When rules become practice The importance of work environment regulation, inspection and organisational conditions



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Preface

Regulations and laws are important for active work on health and safety issues and can be crucial for achieving a good work environment with healthy employees.

Previous research has highlighted the need to understand how organisations comply with these laws and regulations, how they are put into practice, interpreted and applied, and what conditions exist. With this systematic review, we want to find out more about the importance of work environment regulation for how organisations' manage their work environment , and increase understanding of the relationship between legislation and work environment practice.

Given that there are common regulations within the EU and that the European context is relevant to Swedish work environment regulation, we have chosen to include material from all over Europe. This has also provided the opportunity to obtain more data for the systematic review, as well as being able to understand and learn from what happens when there are different conditions and implementations of the regulations.

The authors of the systematic review are Professor Christian Ståhl, Associate Professor Daniel Lundqvist, and Associate Professor Cathrine Reineholm, all staff members at the Department of Education and Sociology, the Department of Behavioral Science and Learning at Linköping University. The Linköping University Library has also contributed to the literature search and, on behalf of the agency, a quality review has been conducted by Professor Lotta Dellve and Professor Andrea Eriksson. The responsible process managers at the Swedish Agency for Work Environment Expertise have initially been Karin Sjöberg Forssberg, PhD, and subsequently Thomas Nessen, PhD. Lasse Nivér has been the agency's communications officer.

The authors of the agency's systematic reviews have chosen their own theoretical and methodological starting points and are responsible for the findings and conclusions presented in this systematic review.

I would like to extend my sincere thanks to our external researchers and quality reviewers, as well as to the agency employees who contributed to the production of this valuable systematic review. The systematic review is published on the agency's website and in the "Systematic Reviews" series.

Gävle, March 2025

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Summary

Previous research has found that organisations' management of work environment issues has an impact on employee health, and that laws and regulations can be effective ways to improve the work environment. Research on the impact of regulations on the work environment shows that it is rarely a simple and clear chain from legislation to changed practice, but that the application and implementation of regulations in practice is often fragmentary and insufficient. Therefore, there is a need for knowledge about how work environment management takes place in organisations and how this is affected by both regulations and organisational conditions.

Research questions

The overall aim of the systematic review is to summarise existing European research on how workplaces address work environment issues based on current legislation and regulations. The focus of the review is on how rules are put into practice, how they are interpreted and applied, and what conditions exist for this to happen in accordance with the purpose of the regulations. The review also includes both facilitating and obstructive conditions for work environment management.

The following questions have guided the systematic review:

- 1. How do workplaces interpret and apply work environment regulations in their work environment management?
- 2. What organisational conditions are important for workplace compliance with workplace regulations?

Method

The systematic review is a rapid review, limited to studies containing empirical data from Europe. Only articles published in English in peer-reviewed scientific journals have been included. The inclusion criteria were that the studies should:

- focus on European working life and workplace contexts
- investigate laws, regulations and supervisory activities for the work environment in organisations and workplaces, in relation to organizations' and workplaces' actions with the work environment and/or conditions for such activities.

The studies should be published or "in press" between January 2013 and March 2024. The searches resulted in 16,284 unique studies after duplicates had been removed. Of these, 339 studies were considered to require full-text review.

After relevance and quality review, 56 studies were included in the systematic review.

Results

The included studies were sorted into seven focus areas based on their main focus: workplace rule compliance, management standards and certification systems, supervision and inspections, general conditions for regulatory compliance, working practices and roles, management and support functions, and contextual factors. A thematic analysis of the studies' results was then conducted, in which four themes emerged:

- From legislation to practice, covering compliance and interpretation of rules, and inspection of regulatory compliance.
- The importance of context, which addresses how conditions differ between countries and sectors, and how external social factors come into play.
- The importance of structure, which concerns organisational conditions and working conditions.
- The importance of social relations, which concerns social interaction in the workplace.

From legislation to practice

Several studies find that regulations act as an external pressure on organizations to ensure that they have an adequate work environment, and that inspections have an impact on employers' actions and on work environment outcomes. However, such inspections need to include both control and advice in order to lead to workplaces changing their health and safety practices. Inspections can lead to greater risk awareness and thus better reporting and improved preventive work. Stricter regulations on the psychosocial work environment have led to changes in employers' action plans.

How rules are interpreted and whether they are applied or not depends on how relevant they are considered to be to the workplace. Compliance is also linked to the functioning of reporting systems for different types of risks, and various studies indicate that employers do not make sufficient use of such systems.

An integrated approach to risk management is linked to corporate security work. Risk reporting and risk management are also influenced by factors such as the handling of the issue by safety representatives and managers, support from management, awareness of action plans, use of anonymous data reporting and integration of procedures into organisational processes, as well as company size.

The importance of context

Regulations are developed and applied at different levels of decision-making - from the EU, through national legislation, down to the workplace level. Comparative studies have indicated that EU directives are implemented in different ways and have different conditions for implementation depending on the country. Studies indicate that northern European countries have more developed work environment practices than southern European countries and therefore have better conditions for implementing EU directives. The national context also has an impact on inspection practices. Moreover, laws and regulations may differ or be applied differently depending on the sector.

The importance of structure

When it comes to the structural conditions of organisations, financial resources are most often highlighted. A lack of financial resources means that there is no time or space to reflect on or work on health and safety issues.

High production requirements and a high work pace are structural factors that hinder the ability to prioritise or work on work environment issues, and thus comply with existing regulatory systems. For employees, high production demands can reduce the ability to prioritise safety. Working and employment conditions are also important; for example, the organization of employees' working hours and whether they are employed directly by companies or through temporary work agencies can affect the possibility of a good working environment.

Larger organizations are better placed to implement regulations and achieve a good work environment. They also have more developed forms of risk assessment and better compliance with work environment rules. Small businesses face particular health and safety challenges in terms of lack of knowledge and resources.

Leadership is a central part of how health and safety is managed in the workplace. Examples of facilitating factors here include clarifying managers' responsibilities and pointing out the financial benefits of a good work environment. Health and safety training is linked to regulatory compliance, safety and commitment to the work environment, and managers who have received health and safety training believe that health and safety training can have a positive impact on production and efficiency.

Well-functioning OSH systems and procedures act as an internal pressure on actors within the organization, which in combination with the external pressure from legislation contributes to risk awareness and regulatory compliance. Internal monitoring and control systems are also important when work is carried out in several supply chains, where requirements from the top of the supply chain are important for compliance and the development of good practices for subcontractors. Support systems, external or internal, can provide expertise and lead to better risk assessments.

The importance of social relations

The theme of the importance of social relations touches on issues of culture and climate, communication and equality. There are different roles in health and safety management that come with different approaches, cultures and perspectives. Clear roles and responsibilities are a prerequisite for a good work environment and safety management. Decision latitude for the different roles is important, and the role the of health and safety representative is often unclear. When employees are involved in work environment management and are given a clear role, they also gain ownership of the issue. Studies indicate that a good safety culture can have an impact on how safety work is carried out. Issues of gender and gender equality are generally uncommon in the included studies.

Conclusions

An overall conclusion, in line with previous research, is that there is not a linear relationship between legislation, work environment practices and work environment outcomes. An organization's approach to work environment management depends on conditions at different levels, from EU directives and legislation, through management and governance, to employees' working conditions and knowledge. These conditions can combine to create external and internal pressures on organizations to improve or maintain work environment management.

