This section provides a brief overview of some theoretical approaches and research concerning healthy work in small firms. The goal of this overview is rather modest — to list some research on links between such organizational factors as the psychosocial work environment, leadership, learning and quality development, and outcomes. Identified as important is the need for integration and analyses of “bundles” and configurations of organizational aspects that are related to the healthiness of small firm work environments.

In their discussion of models of healthy work organizations, Murphy & Cooper [37] argue that there appears to be a convergence of opinion and evidence on some of the critical factors that tend to create a healthy work organization. They do qualify their observations by observing that additional empirical work is needed to test existing models and develop new ones. For example, most models identify as necessary components: meaningful work which utilizes worker skills, worker autonomy/control, job security, rewards for performance, worker involvement/participation, and safe and healthy physical work environments. Other important healthy work factors found as a part of recent research are teamwork and commitment to core organizational values. The healthy work organization concept is related to the concept of ‘development work’, which some Swedish researchers describe as an important work organization innovation that leads to improvements in work and working conditions while at the same time strengthening quality and performance [15, 16].

The extensive research on the relationship between the psychosocial work environment and health/well-being shows that factors related to work content, work characteristics, work organization, and social relations are of importance for individual health in a wide sense [see e.g. 19, 24, 25]. More specifically, literature on work-related stress highlights that certain levels of job complexity, autonomy, role ambiguity and workload usually are associated with well-being at work. With respect to psychosocial conditions of work environments, several studies have found that employees in small organizations tend to have higher levels of job satisfaction than do those in large organizations [28, 57]. Evidence of workplace health effects and the condition of the physical work environment and its relationship to workplace size has infrequently been a topic of study. The small amount of studies indicate that “at the very least the situation in small enterprises is no better than in their larger counterparts” [50, p 99]. In Sweden, sickness absence has increased dramatically from 1997 to 2002. While levels are higher for public sector employees (compared with the private sector) the rate of increase for small and larger enterprises is also of considerable concern [3]. In a study of 343 Finnish workplaces, Lindström et al. [32] found that firms with over 50 employees had more sickness related absenteeism than did those in smaller enterprises. This is similar to what was found in Swedish investigations [9].
There are several studies on how leadership moderates or influences health and organizational performance. In his review of more than 130 field studies about organizational change, Pfeffer [41] emphasized that a frequent finding was that leadership that focuses on developing human resource practices stimulated a higher level of organizational performance. Cascio [10] pointed out that today’s leaders need to integrate a human resource focus with a financial focus; developing teamwork, creating conditions where workers can make decisions about their jobs, and extensive training for workers and leaders are examples of this strategy. Research studies indicate that employees in workplaces with relation-oriented managers often experience job satisfaction [56], low levels of sickness absence [4] and low levels of stress [17]. In a study of 372 small firms, Chaganti et al. [11] found that the fastest growing firms had both strong consideration and initiation leadership styles. Smallbone et al. [47] examined the development of 306 SMEs (small and mediumsized enterprises) and found that one of the most important factors for high growth was the commitment of the company leader to achieving growth.

Among organizational researchers there has been much focus on learning and competence development in both large and small organizations. However, there is little agreement concerning the nature of learning and relationships between learning and performance in SMEs [7, 55]. Huselid [23] found a positive relationship between training and economic results at the company level while Baldwin [6], in a similar study, did not find such a relationship. Swedish research has shown that in a working environment that encourages learning and competence development employees also tend to experiences worker health and well-being [16, 19]. Hill & Stewart [22] describe each small organization as unique with learning activities that are essentially informal, reactive and short-term in outlook. Our comprehensive view is consistent with much empirically-based research in this area which maintains that there is a positive relation between learning and performance that also relates to worker health and organizational effectiveness.

Small firms have been slow to systematically adopt quality improvements [29, 38] due to limited resources, lack of financial means and the frequent inability to initiate internal training [21]. The link between quality and performance has been studied rather extensively and researchers have drawn different conclusions about the effect of quality improvement at the company level [39, 40]. Quality management systems are increasingly being integrated with business management systems that include work health, safety and environmental practices [54]. Axelsson [5] has found that work environment processes and quality development processes have many commonalities and that more than 50% of quality improvement efforts in some cases are related to the work environment. According to Greenan et al. [20], a trend can be seen that environmental and work environment issues are becoming increasingly important in both large and small organizations. This tendency leads to a greater emphasis on the integration of quality, environmental and work environment systems [3].