An *external pressure* on organizations to ensure that they have a sufficiently good work environment is created by laws and inspections. In terms of external pressures, studies have highlighted the following aspects as key:

- Clarity and relevance at the rule level are prerequisites for work environment management to be perceived as meaningful and thus prioritised in the workplace.
- Regulatory enforcement practices need to balance between requirements and advice in order to be perceived as supportive for employers.
- Consultative approaches are perceived as more constructive by employers.

An *internal pressure* in workplaces is created through management and governance, internal systems for risk reporting and risk management, safety procedures and an integrated approach with clear roles and collaboration. In terms of internal pressure, studies have highlighted the following aspects as key:

- A well-functioning work environment requires sufficient knowledge and competence among managers, so that they can both prioritise work environment issues, and offer good support to their employees.
- Employees, in turn, need to have sufficient conditions in terms of reasonable workload and knowledge of work environment risks to be able to work in a way that maintains compliance.
- The interplay between structural conditions and social relations is central to how workplaces prioritise and implement work environment management.
- The size of organizations matters; small businesses in particular face compliance challenges.

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The appendices to the report are presented in a separate appendix report.

Definition of key concepts

Work environment. The term refers to the physical, social and organisational work environment, as well as the concept of psychosocial work environment often used in international research. It thus encompasses a wide range of risk factors, such as physical strain, chemical risk factors, noise, stress and psychosocial demands, as well as positive factors such as social support and social capital.

Work environment management. This term is used as an umbrella term for the English term Occupational Health and Safety Management (abbreviated in various ways, mainly OHS/OSH/OHSM/OSHM/SOHSM). In Swedish, the term systematiskt arbetsmiljöarbete (SAM) is often used, which is linked to statutory requirements.

Work environment outcomes. The term is used in this systematic review as an umbrella term for the various outcomes that studies have investigated, such as individuals' health, accidents, fatalities and safety behaviors.

Expert resources. The term is used as an umbrella term for the various organisational resources that can be used in work environment management, such as Human Resources (HR) or occupational health.

Internal systems. Refers to the procedures and reporting systems in place within an organization, such as incident reporting systems or procedures for integrating work environment issues into other processes.

Regulatory compliance.Used as a collective term for the various terms used in international studies to describe whether or not workplaces and employees comply with regulations, such as compliance, safety behavior, adherence.

Management standard. Used as a collective term for voluntary certifications that employers can follow, such as those issued by the Occupational Health and Safety Assessment Series Project Group (OHSAS) or the International Organization for Standardization (ISO).

Safety culture and safety climate. Refers to employees' perception of the role of safety in a workplace. The more ephemeral concept of 'climate' can be interpreted as a description of a current state of affairs at a particular point in time, but is usually seen as an expression of a more long-term underlying and pervasive 'culture'.

Inspection. Refers to various forms of inspection and control by authorities of the workplace environment.

1. Introduction

This systematic review examines how workplaces manage work environment issues based on current legislation and regulations. The focus of the review is on how rules are put into practice, how they are interpreted and applied, and what conditions exist for this to happen in accordance with the purpose of the regulations. This is a complex issue that requires multi-level analysis. Previous systematic reviews have often examined the link between work environment and health outcomes (1), or between legislation and health outcomes (2), without examining in detail the intermediate stage - the work environment management itself (governance and inspections and the organization's work environment management in Figure 1). This intermediate stage is the focus of this systematic review. It examines what research there is on the importance of regulations for workplace management and how such regulations are interpreted and applied, and what conditions are required for workplaces to comply with current regulations. The focus on the intermediate stage means that the research studied concerns the concrete work environment management and its conditions, and how this is affected by laws, regulations and regulatory activities.

How work environment management and its prerequisites in turn affect the work environment and its outcomes, for example in terms of health consequences and accidents, is therefore not the focus of this systematic review.



Figure 1. Focus of the systematic review.

Previous research has found that organizations' work environment management issues has an impact on employee health, and that laws and regulations can be effective ways to improve the work environment (3, 4). Although legislation exists at both a national and a European level, there are differences between how countries, sectors and industries deal with these issues. The psychosocial work environment and its risks have been identified in previous research as particularly challenging (3). One conclusion that can be drawn from research on the impact of regulations on the work environment is that it is rarely a simple and

clear chain from legislation to changed practice, but that the application and implementation of regulations in practice is often fragmentary and inadequate (4). There is also a long tradition in the field of work environment management of relying on self-regulation through broader legislation, which is then supplemented by more detailed provisions in specific areas. To be able to carry out the work environment management prescribed by laws and regulations, managers, work environment representatives and other actors therefore need both relevant knowledge and the necessary conditions. Support may also be needed to apply laws and regulations and to adapt activities appropriately in relation to regulatory requirements (3).

A previous meta-review (a compilation of existing systematic reviews) of the impact of different types of work environment interventions on work environment outcomes found that research has largely focused on inspection practices, information and advice activities, and regulatory compliance (5). The review only examined efficacy studies with control groups and found that most studies were from North America, followed by Europe, and that there are few systematic reviews with adequate methodology. Work environment management is seen in this research as an intermediate outcome between the intervention and outcomes in terms of health and reduced number of accidents. The review notes that sickness absence as an outcome measure is underrepresented in the studies, and that training interventions and the formulation of regulations have been researched to a relatively low degree (5).

From previous research, Sweden is at the forefront of work environment regulation, with more developed systems for managing work environment risks (3). However, there are differences between different industries in terms of what is prioritised in work environment management (6, 7). More technically oriented industries often focus on sick leave, accidents and physical risks. In the public sector, sickness absence is also often in focus, but there, shortcomings in psychosocial issues and their follow-up are more often highlighted. Similarly, differences in work environment management depending on the size of the company have been identified, with shortcomings and problems in the work environment being more common in small companies. Small businesses are reported to have less interest in work environment issues, and more incidents and serious accidents at work than larger companies (6-10). Furthermore, responsibility for work environment management is more informal in smaller organizations; many small business owners find rules and regulations complicated and often lack knowledge of risk assessments and actions (6).

Previous research has examined the practices of organizations in relation to work environment management. However, according to a report from the Swedish Work Environment Authority (3), there is a lack of research on organizations' compliance with Swedish work environment regulations, and more knowledge is needed about how laws and regulations are interpreted and applied in practice in workplaces. In addition, knowledge is needed about the conditions required for good compliance.

This systematic review is partly based on an earlier compilation commissioned by the Swedish Work Environment Authority (3), the purpose of which was to investigate whether laws and regulations lead to an improved work environment. That review focused specifically on the relationship between law and effect, and it was not part of the purpose of making a developed analysis of the steps in between. However, the qualitative studies in the review often focused on these steps: how the law affects workplaces' work environment management. This systematic review examines the way in which rules are put into practice and what conditions exist for this to happen in accordance with the purpose of the legislation.

Purpose

The overall aim of the systematic review is to summarize existing European research on how workplaces address work environment issues based on current legislation and regulations. The focus of the review is on how rules are put into practice, how they are interpreted and applied, and what conditions exist for this to happen in accordance with the purpose of the regulations. The review also includes both facilitating and obstructive conditions for work environment management.

Research questions

The following questions have guided the systematic review:

- 1. How do workplaces interpret and apply work environment regulations in their work environment management?
- 2. What organisational conditions are important for workplace compliance with workplace regulations?

Delimitations

The systematic review is limited to studies containing empirical data from Europe. The European context is relevant because there are both common regulations within the EU and similarities between, for example, the Nordic countries in terms of legislation and inspection. Therefore, a delimitation to Europe has been considered to contribute to a more coherent systematic review. This means that studies that do not contain empirical data (such as theoretical studies or pure policy analysis) were excluded, as well as studies whose empirical material comes from outside Europe. In addition, studies that focus solely on the effects of the work environment on health or other outcomes have been excluded if they are not linked to legislation, regulations and organisational conditions for work environment management.