There is a great need for integration and systematisation of the different areas discussed above. Two approaches seem fruitful for this purpose – the analysis of bundles or groups of interrelated organizational aspects (see e.g. MacDuffie [33]) and the structural analysis of configurations or organizational types [23, 34, 35, 36, 45]. In the organizational research literature concepts like “high commitment management”, “high involvement work practices”, “high-performance work practices” and “configurations” seem to be used interchangeably. A recurrent observation in these literature is that several organizational aspects tend to co-vary and form “bundles”, and that organizations with similar values on these interrelated aspects seem to cluster into distinct groups. Overviews relating to the Swedish situation are given by
In an overview of current research, Ketchen et al. [26] found that an organization's performance is partially explained by its configuration. An important reference for the present study is Wood and Albanese [52] in which evidence is presented that organizational factors rather than factors exogenous to the organization were significantly related to the level of “high commitment management”.

Concerning leader change competence (leader ability to implement and manage change) and profits we found a strong positive correlation while there was a negative correlation between leader change competence and learning problems experienced by employees. Concerning health indicators we found that musculoskeletal symptoms were related to job content, leadership and credit worthiness ratings in the firms studied.

3. Research design and analysis

3.1. Research design

The findings and theoretical research described above form a background for the analyses of data derived from an ongoing research- and development project of SMEs in Sweden (Jämtland county) and Norway (Nord-Trøndelag county). The data reported here comes from the first measurement wave of a comparative longitudinal study of 42 SMEs (30 Swedish and 12 Norwegian) that employed a total of 1177 individuals in 2000. Data was collected through questionnaires distributed to all employees and leaders at the worksites (988 responses, 84% response rate), public records and interviews with leaders. This article is based on 22 indicators constructed from the questionnaire data.

The set of companies participating in the study was the result of recruitment choices made by the Occupational Health Services, the social insurance offices of both countries and the Swedish National Institute for Working Life. The goal was to get a sample with small companies from key sectors – ICT, retail trade, manufacturing, wood products, food processing, construction, customer support services, technical development and consulting. The gender, age and educational distributions for the companies are: 43 % women, 65 % under 40 years of age and 16 % in the 50 + age group, 16 % with a basic education and 25 % with a university education.

There may have been a tendency to recruit companies with, for instance, more or less interest in and/or resources for workplace development but it has not been possible to obtain relevant data for a discussion of such or other selectivity issues. It must be stressed that the collection of companies used in the study is not a representative probability sample, so no inferences to a larger population are intended. For instance, p-values for regression or correlation coefficients are meant to be used as summary indicators of strengths of relationships.

Figure 1 shows that the mean sickness absence days per employee over the last 12 months in the studied companies were between four and ten days in different sectors. These rates were similar to that for the whole small business sector in Sweden [9].
3.2. Analysis model and indicators

In Figure 2 the rather explorative analysis model for the relations between assumed determinants and outcomes (the three indicators to the right) is presented. Relationships covered in the literature mentioned in the section about theoretical approaches were incorporated into this model. For the outcomes we assume positive relations between organizational performance and health performance, and negative relations between organizational performance and mean sickness absence, and between health performance and mean sickness absence. Regarding the relations between determinants and outcomes we do not consider the research fields as developed enough to permit specific assumptions for all possible relations. We ask the reader to see this model as one of a rather limited set of similar models.

The indicators knowledge of workplace goals, customer oriented quality practices and efficient use of technology are associated with the concept of quality development commonly used in literature. The indicator respectful leadership measures “good” leadership aspects and the indicators creative work and adequate competence relate to such aspects of learning. Several indicators in the model are related to psychosocial work environment: work intensity demands, psychosocially demanding work, data stress, demands higher than control, team spirit, decision latitude and restructuring worries.

Continuous lines are used for assumed positive relationships and broken lines for assumed negative relationships in Figure 2. The 22 indicators described below were developed on the basis of substantive considerations and factor analyses. Of these, thirteen indicators in the model are seen as determinants (to the left in the model). On the right side of the model, the
remaining nine indicators make up the three general areas that are depicted in the figure. These nine indicators focus on outcomes.

Three of the nine indicators form the organizational performance concept: this outcome indicator is the mean of the indicators perceived lack of efficiency (four items), workplace adaptability (three items) and customer satisfaction (seven items). Five additional indicators form the health performance concept: this outcome indicator is the mean of indicators measuring not being in a depressed mood-worries (six items), not having musculoskeletal symptoms (three items), not having sleep problems (two items), perceived physical health (one item) and psychological well-being (one item). The last concept, mean sickness absence is measured by a single item, mean sickness absence days per employee over the last 12 months.

Figure 2. Analysis model for the empirical analyses.

The questionnaire used [44] contained a total of 162 items covering a wide range of topics. Only some of the 162 items were used in this study. The co-workers’ and leaders’ perception of their work environment and job and organizational characteristics as well as various aspects of health and organizational performance were the focus of this study.