A further delimitation made concerns the type of publication. Only articles published in English in peer-reviewed scientific journals have been included. Systematic reviews sometimes include research in other languages, as well as grey literature, i.e. reports and government documents of various kinds. However, the project's searches generated such a large amount of literature that it has not been possible to include other literature within the scope of the assignment. However, there is a representation of studies conducted in Swedish context in the material.

2. Method

This chapter presents the methodology used for the systematic review. The description here follows a chronological order to make the key elements and steps easy to identify. The review was based on guidelines from Grant and Booth (11), and is a 'rapid review' which aims to establish what is known about a specific topic through systematic search methods and a critical review of previous research to establish what is known about a specific subject.

Delimitations and criteria for the selection of studies

The work began by formulating the content, focus and boundaries of the study, based on the project's purpose and questions. A starting point for this was the so-called PEO model (People, Exposure, Outcome) to develop criteria for inclusion and exclusion (11).

The inclusion criteria (Table 1) were that studies should

- focus on European working life and workplace contexts,
- examine the laws, regulations and regulatory activities for the work environment in a workplace context, or
- study how organizations and workplaces interpret and apply regulations in their work environment management, and/or conditions for such work in relation to regulations.

Furthermore, additional, practically oriented, inclusion criteria were set to ensure that the evidence for the systematic review was scientifically and empirically based and published between January 2013 and March 2024 (when the searches were conducted). The time range was chosen to focus on research addressing current regulatory frameworks, and because previous systematic reviews exist for similar areas from earlier years. These criteria meant that the studies should

- be scientific articles in international (academic) peer-reviewed journals
- be published or 'in press' between January 2013 and March 2024
- be written in English
- contain empirical material.

 Table 1. Inclusion criteria according to the PEO model

People	Exposure	Outcome
Studies focusing on European working life and workplace contexts	Laws, regulations and regulatory activities for work environment management in organizations and work- places	Organizations' and work- places' work environment management and/or conditions for such work

The systematic review's exclusion criteria were developed at the same time as the inclusion criteria (Table 2). According to these criteria, studies should be excluded if they

- focused on countries outside Europe
- focused solely on contexts other than working life
- focused solely on legislation and regulations with no connection to the work of organizations and workplaces on health and safety
- focused solely on the employee's work environment (or other outcomes) with no link to legislation, regulation and occupational health and safety
- focused solely on the prerequisites for organisational interventions or implementation with no link to legislation, regulations and work environment management
- were published before 2013
- were not based on empirical material (such as literature reviews, metaanalyses, conceptual papers, viewpoints or such)
- was literature not published in scientific, academic journals (such as reports, books, book chapters, doctoral or licentiate theses)
- were written in languages other than English.

Table 2. Exclusion criteria according to the PEO model

People	Exposure	Outcome	
Studies focusing solely on contexts other than European working life	Only laws, regulations and inspection activities without relevance to health and safety	Focus only on work environment management or other outcomes	
		Focus on conditions for compliance only	

Search strategy

After determining the inclusion and exclusion criteria, five qualitative studies and five quantitative studies were identified that met the inclusion criteria and that the authors had knowledge of from previous work. These studies were used to generate appropriate search terms, but also to validate the later searches and ensure that all studies were found in the search results. The final search terms were determined through discussions between the authors, Linköping University Library and process managers from the Swedish Work Environment Authority.

The searches were conducted in six general databases (Scopus, Web of Science, PsycInfo, ASC, BSP, PubMed), one subject-oriented database (Safety Lit), and one subject-specific journal (Journal of Safety Research) in March 2024. Search strings and searches were conducted per question for this knowledge synthesis (see Appendix 3). The searches related to question 1 generated a total of 9,656 hits, while the searches related to question 2 generated a total of

17,353 hits. Linköping University Library carried out all searches and delivered the search results in .ris format to the report authors.

The search strategy also included hand searching, for example in the reference lists of articles. The hand search generated 247 hits.

Duplicates were found within each question and also between questions. Therefore, the decision was made to merge all hits and then remove the duplicates. The searches had generated a total of 27,009 hits and the hand search had generated 247 hits. After removing duplicates, 16,284 unique studies remained.

Screening of titles and abstracts

The review process started by reading all titles and abstracts for all search hits. The Rayyan QCRI software was used to support the work process. All search hits were marked with either "include", "exclude" or "maybe". Studies marked with 'maybe', and studies that the report authors assessed differently, were discussed until consensus was reached. The assessment focused on whether the study in question empirically examined the relationship between laws, regulations and inspection activities in the field of work environment management on the one hand, and European organizations' and how workplace handle work environment management on the other hand, and whether the conditions for organizations and workplaces to work with work environment management in relation to regulations had been studied. The screening also identified reviews and conceptual studies.

In total, 339 studies were considered to require full-text review to determine whether the set inclusion criteria were met.

Relevance assessment of full texts

A relevance review of the full texts of the studies was performed on the studies that passed the screening. Only empirical studies have been included, which in this case means studies that examine workplaces or other actors that are in various ways involved in work environment management. Therefore, policy studies using only documents or official statistics have been excluded as a rule, as well as purely theoretical papers or discussion papers. For the remaining studies, considerations have had to be made where some studies that investigated potentially interesting areas have nevertheless been excluded from the analysis, as it was deemed that they did not have the right focus based on the issues.

An example of such a trade-off for the first question concerns the aim of the systematic review's purpose of primarily investigating the significance of regulations and inspection activities for work environment management rather than for different outcomes. This meant that studies were excluded if, for example, they only included an analysis of a rule amendment and its effects in terms of number of accidents, or other health outcomes. Studies that did not focus on how the rules affected the work environment were also excluded because they do not contribute knowledge about the step between rules and outcomes. Another exclusion was if studies did not focus on organisational dimensions, but for example mainly studied the use of a certain protective equipment or comparison of different machines without reference to health and safety issues. Studies measuring work environment risks and exposures that do not clearly focus on regulations or work environment management have also been excluded.

Studies on compliance with different types of management standards and certification systems are borderline cases as such schemes are not legal requirements, but voluntary standards that employers can choose to comply with in order to strengthen their OSH management. However, studies on this have been included if they contain reasoning on how workplaces work with such standards as these can be considered as regulations that are binding as long as the workplace claims to comply with them. In a practical sense, this thus becomes an example of compliance that can therefore also provide relevant information to the systematic review.

An example of a consideration related to the second question is that the purpose was primarily to investigate the conditions for compliance with *regulatory systems*. Therefore, many studies have been excluded because they do not have an explicit focus on rules. For example, many studies that address organisational conditions, such as how workplaces address safety issues and what their safety culture looks like, or that examine the effects of health promotion interventions, have been excluded. However, a few studies have been included even though they do not explicitly examine organisational factors, if they have been judged to touch on important conditions that in the study are shown to have repercussions for workplaces' opportunities to work with work environment issues, such as the economic situation. These studies have specifically examined how such contextual factors can influence workplace health and safety management.

As a result of the relevance review, 61 studies were deemed to meet the criteria set for this systematic review.

Quality assessment

For those studies that were deemed relevant, a quality assessment was carried out. The quality assessment was performed using the Mixed Method Appraisal Tool (MMAT) version 2018 (12). The MMAT is an instrument for quality assessment of studies with different study designs. Initially, it is assessed whether the study's research questions can be answered based on the material presented. Next, five questions are answered based on the specific design of the study. All report authors were involved in this step.