2 A detailed documentation of indicator construction can be obtained from the first author.
The content of the 13 indicators to the left side of Figure 2 that act as determinants is as follows: The knowledge of workplace goals indicator consists of two items that seek to measure how well the employees know workplace goals. The indicator customer oriented quality practices (seven items) covered feedback on quality to employees, programs for improvements, quality goals and cooperation with customers. The efficient use of technology indicator consists of two items covering the status and effectiveness of technical equipment. The respectful leadership indicator (nine items) covered leadership consideration, information about changes, ethical issues and dialogue between leaders and co-workers. The creative work indicator (ten items) covered developing and learning at work, meaningful and stimulating work and variation at work. The questions in the adequate competence indicator (two items) were about resources and competence in relation to work demands. The work intensity demands indicator had eight items about hard and demanding work, stress and time pressure. The questions in the psychosocially demanding work indicator (two items) were about the employees' perception of the degree of demanding work. The data stress indicator consists of two items about stress related to data problems. In the questions on the demands higher than control indicator, people were asked to say if their job demands were higher than what they could handle. The team spirit indicator was measured by three items concerning team functioning and team climate at work. The decision latitude indicator (four items) measured worker autonomy/control and possibility to influence work. The indicator restructuring worries had two items about concerns related to possible restructuring and its potential impact upon continued employment.

From the individual indicator data an aggregate data file was constructed with indicator means for the 42 firms in the project. The reason for this is that the focus of this article is on organizational level aspects.

3.3. Research questions and analysis

The following questions are addressed:

1. What empirical relationships can be found between outcomes for performance indicators such as organizational performance, health performance, sickness absence and assumed determinant organizational factors presented in the model in Figure 2?
2. Is there a bundling tendency in small firms? That is, do several organizational aspects co-vary?
3. Is it possible to find groupings of co-varying indicators and more specifically is it possible to find groups of companies that are similar in the sense that they have similar indicator patterns?

The presentation of the analyses is organized in three subsections. Subsection 4.1 shows and comments on a correlation analysis. In subsection 4.2 a structural analysis of co-variation between the 22 indicators are shown and commented upon. Here we include all indicators, both those that are parts of the outcome indicators in the determinants-outcome model (Figure 2) and those that are used in that model as determinants. In subsection 4.3 a grouping of companies is presented and discussed.

---

3 In the following overview the range for each item is 1-5, unless stated otherwise.
We applied two rather different approaches to this analysis. In one approach we make a
distinction between determinants and outcomes, integrating possible determining relations
between the main concepts in the model, using correlation analysis. Since we have cross-
sectional data we cannot test if causal hypotheses are empirically supported without
introducing several external assumptions. Thus, the results from this approach are mainly
exploratory that suggest refined proposals for further research. The second approach takes a
structural view, with one aim being to identify groups of variables or indicators that tend to
covary to form broader aspects/latent dimensions. A second aim was to determine if there are
groups of companies with similar patterns. The exploratory methods – used were component
analysis and multidimensional scaling.

4. Analysis results

4.1. Determinants and outcomes - indicators of organizational performance, health
performance and sickness absence

In keeping with the model presented in Figure 2 above we studied the relationships between
those indicators treated as determinants (the 13 indicators on the left side of the figure) and
the three right-side outcome indicators: organizational performance, health performance and
sickness absence.

Table 1 below shows the simple pair-wise correlations between the determinants and the
outcomes.
Table 1. Correlations between all indicators and the outcome indicators.