In total, 5 studies were excluded due to poor methodological quality. Overall, therefore, this systematic review is based on 56 studies. Figure 2 presents a summary and overview of the different steps of the process.



Figure 2. Flowchart of the number of articles during the different steps of the process.

The quality assessment also assessed potential conflicts of interest that may have been caused by the funding of the included studies. In the cases where a funder was indicated, it was usually a government research council or internal funding from the universities/colleges where the researchers were active. No conflicts of interest were identified.

Included studies

After a relevance and quality review of all full texts that were collected, 56 studies met all inclusion criteria and were thus included in the analysis. Of these studies, just over half are from the Nordic region, or have empirical data from a Nordic country. Methodologically, the studies have different approaches.

The majority of the studies are cross-sectional, i.e. data were collected at one point in time. Of the remaining studies, 12 are longitudinal, 5 are based on registry data, 2 are intervention studies or randomized controlled trials (RCTs) and 6 have different combinations of methods. The methodological approaches of the studies are summarized in Table 3.

Table 3. Number of included studies by geographical area and study design.

Approach	Design	Sweden	Other Nordic countries	Övriga Europa	Compare countries	Total
Qualitative	Cross-section	5	11	6	1	23
	Longitudinal					
Quantitative	Cross-section		5	8		13
	Longitudinal		4	3		7
Several methods	Cross-section			2	1	3
	Longitudinal	1		1	1	3
Registry-based study	Cross-section			2	1	3
	Longitudinal			1	1	2
Implementation/RCT			2			2
Total		6	22	23	5	56

The studies span across a range of different industries, and many of them include data from more than one industry. Some studies focus on specific sectors, including construction, chemical companies, the oil industry, manufacturing, and health and social care.

The included studies are published in 26 different journals, the most common being Safety Science (24 studies), Journal of Safety Research (3 studies), and Work (3 studies). The number of articles per year varies between two and eight. See tables in Appendix 4 and 5.

Analytical process

The analytical process began with all of the studies being read and tables with key information from the studies relevant to the systematic review were produced, which is a common procedure in systematic reviews (13). Such key information included, for example, the country in which the study was conducted, on which population, the purpose of the study and the overall results. This table can be found in Appendix 1. The procedure is called narrative synthesis (14).

Based on this synthesis, various patterns were then identified in the material. This step was initially carried out through a descriptive content analysis (15), the aim of which was to sort the included studies according to their focus. This resulted in seven focus areas. Subsequently, a thematic content analysis (16) of the results of the included studies was conducted for the purpose of identifying common themes. The aim of such an analysis is to provide more comprehensive and coherent descriptions of the overall results of the included studies and to formulate how they can be understood in relation to each other. This analysis resulted in four themes: 1) from legislation to practice, 2) the importance of context, 3) the importance of structure, and 4) the importance of social relations.

The results chapter is structured around this analysis process. It starts with an overview of the focus areas of the different studies. The thematic analysis of the material is then presented.

3. Results

This section presents the results of the systematic review. The section begins with an overall description of the focus of the studies based on a descriptive sorting, and is followed by a thematic analysis that presents pervasive patterns in the studies' results. Based on the content of the included studies, it can be concluded that the two questions of this systematic review, how workplaces interpret and apply rules and what organisational conditions exist for compliance with rules, often intertwine.

The results follow this finding, and are therefore reported together for the two questions. The logic of the results section is presented in Figure 3 below, which shows that the two questions have generated a search result with studies sorted into seven focus areas. The results of the studies were then analytically synthesized into four different themes.

Research questions	Focus areas of the studies	Themes
How do workplaces interpret and apply work environment regulations in their work environment management? What organisational conditions are important for workplace compliance with health and safety regulations?	 Workplace regulatory compliance Management standards and certification systems Regulation and inspections General conditions for regulatory compliance Working methods and roles Management and support functions Contextual factors 	From legal text to practice The importance of context The importance of structure The importance of social relations

Figure 3. Structure of the results section.

Focus areas of the studies

In the initial descriptive analysis, the studies were sorted into different focus areas in order to provide an overview of the material. This section briefly describes these areas. The results of the studies are then presented in more detail in the thematic analysis.

The initial analysis generated seven focus areas: workplace regulatory compliance (20 studies), management standards and certification systems (3 studies),

regulation and inspections (10 studies), general conditions for regulatory compliance (11 studies), working methods and *roles* (5 studies), management and support functions (5 studies), and contextual factors (2 studies).

Workplace regulatory compliance

This focus area includes studies on rule compliance and workplace management *safety and risk assessments* (17-27). In summary, the studies indicate that rules in the field of work environment management are important for the issues to be prioritised in different activities, and that the rules are part of the structural pressure that exists in workplaces. In general, *larger companies* have better conditions to operate under the current rules. Establishing some form of *internal system* for work environment management can create *an internal pressure* on good practice, and on being able to use professional judgment. Good relations between management, unions and employees and good awareness of safety provisions are also highlighted. EU level rules can be implemented differently in different countries, depending on the national context's regulatory system and guidelines.

There are also studies that focus more specifically on certain aspects of the work environment (28-36). These studies show that regulatory systems on *psychosocial risks and work-related stress* have an impact on the existence of organisational action plans. However, regulatory systems are often complex and require guidance to be implemented appropriately, and studies indicate that small businesses often face significant challenges in this regard. Specific rules addressing either particular risks or groups can be particularly difficult to implement, as shown by studies on chemicals, wood dust and special protection for pregnant women.

Management standards and certification systems

In addition to statutory rules, it is also possible for companies to *certify* themselves in accordance with certain standards concerning, for example, the working environment and management. A number of studies have focused specifically on this (37-39). The use of different management standards and certification systems complements the rules that workplaces can choose to follow to demonstrate that they have a good working environment. One such standard was OHSAS 18001, which was replaced by ISO 4001 in 2018. In conclusion, the studies indicate that standards often contain higher requirements and ambitions than required by legislation. The results also indicate that companies that have chosen to certify themselves generally seem to work more on work environment issues, but that this is particularly complex when it comes to the psychosocial work environment; the standards do not offer sufficient guidance here.

Regulation and inspections

The next area of focus is on *inspection and regulatory activities* by public authorities (40-49). In summary, the studies indicate that inspections have an impact on work environment management, and that employers perceive more *consultative and supportive* inspection practices as being more useful. Inspections

also seem to have a more tangible impact in larger organizations. The work of inspectors is influenced by various *structural conditions*, such as financial resources for inspections and the degree of trade union presence in the workplace.

General conditions for regulatory compliance

This focus area encompasses a number of different organisational dimensions that can affect the conditions for implementing statutory requirements concerning the work environment (50-60). In summary, the studies show that organisational conditions such as *competence, safety climate, training, a climate of equality* as well as *time, financial resources and work intensity* are linked to how well the work environment management works. The results indicate that work environment management is promoted by internal systems that span several organisational levels and include collaboration between different actors.

Working methods and roles

This focus area includes studies that have focused on more limited conditions for work environment management, such as roles and responsibilities, working methods and routines, cultures, work pace, and gender dimensions in the workplace (61-65). In summary, the studies show that roles and working methods in work environment management are often *unclearly defined*, and that those who are given a formal role, depending on how committed they are, may take on more responsibility than the role prescribes. It can also mean that gain a sort of ownership of the issue. In workplaces, different occupational groups may also have different *cultures* in terms of how they understand safety issues. Those responsible for work environment management need reasonable conditions and mandates in organizations. *Gender aspects* can influence the work environment through cultures and expectations.