<table>
<thead>
<tr>
<th></th>
<th>Sickness absence</th>
<th>Organizational performance</th>
<th>Health performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sickness absence</td>
<td>-</td>
<td>-0.342</td>
<td>0.492</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.026</td>
<td>0.001</td>
</tr>
<tr>
<td>Organizational performance</td>
<td>-0.342</td>
<td>-</td>
<td>0.333</td>
</tr>
<tr>
<td></td>
<td>0.026</td>
<td>-0.031</td>
<td></td>
</tr>
<tr>
<td>Health performance</td>
<td>-0.492</td>
<td>0.333</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>0.001</td>
<td>0.031</td>
<td></td>
</tr>
<tr>
<td>Knowledge of workplace goals</td>
<td>0.023</td>
<td>0.037</td>
<td>0.239</td>
</tr>
<tr>
<td></td>
<td>0.886</td>
<td>0.814</td>
<td>0.127</td>
</tr>
<tr>
<td>Customer oriented quality</td>
<td>-0.128</td>
<td>0.344</td>
<td>-0.070</td>
</tr>
<tr>
<td>practices</td>
<td>0.420</td>
<td>0.026</td>
<td>0.660</td>
</tr>
<tr>
<td>Efficient use of technology</td>
<td>-0.057</td>
<td>0.464</td>
<td>0.009</td>
</tr>
<tr>
<td></td>
<td>0.720</td>
<td>0.002</td>
<td>0.954</td>
</tr>
<tr>
<td>Respectful leadership</td>
<td>-0.245</td>
<td>0.782</td>
<td>0.170</td>
</tr>
<tr>
<td></td>
<td>0.118</td>
<td>0.000</td>
<td>0.283</td>
</tr>
<tr>
<td>Creative work</td>
<td>-0.095</td>
<td>0.381</td>
<td>0.163</td>
</tr>
<tr>
<td></td>
<td>0.551</td>
<td>0.013</td>
<td>0.302</td>
</tr>
<tr>
<td>Adequate competence</td>
<td>-0.010</td>
<td>0.356</td>
<td>0.072</td>
</tr>
<tr>
<td></td>
<td>0.950</td>
<td>0.021</td>
<td>0.648</td>
</tr>
<tr>
<td>Work intensity demands</td>
<td>-0.061</td>
<td>-0.366</td>
<td>-0.294</td>
</tr>
<tr>
<td></td>
<td>0.699</td>
<td>0.017</td>
<td>0.059</td>
</tr>
<tr>
<td>Psychosocially demanding work</td>
<td>-0.031</td>
<td>-0.312</td>
<td>-0.302</td>
</tr>
<tr>
<td></td>
<td>0.846</td>
<td>0.044</td>
<td>0.052</td>
</tr>
<tr>
<td>Data stress</td>
<td>-0.050</td>
<td>-0.369</td>
<td>-0.198</td>
</tr>
<tr>
<td></td>
<td>0.752</td>
<td>0.016</td>
<td>0.208</td>
</tr>
<tr>
<td>Demands higher than control</td>
<td>0.158</td>
<td>-0.656</td>
<td>0.277</td>
</tr>
<tr>
<td></td>
<td>0.318</td>
<td>0.000</td>
<td>0.076</td>
</tr>
<tr>
<td>Team spirit</td>
<td>-0.312</td>
<td>0.726</td>
<td>0.364</td>
</tr>
<tr>
<td></td>
<td>0.045</td>
<td>0.000</td>
<td>0.018</td>
</tr>
<tr>
<td>Decision latitude</td>
<td>0.135</td>
<td>0.217</td>
<td>0.038</td>
</tr>
<tr>
<td></td>
<td>0.399</td>
<td>0.173</td>
<td>0.812</td>
</tr>
<tr>
<td>Restructuring worries</td>
<td>0.294</td>
<td>-0.274</td>
<td>-0.290</td>
</tr>
<tr>
<td></td>
<td>0.059</td>
<td>0.079</td>
<td>0.062</td>
</tr>
<tr>
<td>N=</td>
<td>42</td>
<td>42</td>
<td>42</td>
</tr>
</tbody>
</table>

Pearson correlation coefficients are in the first row and p-values in the second row for each indicator.

For sickness absence there are strong or rather strong negative correlations with health performance, organizational performance and team spirit, and a rather strong positive correlation with restructuring worries. For organizational performance there are strong or
rather strong positive correlations with health performance, customer oriented quality practices, efficient use of technology, respectful leadership, creative work, adequate competence and team spirit, and strong or rather strong negative correlations with sickness absence, work intensity demands, psychosocially demanding work, data stress and demands higher than control. For health performance there are strong or rather strong negative correlations with sickness absence, work intensity demands and restructuring worries, and rather strong positive correlations with organizational performance and team spirit. For two of the determinants, knowledge of workplace goals and decision latitude the correlations with all three outcomes are low. All strong or rather strong correlations have the assumed sign.

4.2. Structural analysis to explore groups of indicators

Several aspects covered in this article may be viewed by different professions as falling within their domain of interest. Too, their perspectives on ordering or grouping arrangements may vary. For instance, if ergonomists were asked to describe which main groups the indicators used here could be seen as belonging to they would likely create groupings different from groupings that might be created by practitioners of work psychology, organizational behaviour, quality movement, strategic human resource management or organizational learning. This absence of conceptual coherence across disciplines [41] would lead to assessing as to whether there is empirical support for various integrated models or combinations of models. Such a model testing approach is outside the scope and size of this article. Instead we chose an exploratory approach; aiming first at finding out which general groups of indicators emerge and in section 4.3 which dimensions emerge for a grouping of the workplaces.

The 22 indicators described above were initially created based on substantive considerations and factor analyses. Here, a second-order principal components analysis was carried out to determine which dimensions emerged. It seems reasonable to assume that such dimensions would be more basic or general and thus also more useful in a model discussion.

Table 2 below shows the six components that emerged when using standard criteria. Five indicators were clearly belonging to the first component which, in a broad sense, seemed to be about high work demands. The next component had three clear indicators, which were about efficient use of technology, the adaptability level of the workplace, and how well the workplace had developed customer oriented quality practices. A common aspect for much of the content of these indicators was that they covered practices or routines with an aim to increasing performance. We called this component performance drivers. The third component got its name from the only indicator with a clear loading: adequate competence. The fourth component was very similar to the health performance indicator described in Section 3.2 and we gave it the name general health performance. The indicators on the fifth component were mainly about respectful leadership and creativity so we labelled the component respectful leadership and creativity. Finally, we assigned the sixth component the name knowledge of workplace goals.

These component names are to be seen as preliminary interpretations for use in concept development. We did not use these results in the analysis linked to the determinants-outcomes model presented above. Rather, these results gave a complementary picture of structural relations between indicators. We return to this point in the final section of the paper.
Table 2. Loadings for 22 indicators on six components.

<table>
<thead>
<tr>
<th>Structure Matrix</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychosocially demanding work</td>
<td>-.664</td>
<td>-.003</td>
<td>.182</td>
<td>-.215</td>
<td>-.145</td>
<td>-.090</td>
</tr>
<tr>
<td>Work intensity demands</td>
<td>-.819</td>
<td>-.152</td>
<td>-.009</td>
<td>-.239</td>
<td>-.160</td>
<td>.251</td>
</tr>
<tr>
<td>Demands higher than control</td>
<td>-.712</td>
<td>-.564</td>
<td>.106</td>
<td>.308</td>
<td>-.639</td>
<td>-.068</td>
</tr>
<tr>
<td>Data stress</td>
<td>-.666</td>
<td>.180</td>
<td>.483</td>
<td>-.109</td>
<td>-.235</td>
<td>-.068</td>
</tr>
<tr>
<td>Sleep problems</td>
<td>-.597</td>
<td>-.010</td>
<td>.535</td>
<td>-.321</td>
<td>-.230</td>
<td>.055</td>
</tr>
<tr>
<td>Efficient use of technology</td>
<td>.018</td>
<td>.812</td>
<td>.006</td>
<td>.131</td>
<td>.178</td>
<td>-.184</td>
</tr>
<tr>
<td>Workplace adaptability</td>
<td>.370</td>
<td>.804</td>
<td>-.367</td>
<td>.343</td>
<td>.381</td>
<td>-.099</td>
</tr>
<tr>
<td>Customer oriented quality practices</td>
<td>-.001</td>
<td>.762</td>
<td>.045</td>
<td>.011</td>
<td>.083</td>
<td>-.063</td>
</tr>
<tr>
<td>Adequate competence</td>
<td>.100</td>
<td>.191</td>
<td>-.802</td>
<td>.023</td>
<td>.027</td>
<td>-.164</td>
</tr>
<tr>
<td>Physical health</td>
<td>.039</td>
<td>.122</td>
<td>.153</td>
<td>.834</td>
<td>.072</td>
<td>.125</td>
</tr>
<tr>
<td>Psychological well-being</td>
<td>.486</td>
<td>-.006</td>
<td>.466</td>
<td>.702</td>
<td>.255</td>
<td>-.024</td>
</tr>
<tr>
<td>Mean absence days per year</td>
<td>-.100</td>
<td>-.207</td>
<td>.034</td>
<td>-.696</td>
<td>-.340</td>
<td>.154</td>
</tr>
<tr>
<td>Depressed mood-worries</td>
<td>-.401</td>
<td>.133</td>
<td>.259</td>
<td>-.686</td>
<td>.071</td>
<td>.442</td>
</tr>
<tr>
<td>Musculoskeletal symptoms</td>
<td>-.198</td>
<td>-.293</td>
<td>.318</td>
<td>-.667</td>
<td>-.321</td>
<td>-.308</td>
</tr>
<tr>
<td>Decision latitude</td>
<td>.151</td>
<td>-.038</td>
<td>.022</td>
<td>.096</td>
<td>.804</td>
<td>.303</td>
</tr>
<tr>
<td>Respectful leadership</td>
<td>.475</td>
<td>.486</td>
<td>-.372</td>
<td>.274</td>
<td>.773</td>
<td>-.257</td>
</tr>
<tr>
<td>Creative work</td>
<td>.017</td>
<td>.411</td>
<td>.253</td>
<td>.264</td>
<td>.758</td>
<td>.063</td>
</tr>
<tr>
<td>Customer satisfaction</td>
<td>.578</td>
<td>.534</td>
<td>.169</td>
<td>.290</td>
<td>.710</td>
<td>.129</td>
</tr>
<tr>
<td>Perceived lack of efficiency</td>
<td>-.449</td>
<td>-.160</td>
<td>.375</td>
<td>-.456</td>
<td>-.541</td>
<td>.539</td>
</tr>
<tr>
<td>Restructuring worries</td>
<td>-.435</td>
<td>-.117</td>
<td>-.369</td>
<td>-.414</td>
<td>-.532</td>
<td>-.345</td>
</tr>
<tr>
<td>Team spirit</td>
<td>.468</td>
<td>.486</td>
<td>-.486</td>
<td>.438</td>
<td>.509</td>
<td>-.396</td>
</tr>
<tr>
<td>Knowledge of workplace goals</td>
<td>.167</td>
<td>-.072</td>
<td>-.005</td>
<td>.165</td>
<td>.251</td>
<td>.863</td>
</tr>
</tbody>
</table>

Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization. Loadings with an absolute value > .4 are in bold. Since we have used an oblique rotation method a measure of total explained variance cannot be obtained; using a varimax rotation with six components assumed, the total explained variance is 74.8 percent.