Management and support functions

This focus area includes studies that target organisational functions, including both *managerial and leadership* and the use of *formal expert resources* such as HR and *occupational health* (66-70). Overall, the studies indicate that leadership is a central part of how work environment management is conducted in workplaces, and that training managers can have a good effect on improving this work. Examples of facilitating factors here include clarifying managers' responsibilities and pointing out the financial benefits of a good work environment. Leadership also needs to be combined with a safety culture. Occupational health was only examined in one of the studies; it shows that this resource is rarely used for preventive work environment management.

Contextual factors

This focus area includes studies that go beyond the organisational level to examine the impact of external factors at the societal level on work environment management (71, 72). Overall, these studies indicate that *socio-economic factors* have an impact on the work environment and work environment management,

although it is difficult to draw any direct conclusions about causal relationships from these studies. However, the studies indicate that work environment management generally declines during recessions and that the number of accidents decreases when fewer people are working.

Rules and conditions: four themes

This section presents a thematic analysis of the results of the included studies. In the analysis, themes have been sought that in various ways concern both the conditions for compliance with regulations and the actual work environment activities that take place at workplaces in relation to regulations and inspection.

Four themes have been developed in this analysis:

- From legislation to practice, covering compliance and interpretation of rules, and inspection of regulatory compliance.
- The importance of context, which looks at how conditions differ between countries and sectors, and how external social factors come into play.
- The importance of structure, which concerns organisational conditions and working conditions.
- The importance of social relations, which deals with social interaction in the workplace.

From legislation to practice

Several studies find that *inspections* have an impact on employers' actions and on work environment outcomes, and that regulations act as an external pressure on organizations to ensure that they have a sufficiently good working environment (23, 42, 43, 47, 48). However, regulation can take different forms and be interpreted or controlled from different starting points. For example, it matters *how extensive the regulation* is and how this affects the extent to which rules are implemented in workplaces.

A study comparing inspection practices in Germany, the UK and France (18) indicates that more inspection visits do not reduce the number of accidents; rather, a *broad approach* with different work environment tools as well as more targeted inspections seem to be beneficial in order to have a more tailored inspection of operations. Strict rules can have a deterrent effect (18), which is reflected in both small business owners' fear of doing the wrong thing and desire to do the right thing as driving forces of compliance (25). However, most of the studies on enforcement and inspections focus on *the type of enforcement*, and point out that inspections need to balance control and advice if they are to lead to workplaces changing their work environment management. This balance may look different. Swedish supervisory activities are seen as more *advisory and supportive* in nature than the Danish, and such an advisory approach was perceived as more constructive by companies (42). Similar findings emerge from two Norwegian studies (43, 44) reporting from a project comparing different inspections that

included counseling through workshops were more likely to result in actions being taken, although the impact of supervision on psychosocial risks appears to have been limited. Two Finnish studies emphasize that employers want an *advisory and follow-up* inspection practice (45), while inspectors want *clearer tools for control* such as sanction possibilities (46). A UK study found that *austerity measures* for public authorities result in worsened conditions for inspections and for inspectors' *competence provision*, making it more difficult to ensure that employers comply with legal requirements (49). Several studies also indicate that more governance and inspections are needed to increase compliance (21, 28, 35).

The fact that workplaces need advice on regulations is also linked to the need to *interpret* regulatory systems. In this regard, various studies have shown how this interpretation is linked to how people in the workplace assess the relevance of rules to the current context and situation. Rules are applied selectively - some are followed while others are ignored due to employees using their professional judgment and making their own risk assessments (26). In some cases, the rules are seen as complicated or disruptive to the business (26, 33). The fact that regulatory systems can be perceived as unclear is one reason given for the need for interpretation, which also affects the activities of work environment representatives as they are forced to navigate between different views and expectations (62). Here, different *cultures* can develop around how the workplace should relate to rules, and these cultures can differ between management, white-collar and blue-collar workers (63), for example in terms of who should 'own' the work environment issue and whether responsibility should lie with management or employees.

Some studies have examined the introduction of more *specific rules*, such as special protection for pregnant women and requirements for special risk assessments and accommodations, and point to low compliance (28, 29). These rules affect a limited number of staff, and the studies do not suggest that such legislation has led to any change in practice.

Another area that has been subject to legislative change is the *psychosocial or organisational work environment*. Several studies have examined whether the psychosocial work environment and the work on these issues have improved (30, 31). They show that regulations have increased the prevalence of action plans among European employers (31), and stress action involving stress also increase the number of resources at work (32). The psychosocial work environment is also influenced by awareness of such action plans, as well as by management support, anonymous data reporting and integrated procedures in organisational processes (20). Obstacles to working on these issues include the complexity of the risks, that the scope for avoiding risks is limited, lack of accountability of staff at different hierarchical levels, discrepancy between formal responsibilities and the space to make decisions, and a lack of reflection on the processes available to develop and implement measures (56). Studies examining *whether management standards and certification systems* are relevant to the psychosocial work environment indicate that these systems are generally

insufficient to provide guidance on this (38), and it is unclear in the instructions to certification agencies how the work on the psychosocial work environment should be followed up (37).

One dimension that is relevant to compliance is how well workplaces' *reporting systems* work for different types of risks. Companies are required to carry out various types of risk assessments, and a German study suggests that this is not done to a sufficient extent (21). It can be related to *risk awareness;* an example here is a Spanish study of the construction industry where workers estimated risks lower than inspectors (22). Inspections can lead to greater risk awareness and thus better reporting and improved preventative work (47), and an integrated approach to risk management is linked to company safety performance and safety outcomes according to Norwegian and Finnish studies (54), and managers' safety commitment (68, 69). Using external health and safety consultants can also contribute to better risk management if the consultants are also used as a sounding board to improve safety (61).

Risk reporting and risk management are also related to factors such as how safety representatives and managers address and prioritise work environment issues, the extent to which staff are supported by management, whether there is an awareness of action plans, whether the company offers the possibility of anonymous reporting of incidents and how procedures are integrated into organisational processes (20), as well as company size (21).

The importance of context

Implementation of regulatory systems takes place between different levels. Rules may originate in EU directives or national legislation, and before they land in the workplace they will be influenced in different ways by the context in which they are processed and operationalised into practice.

European regulatory systems are to be implemented in a variety of national contexts. Comparative studies have shown that EU directives are implemented in different ways - and have different chances of being implemented - depending on the country. When EU directives on work environment (89/391/EEC) have been introduced, this has happened to a greater extent in Sweden than in Spain, which is explained by the fact that Sweden has a more developed system for preventive work environment management with more collaboration and a higher degree of integration of work environment management in the organizations (23). A comparison between Spain and the UK on the EU Directive 92/57/ EEC in the construction industry shows that the countries differ in terms of the conditions for preventive work environment management. The national regulatory framework is clearer in the UK regarding the obligations of different actors (27). In the field of chemicals, a European regulatory framework (REACH) was introduced which studies have pointed out is complex and requires guidance (35), which also suggests that rules will be applied differently in different contexts. Thus, EU directives can be assumed to lead to different levels of effectiveness depending on the national context. Studies that do not concern EU directives or common regulations have also *pointed to the importance* of the national context, for example, regarding inspection practice - this is more advisory and supportive in Sweden than in Denmark (42).

Laws and regulations may also differ or be applied differently depending on the *industry*. One example is a study from Norway that compared the oil and construction industries. These have different regulatory frameworks based on whether the activity is conducted at sea or on land. In the Norwegian oil industry, which is based on offshore work rules, compared to the construction industry, there are more developed safety procedures, better cooperation between unions and employers, fewer actors involved and better continuity in the organizations (17). Another example concerns Swedish care for the elderly. The conditions for complying with the Work Environment Act and the Swedish Work Environment Authority's regulations are generally poor because it is an industry with fewer resources than many others (50). The systematic work environment management improved in this sector during the COVID-19 pandemic, which can be seen as an external influence and thus a contextual factor. The study noted improvements in safety and communication in work groups regarding risks, as well as in workplace accommodations and equality climate (50). A Swedish study of industries with different gender dominance (elderly care, tire shops and cleaning companies) identified different conditions for work environment inspections (64), such as different workplace cultures. However, work environment management was inadequate in all the sectors surveyed in terms of risk assessment, incident reporting, documentation, systematics and knowledge and skills.

Another contextual factor is socio-economic conditions. Laws and regulations on the work environment can certainly be assumed to be affected only secondarily by the national economy, but it is still reasonable to assume that the national economy has a more direct impact on workplace resources and organisational conditions. A Danish study (71) investigated the impact of the recession on preventive work environment activities and found that work environment activities relating to the psychosocial work environment and accidents at work were affected. More preventive actions concerning the psychosocial work environment were implemented in 2011 than in 2006, suggesting that the focus on the psychosocial work environment had increased during the recession. In contrast, preventive work environment management to prevent workplace accidents and improve the physical working environment was more mixed but had generally declined. A Greek study (72) examined the relationship between changes in GDP in relation to enforcement sanctions and workplace accidents and found a statistical correlation. As GDP decreases, so does the number of accidents and the number of sanctions stemming from inspections. The study concludes that this is because the number of workers in hazardous jobs decreases during economically difficult times, reducing the need for reactive inspections. Therefore, supervisors are advised to act early and take preventive inspection actions when GDP starts to rise, rather than waiting for an increase in workplace accidents.

The importance of structure

The next theme is about the structural conditions of organizations, which in this context refers to the basic working conditions of organizations. This includes organizations' *financial conditions* that determine how much resources and time can be spent on work environment management. Financial resources are a prerequisite highlighted in several studies in different contexts (17, 25, 28, 36, 50, 54): if such resources are lacking, there is neither the time nor the space to reflect on or work on work environment issues.

Another recurring condition is the size of the organization. A consistent result is that larger organizations have better conditions to implement regulatory systems and achieve a good work environment. Company size was by far the strongest predictor of more developed forms of risk assessments (21). Larger companies also have better risk awareness (47) and better compliance with work environment rules (28, 34, 35, 70). Small businesses face particular challenges regarding the work environment. A UK study (25) indicated that small businesses do not want deregulation in the work environment field, nor a reduction in the number of inspections, as inspections, if carried out properly, can be helpful. Practical barriers to compliance in small businesses are the demands of paperwork and lack of time, and therefore guidelines and appropriate supervision become important to ensure that health and safety is prioritised in the business. The conditions for supervision are also particularly problematic among small businesses, as these companies often lack knowledge and resources for work environment management (40, 41). A German study also recommended more monitoring and advisory activities targeted at small businesses (21). These findings can be contrasted with those reported above on inspections, which focused on the type of inspections as determining whether or not they are perceived as constructive and helpful, and that this practice differs between countries.

Other structural conditions relate to *working conditions and working hours*. A Polish study (33) shows that working time legislation is circumvented by truck drivers through manipulation of working hours and driving manuals (measuring time and mileage). The manipulation of the organization's control system can be considered here as a deliberate non-compliance with rules due to production requirements.

Employment conditions are another prerequisite, where temporary employment (via temporary employment agencies or consultants) can pose difficulties for work environment management (17, 52, 55). Several studies from different contexts highlight *production demands and high work rates* as obstacles to prioritizing or working with work environment issues, and thus complying with existing regulations (53, 59, 60, 68).

Another structural prerequisite is *how developed and integrated* systematic work environment management is in the organization. Companies that have a more developed and systematic approach to work environment issues (54, 70) and more preventive work (23, 27) have better work environment outcomes. If the system is well-functioning it acts as an *internal pressure* on actors within the organization, which in combination with the external pressure from legislation contributes to risk awareness and regulatory compliance. In more complex organizations, work environment management also becomes more complex, requiring adequate resources and developed systems to coordinate. A Norwegian study highlights in particular roles and responsibilities, project management, work environment management and integration, safety climate, learning, site and personnel management, and operational risk management (54). Other examples of internal systems that are linked to work environment outcomes are organisational action plans for psychosocial work environment (31, 32), user-friendly digital safety and work environment systems (55), and adequate safety and hygiene procedures (50, 68). The different levels of an organization affect each other and a systems approach is identified as positive for increasing the degree of collaboration on work environment management (51). Studies also show that "maturity" in terms of work environment issues can differ between industries, as shown, for example, by a Norwegian study in which the Norwegian oil industry was judged to be more mature than the construction industry, which seemed to strive for minimum standards in compliance with regulations (17). Such a difference in maturity can also be seen between regions, for example in the case of waste companies in different parts of Italy (57). Internal systems are also important when work is carried out through multiple supply chains, where requirements from the top of the supply chain influence compliance and the development of good practices for subcontractors (24).

One way to strengthen an organization's internal health and safety management system is to *certify* to a standard; one that has been examined in several studies is OHSAS 18001. While this standard does not appear to have provided much guidance on psychosocial risks (37, 38), studies show that companies certified to the standard had better safety outcomes than others, and that managers and employees in certified companies are more committed to work environment issues and make more efforts in their work environment management (39). As the requirements of the standard go beyond legislation, the organization needs to have a developed system and safety climate to translate it into good safety outcomes and clearer and more thoughtful work at the different levels of the organization. A Danish study comparing companies that have and have not been certified (39) finds that certified companies rate higher on both content (what work environment actions are implemented) and process (how the work is done in terms of organization and systems).

In internal systems, there may also be different ways of working *on follow-up and internal control*. In industries with multiple supply chains, such as construction, follow-up and inspection through the contractor chain is an important element of the internal OSH system (24). In a Finnish study of temporary work agencies in the restaurant industry, work environment management was characterized as reactive and the study pointed to challenges in establishing common policies when basic work environment factors such as ergonomics differ (52). Follow-up is also an area that has been identified as lacking in organizations (57).

Management standards and certification systems can be used as a method to increase internal control and follow-up (38, 39). An Italian study (58) examined whether video surveillance of employees can improve safety by reducing risk behaviors and informing targeted training interventions. This could then provide a risk-free and objective description of the work, but entails costs for the purchase of equipment and for analysis. However, the study does not mention the potential privacy concerns that such an approach could raise.

A further structural aspect relates to *support systems*. Such systems can be organisationally external or internal, and possess some form of expertise, such as occupational health care. A study (67) concludes that Swedish public organizations do not use occupational health care services in preventive work environment management in the way intended by the regulations. Instead, the HR department has an important role in the coordination and utilization of resources for work environment management, as they often act as an intermediary or gatekeeper between the business and occupational health care. The quality of occupational health care has been mentioned in a Finnish study as an aspect of how well collaboration works in work environment management (51). Access to specialist risk support is associated with better risk assessments (21).

In several studies, *managers* and their *leadership* are highlighted as important in relation to the work environment management that is carried out. Leadership and the support shown by managers can be linked to improved safety culture, organisational safety behaviours and compliance (20, 55, 66, 68). Studies also show that managers' training, competence and commitment to the work environment are central to how they prioritise work environment management (43, 69, 70).