The oblique rotation method (delta=.5) allows for correlation between the components. These were summarized in Table 3; from the loadings matrix above it was also directly evident that, for instance, the three dimensions of high work demands, general health performance and respectful leadership and creativity were interrelated in the sense that some indicators have high loadings on two or all of these components.

Table 3. Correlations between the six components and sickness absence

<table>
<thead>
<tr>
<th></th>
<th>High work demands</th>
<th>Performance drivers</th>
<th>Adequate competence</th>
<th>General health performance</th>
<th>Respectful leadership, creativity</th>
<th>Knowledge of workplace goals</th>
<th>Mean # of absence days</th>
</tr>
</thead>
<tbody>
<tr>
<td>High work demands (INVERT)</td>
<td>1 -.113</td>
<td>-.356</td>
<td>-.471</td>
<td>.402</td>
<td>-.303</td>
<td>-.179</td>
<td></td>
</tr>
<tr>
<td>Performance drivers</td>
<td>.113</td>
<td>1 .064</td>
<td>.257</td>
<td>.359</td>
<td>-.149</td>
<td>.217</td>
<td></td>
</tr>
<tr>
<td>Adequate competence</td>
<td>-.356</td>
<td>.064</td>
<td>1 -.057</td>
<td>-.600</td>
<td>.184</td>
<td>.024</td>
<td></td>
</tr>
<tr>
<td>General health performance</td>
<td>.471</td>
<td>.257</td>
<td>-.057</td>
<td>1 .387</td>
<td>-.062</td>
<td>-.696</td>
<td></td>
</tr>
<tr>
<td>Respectful leadership and creativity</td>
<td>.402</td>
<td>.359</td>
<td>-.060</td>
<td>.387</td>
<td>1</td>
<td>.125</td>
<td>.348</td>
</tr>
<tr>
<td>Knowledge of workplace goals</td>
<td>-.303</td>
<td>-.149</td>
<td>.184</td>
<td>-.062</td>
<td>.125</td>
<td>1</td>
<td>.114</td>
</tr>
<tr>
<td>Mean number of absence days last year</td>
<td>-.179</td>
<td>-.217</td>
<td>.024</td>
<td>-.696</td>
<td>-.348</td>
<td>.114</td>
<td>1</td>
</tr>
</tbody>
</table>

**bold** = correlation is significant at the 0.05 level (2-tailed); **bold and underline** = Correlation is significant at the 0.01 level (2-tailed).
4.3. Structural analysis to explore groups of companies

Here, instead of grouping the variables we used multidimensional scaling\(^1\) to explore the structure of the units. We were asking which groups of similar companies emerged and we also interpreted the underlying dimensions on which the companies were grouped. The input is a proximity matrix with similarity coefficients between the 41 companies (one company had missing data), created from the same 22 indicators used in the principal component analysis above. In this analysis the result is a matrix with coordinates for the companies in two dimensions.

As a guide for interpreting these dimensions, a correlation analysis was performed (see Appendix). This showed that the first dimension correlates most strongly with the indicators respectful leadership, team spirit, customer satisfaction and workplace adaptability, and in the opposite direction with demands higher than control, perceived lack of efficiency and sleep problems. The second dimension correlated strongly with the indicators loading high on the general health performance dimension in the former analysis. As a summary interpretation we named the first dimension “supportive and efficient organization”, and the second was assigned the same name as in the former analysis - “general health performance” – since the indicators coincide.

\( ^1 \) Alscal in SPSS 11.1 was used with interval metrics assumed when creating the proximity matrix. The fit indicated by Young’s S-stress measure was .232 (\( R^2 = .801 \)) for two assumed dimensions, .165 (\( R^2 = .862 \)) for three assumed dimensions and .120 (\( R^2 = .913 \)) for four assumed dimensions. The first two dimensions are quite similar in the three solutions and we use the two-dimensional solution here since it is easier to interpret although the methodological advice would be to use a solution with more dimensions assumed.

Figure 3. The firms grouped in the two main dimensions of the multidimensional analysis.