Another dimension concerns *skills* and awareness of risks, which is linked to training. Training in work environment management appears to be generally associated with compliance, safety and workplace commitment (16, 51, 62, 64). A Norwegian study (70) indicates that managers who have received training on the work environment believe that work environment initiatives can have positive effects on production and efficiency. Lack of knowledge is highlighted in several studies as one of the reasons for non-compliance with rules or safety procedures (35, 40, 60). Compliance with specific regulations requires training on the specific areas to which the regulation relates, for example rules on pregnant workers (28, 29) or electromagnetic fields (34).

The importance of social relations

The last theme concerns social relations as a prerequisite for work environment management. This includes roles, culture and climate, as well as communication and equality.

One aspect of this theme is about the *roles* that exist in work environment management. Roles have both a structural dimension, in that different professions and positions have formally designated responsibilities, and a more social dimension, related to the nature of interaction and dynamics in the workplace. The latter touches on the different approaches, cultures and perspectives associated with different roles. Studies have indicated that safety representatives have more confidence in the effects of legislation than work environment officers (19), and work environment specialists rate safety higher than employees and inspectors (34). A Norwegian study focusing on the oil and gas industry (63) describes how three different subcultures developed within the organisation - the management culture, the engineering culture and the operational culture - and that these had different understandings of safety rules. The study showed that management viewed safety as an achievement, engineers viewed it as a process, while operational staff viewed safety as an action. Management wanted more individual responsibility and simpler rules, while engineers wanted a top-down approach; workers, on the other hand, were more 'rule-followers', but were torn between rule-following and practicality because rules reduce the room for improvisation. Clear roles and responsibilities have been highlighted as a prerequisite for good safety performance (54), and leadership commitment is described as a factor influencing role clarity (69). Furthermore, good relations between trade union representatives and employers are highlighted as a factor promoting safety in the workplace (17).

HR can play a role as an intermediary in communication between the workplace and external resources such as occupational health care (67). A Swedish study has pointed out that inspectors and small business owners represent different cultures, and that in practice there is a meeting between bureaucrats and entrepreneurs (41).

One aspect of roles is about the decision latitude or mandate the different roles receive or are given. A Danish study examined work environment representatives (62), and how in their daily practice they develop a role that can generate sufficient recognition from management to have the room for maneuver to fulfill their role. The results show that the legislation on work environment representatives is broad and unclear, resulting in different stakeholders having different perceptions and expectations of what work environment representatives should do. As a result, work environment representatives need to navigate between different expectations and create their own role description, which often involves being problem solvers rather than strategic partners in work environment management. The fact that roles do not come with a clear decision latitude has been highlighted in other studies as a barrier to conducting psychosocial risk assessments (56), and for employees, high production demands can reduce the decision latitude in terms of control over risks (59). When employees are involved in work environment management and are given a clear role, they also gain ownership of the issue (63).

Linked to roles, responsibilities and cultures is also the phenomenon of *safety culture* or *safety climate*, which has been found to have an impact on safety work (54). A Norwegian study (53) demonstrates a link between safety climate and compliance. This is also influenced by productivity requirements, where high requirements negatively affect compliance. An Austrian study shows that the negative relationship between work intensification and safety compliance at the

organisational level is influenced by the safety climate and safety motivation of employees (59). It has also been found that transactional leadership (leadership based on "transactions" by rewarding desired behaviors) can have a positive effect on compliance with safety rules, which in turn is influenced by safety culture (66).

Issues related to gender and gender equality are generally uncommon in the studies included in the knowledge synthesis, but two studies have an explicit gender perspective. One is a Swedish study (64) that shows that work environment management is inadequate in both male- and female-dominated occupations, but that masculine-gendered cultures, loyalties and identities can limit work environment management (e.g. macho culture in tire companies). The second study, from Spain (65), examined the extent to which gender is taken into account in work environment management and the relationship between women's work environment and corporate social responsibility. It shows that gender is taken into account 'moderately', mainly in the form of initiatives to prevent, punish or stop sexual harassment and violence against women in the workplace. However, the study shows that laws in this area are complied with and that it is important for companies to show externally that they work actively with gender issues in the work environment. Another Swedish study includes a gender equality perspective and found that the gender equality climate in elderly care was positively affected during the COVID-19 pandemic (50), which in turn contributed positively to the work environment.

4. Discussion

The aim of this knowledge review was to summarize existing European research on how workplaces interpret and apply regulations, and what conditions are important for this work. In order to do this, two questions were formulated, one of which concerned how workplaces interpret and apply work environment regulations in their work environment management, and the other focused on which organisational conditions are important for workplaces' compliance with work environment regulations. However, the results of the included studies show that it is difficult to distinguish between these two issues, as interpretation and application are closely linked to organisational conditions. For example, the size of organizations, their culture and the influence of different roles have an impact on how work environment regulation affects routines and working methods, and thus how rules are both interpreted and applied.

Another overarching observation is that the included studies vary widely in terms of research methodology. Only a few can be considered pure impact studies, and few have a longitudinal design. A plausible reason for this is the subject area itself. There are rarely direct cause-and-effect relationships that can be investigated with randomized controlled trials. Work environment management is a difficult outcome to measure and is influenced by many contextual factors. This means that a control group design in which the effect of one factor is examined while holding other factors constant is difficult to implement. Longitudinal studies are also complicated, as it is difficult to isolate how the factor of focus affects the outcome when many other influencing factors can be assumed to vary over time. Therefore, in this area, it is generally difficult to make statements about effects and causality. It can be noted that there are knowledge summaries that focus specifically on effect studies (5), but in these, the outcomes are primarily health-related, which is more measurable than organizations' work environment management. Instead, what emerges from the studies included in the knowledge compilation are a number of *indicators* of what can be assumed to influence how well the work environment management functions, and this is also a reason why qualitative studies are of great value in this type of research. It is necessary to be able to understand how work environment management is carried out, what employers do, and how laws and regulations are interpreted and applied, depending on the specific context of the study.

In a systematic review of this kind, it is therefore important to try to take a more holistic approach to the analysis of how different factors can interact, rather than trying to make statements about causal relationships. Therefore, much of the focus in the systematic review is on the thematic analysis that identifies common features in the material. The holistic approach is also a reason why the studies are thematised independently of the method they used. Rather, the key is to identify the overall trends and how the studies can contribute to knowledge about different dimensions of work environment management.

A chain of multiple influencing factors

An overall finding from this systematic review, which is also in line with conclusions from previous systematic reviews (3), is that there is not a linear relationship between legislation, OSH practices and OSH outcomes. Rather, there are factors throughout this chain that influence the way in which, and the results with which, legislation affects workplace practice (see Figure 4). The different steps in the figure also include various forms of contextual factors that can influence how work environment management is organized, and what priority and resources it is given. This includes socio-economic factors such as the state of the market, world events such as the COVID-19 pandemic, and the specific contextual factors that exist in different industries.





At the top level of the chain, it can be seen that a number of societal factors are important. One is the design of the law, which needs to be relevant to workplace practice, and also needs to be understandable and clear. Here, the results indicate, for example, that the importance of EU directives varies depending on how well national regulations are adapted to the requirements, and that the clarity and relevance of laws and regulations can be perceived differently in different organisations. There are also differences between industries in terms of both prerequisites and maturity in safety and work environment issues. The second level in the chain, supervision and inspection, is important because the legislation is intended to function both as a regulator by setting requirements and threatening with sanctions in cases where requirements are not met, and as a guide to how workplaces should act in order to provide a fair work environment. The key assumption at this level is how regulatory enforcement practices are designed, which affects how enforcement is facilitated depending on how sanctions are balanced with support and advice. The studies in this area indicate that both control and guidance is needed, and that workplaces often perceive a consultative approach as constructive in improving the work environment and the workplace's ability to comply with regulations. It is also about helping to interpret and understand the regulatory framework so that it is applied correctly in the specific context. This result can be seen in relation to how a finding in a previous systematic review (3) showed that supervision with sanctions seems to have a better effect than when supervision is only advisory.