Figure 3 above shows the companies’ positions on these two dimensions. The five companies in the lower left part with high values on both dimensions (“high-high”) and the five companies in the upper right part with low values on both dimensions (“low-low”) are marked in the diagram. The companies in each group tended to have similar values on several of the separate indicators belonging to the dimensions. As an illustrative example, we compared the three groups “High-high”, “Low-low” and the large intermediary group in an analysis of
variance. Altogether, significant (p < .05) differences were found between the groups on 11 indicators: creative work, team spirit, decision latitude, perceived customer satisfaction, psychological well-being, physical health, restructuring worries, perceived lack of efficiency, depressed-mood-worries, musculoskeletal symptoms and mean number of absence days last 12 months. These results in a way follow from how the analysis was done. The main point here is not that we found differences, but that this analysis shows that many aspects related to organizational performance and health are, in a broad sense, inter-related. The fact that it is possible to position similar companies on these general dimensions gives some support to the ideas discussed in Section 2 about the existence of “configurations” of companies.

5. Concluding discussion

The research comments above imply that we assume the existence of several relationships, which have been summarized in the model in Figure 2 (Section 3.2) from the perspective of determinants and outcomes. We also applied a more open perspective linked to the structural analysis. The results from the different approaches used are summarized below.

According to the correlation analysis all three relations specified in the model between the outcome indicators received empirical support. The strong negative relation between health performance and sickness absence means that the higher health performance a company has, the lower its sickness absence tends to be. Similarly, the rather strong negative relation between organizational performance and sickness absence also means that the higher organizational performance a company has the lower its sickness absence tends to be. The relation between organizational performance and health performance is rather strong and positive, meaning that firms with good organizational performance tend to have good health performance. We want to point out that neither in the model nor in the analyses do we have a basis for saying something about the causal direction between these concepts or indicators. However, some recent research overviews indicate that it is probable that health performance is a determinant of organizational performance [25,42].

Regarding the relations between outcomes and determinants, for organizational performance, ten of the twelve assumed relationships with the determinants were strong or rather strong and in the assumed direction. For two determinants, knowledge of workplace goals and decision latitude the correlations were low, indicating the absence of a relation. Regarding decision latitude, this concept belongs to the so-called demand-control model [25] and maybe it would be more relevant to use a more complex concept that also takes demand measures into account. In this respect it is interesting to note that the indicator demands higher than control has a strong relation with organizational performance in the assumed direction. Regarding the absence of a clear relation between organizational performance and knowledge of workplace goals, we have no explanation and leave this for further research.

With health performance as an outcome indicator there were strong relationships with only two of the assumed ten determinants. However, three indicators related to the demand-control model have rather low p-values - work intensity demands, psychosocially demanding work and demands higher than control. This might indicate that with a more sophisticated use of these three indicators, a higher correlation with health performance might emerge. The remaining low correlations that are contrary to what was assumed in the model might lead to revisions of the model and a deeper discussion about the assumptions regarding determinants of health performance. Here, it is of interest to note somewhat comprehensively that the more
general organizational performance concept has a strong relation with health performance while many of the more specific determinants do not correlate clearly.

Regarding sickness absence it is assumed in the model that only the two other outcome indicators have relations with this outcome indicator. However, in the analysis two determinants - team spirit and restructuring worries - also had rather high correlations with sickness absence. These results might also lead to revisions of the model.

As a general comment, it is noteworthy that a large number of determinants have strong or rather strong relations with organizational performance, while there are only two determinants with strong relations with health performance. This might indicate that the determinants of health performance in small enterprises differ from those in larger enterprises. It is also noteworthy that the indicators respectful leadership and team spirit correlate strongly \((r > .7)\) with organizational performance. This may be seen as giving support for the ideas of the importance of “co-worker respectfulness” for organizational performance.

Regarding the structural analyses, two main results from the component analysis merit further comment here: a clear structure emerged with six components, and there were also significant and interesting co-variations between some of these components. The indicators grouped with the four components called “performance drivers”, “high work demands”, “general health performance” and “respectful leadership and creativity” give a distinct grouping of what might be seen as more fundamental aspects. It appears possible that the two remaining components, “adequate competence” and “knowledge of workplace goals”, could be conceptually combined under a broad “learning” label. Such a structure could be seen as a potentially fruitful starting point for further conceptual and empirical investigations.

The other contribution from this analysis concerns the findings about relations between general components. Those labelled “performance drivers”, “high work demands”, “general health performance” and “respectful leadership and creativity” were rather strongly interrelated. This, together with the result concerning grouping of firms on the two dimensions as described in section 4.3 relates to recent research by, for instance, Way [51] and Lepak & Snell [31] about configurations of companies. This finding points to the potential fruitfulness of approaches that combine certain groupings.

The present study is limited in scale and uses cross-sectional data, and the results should therefore be interpreted with caution and be seen as mainly explorative. Outcomes are measured by survey questions. Measurement problems, which may have been created by the use of such questions, might to some extent have been remedied by the rather detailed multivariate indicator construction work. However, future research will need to incorporate financial and other performance information as well as health outcome data from registers and other systems as a means to more strongly validate the findings. We have tried to avoid a causal language and instead used a grouping of indicators into determinants and outcomes. We also applied a structural perspective and structural analysis methods instead of relying on cause-effect reasoning.

In summary, this study has identified probable links between healthy work organizational factors and outcomes related to organizational and health performance in small firms. The fields covered here are in much need of conceptual development and integrative analysis to guide more specific analyses. Using different methods we have also found some evidence of interest for practitioners working with workplace health promotion and organizational
performance development in small enterprises. The most important finding in this respect seems to be the inter-relatedness of a large number of factors. This may give some support to those working with concept-driven or holistic approaches by integrating several aspects instead of focusing on any particular process in isolation. The fact that it was possible to single out segments of “high-high” firms and “low-low” firms gives credibility to change strategies oriented to multi-purpose change processes.

References


Appendix.

Correlations between indicators and dimensions obtained in a two dimensional ALSCAL-solution

<table>
<thead>
<tr>
<th>Indicator</th>
<th>DIM1</th>
<th>DIM2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychosocially demanding work</td>
<td>.472</td>
<td>.243</td>
</tr>
<tr>
<td>Work intensity demands</td>
<td>.496</td>
<td>.087</td>
</tr>
<tr>
<td>Demands higher than control</td>
<td>.848</td>
<td>-.160</td>
</tr>
<tr>
<td>Data stress</td>
<td>.376</td>
<td>.130</td>
</tr>
<tr>
<td>Sleep problems</td>
<td>.504</td>
<td>.261</td>
</tr>
<tr>
<td>Efficient use of technology</td>
<td>-.394</td>
<td>.294</td>
</tr>
<tr>
<td>Workplace adaptability</td>
<td>-.719</td>
<td>.069</td>
</tr>
<tr>
<td>Customer oriented quality practices</td>
<td>-.297</td>
<td>.257</td>
</tr>
<tr>
<td>Adequate competence</td>
<td>-.277</td>
<td>.098</td>
</tr>
<tr>
<td>Physical health</td>
<td>-.181</td>
<td>.819</td>
</tr>
<tr>
<td>Psychological well-being</td>
<td>-.503</td>
<td>.654</td>
</tr>
<tr>
<td>Mean number of absence days last year</td>
<td>.367</td>
<td>.469</td>
</tr>
<tr>
<td>Depressed mood-worries</td>
<td>.277</td>
<td>.712</td>
</tr>
<tr>
<td>Musculoskeletal symptoms</td>
<td>.329</td>
<td>.461</td>
</tr>
<tr>
<td>Decision latitude</td>
<td>-.373</td>
<td>.188</td>
</tr>
<tr>
<td>Respectful leadership</td>
<td>-.839</td>
<td>.238</td>
</tr>
<tr>
<td>Creative work</td>
<td>-.551</td>
<td>.170</td>
</tr>
<tr>
<td>Customer satisfaction</td>
<td>-.787</td>
<td>.145</td>
</tr>
<tr>
<td>Perceived lack of efficiency</td>
<td>.662</td>
<td>.091</td>
</tr>
<tr>
<td>Restructuring worries</td>
<td>.372</td>
<td>.234</td>
</tr>
<tr>
<td>Team spirit</td>
<td>-.817</td>
<td>.026</td>
</tr>
<tr>
<td>Knowledge of workplace goals</td>
<td>-.101</td>
<td>-.208</td>
</tr>
</tbody>
</table>

**Bold and underline** = correlation is significant at the 0.01 level (2-tailed).

**Bold** = correlation is significant at the 0.05 level (2-tailed).
Sammanfattning
This thesis presents explorative studies aimed at contributing to more knowledge about relations between organizational factors such as aspects of leadership, learning, psychosocial working environment and quality, and relations between these factors and outcomes related to organizational and health performance, in small enterprises. The main focus is not on particular relations in isolation, but on a whole set of factors and the relations between these. The background of the studies is that several public authorities and researchers have discussed that a good working environment and work organization could be related to increased workplace health and organizational performance. However, only a few of all proposals have been transformed into actions, although small enterprises are seen to have difficulties to carry on development processes due to limited resources and knowledge of such processes. The presented studies and analysis are two-level, using both organizational level data for fifty-two enterprises and individual data for the leaders and co-workers (1090 individuals). The empirical findings give support for probable links between healthy work organizational factors and outcomes related to organizational and health performance. Other findings are that several organizational factors are inter-related, and that it is possible to find grouping of enterprises on two general dimensions. This may give support to those working with a concept-driven or holistic change strategy by .......(cont.)