At the third level of the chain is management and governance in the workplace, where the conditions focused on in the studies are internal systems for risk reporting and risk management, safety procedures and integrated work with clear division of roles and collaboration. The studies highlight that these factors contribute to a higher priority being given to work environment management. The combination of external pressure from legislation and inspections and internal pressure from management improves the performance of work environment management. A prerequisite for this to happen in practice is sufficient knowledge and competence among managers, so that they can both prioritise work environment issues and offer good support to their employees. External factors may also be important; according to the studies, both recession and pandemic seem to be able to put work environment issues higher on the agenda in organisations. Training initiatives for managers are highlighted in several studies as effective. Certification to different standards can also be a way to improve internal work environment management. Previous summaries (3, 4) have pointed to the psychosocial work environment as being particularly complicated to manage in work environment management, something that the results of the systematic review also point to. However, it is worth noting that EU directives in this area have a positive effect, while certifications seem to be less useful for this work. Previous reviews (3, 4) also highlighted challenges with more complex chains of employment relationships; in the present review, studies focusing on entrepreneurial chains have pointed to the importance of internal systems that create internal pressure to maintain good work environment practices.

At the fourth level there are employees, and the conditions relate to basic working conditions that are important for maintaining safe working practices. High productivity requirements can have a negative impact on safety, but a safety culture in the organization can have a mediating function. Large organisations generally have better conditions and systems for work environment management than small ones. The conditions for compliance differ between countries, as studies on the application of EU directives indicate, and between industries, with some being more 'mature' in their approach to safety than others. At this level, there is also the professional judgment of employees, which in some cases leads them to apply laws selectively depending on their own business requirements and their own assessment of risk. Employees' knowledge and skills in safety and the working environment are therefore important and it can be assumed that such considerations can be made in more or less reasonable ways. Training initiatives on work environment management seem to be able to increase employees' knowledge and awareness of risks.

The last level in the chain is the actual work environment outcomes. These include factors such as safety (usually measured by the number of accidents or injuries) or various health outcomes (for example, stress). The systematic review has not aimed to investigate this, but the studies that have included such outcomes indicate that good work environment management is related to both better safety and less ill health.

Results in the Swedish context

The results of the systematic review are based on 56 studies, around half of which were conducted in the Nordic countries; of these, 8 studies have empirical data from Sweden. In two cases, these are comparative studies between Sweden and Denmark (42) and Sweden and Spain (23). Many of the findings presented in the results are thus valid in Nordic conditions, and although regulatory systems and regulatory enforcement practices differ between the Nordic countries, they can be said to be based on relatively similar social conditions. It is also worth noting that there are no striking differences in the conditions highlighted between studies conducted in Nordic countries and other European countries. However, comparative studies between southern and northern European countries indicate that work environment management is more developed in northern European countries (23), which also makes it easier to implement EU directives.

Taken as a whole, the results thus indicate that similar factors influence work environment management in different countries, which means that the results are also valid in a broad sense in the Swedish context. That being said, the national and local context also plays a role, and Sweden is highlighted as a country with better conditions for implementing rules at EU level due to a well-established and relatively well-functioning system with developed rules and procedures for inspection (23). However, the results indicate that in the Swedish context there are also different conditions for adequate work environment management depending on the size of the organisation, industry and working conditions (35, 40, 41, 50, 64).

Methodology discussion

The ambition of this systematic review has been to investigate a research area that often has blurred boundaries, and which therefore needs to be framed with broad search terms. The large number of studies in the searches has meant that delimitations have had to be made in the selection process, which can be a source of bias based on how priorities have been set. This has been handled by providing examples in the method description of how reasoning about the inclusion and exclusion of studies has been done.

A general problem with this area of research is the lack of common terminology, which makes it complicated to search in a delimited way. The searches used broad terms, resulting in a large number of studies. However, studies that did not use any of the search terms in the title or abstract may have been missed. For example, work environment management is part of the responsibility of managers, and given the relatively limited focus of the results on leadership, it is conceivable that more such studies could have been found with other search terms.

Another potential source of bias is the risk that only studies showing significant associations are published, a so-called publication bias. However, in this field of research, impact studies are rare. The included studies show a wide range of methodologies, and studies have generally examined influencing factors rather than direct causal relationships. Overall, this means that the risk of publication bias is lower than in summaries of research on, for example, the effects of different treatments or interventions. There is possibly a risk even in this type of research that obstacles and risks are focused on more than promoting factors, but since the results point to factors that have both a positive and negative impact on work environment management, this bias is not considered to be particularly significant.

Another aspect that may have affected the results is that the knowledge synthesis has not included articles in Swedish, or other forms of publication than scientific articles (such as books, book chapters, reports and grey literature). A previous systematic review from 2016 on the impact of regulations on the work environment (3) included such literature, which in that case resulted in relevant sources. It is therefore possible that the limitation to articles in English in international scientific journals has meant that relevant results have been missed.

5. Conclusions

An overall conclusion from the systematic review is that work environment legislation has an impact on how organisations' work environment management looks like. An organisation's approach to work environment management depends on conditions at different levels, from EU directives and legislation, through management and governance, to employees' working conditions and knowledge. The review also confirms the conclusions of previous reviews that the size of organisations matters; small companies in particular face compliance challenges.

Laws and inspection have a clear impact on employers' actions, and regulations act as an external pressure on organisations to ensure they have an adequate work environment. Workplaces' internal systems, if well-functioning, help to create internal pressure on the organisation to address work environment issues. Rules and workplaces' organisational conditions can thus combine to create external and internal pressures on organisations to improve or maintain the work environment management.

An *external pressure* on organisations' work environment management is created by laws and supervision. In terms of external pressures, studies have highlighted the following aspects as key:

- Clarity and relevance at the rule level are prerequisites for work environment management to be perceived as meaningful and thus prioritised in the workplace.
- Regulatory enforcement practices need to balance between requirements and advice to be perceived as supportive for employers.
- Consultative approaches are perceived as more constructive by employers.

An *internal pressure* in workplaces is created through management and governance, internal systems for risk reporting and risk management, safety procedures and an integrated approach with clear roles and collaboration. In terms of internal pressure, studies have highlighted the following aspects as key:

- A well-functioning work environment requires sufficient knowledge and competence among managers, so that they can both prioritise work environment issues, and offer good support to their employees.
- Employees in turn need to have sufficient conditions in terms of reasonable workload and knowledge of work environment risks to be able to work in a way that maintains compliance.
- The interplay between structural conditions and social relations is central to how workplaces prioritise and implement work environment management.
- The size of organisations matters; small businesses in particular face compliance challenges.

A conclusion can also be drawn from what was not focused on in the included studies. Although equality and gender perspectives were represented, it was only in a few studies. This suggests differences between male- and femaledominated workplaces in terms of culture and priorities. These differences can be assumed to be related to societal expectations of women and men, and to how organisations contribute to 'doing gender', which can be reflected in, for example, risk propensity and the development of safety culture. In this respect, there is an interaction between the structural conditions of an organisation (gender balance and type of work) and the social relations that develop in the workplace.

The results of the systematic review are relevant for actors at different levels. For policy makers, the results are relevant in terms of the importance of regulatory frameworks working at different policy levels, so that EU directives do not face obstacles at national level. One area of concern for both policy makers and authorities is ensuring adequate regulatory enforcement practices, with studies pointing to the importance of a balance between requirements and sanctions on the one hand, and support and advice on the other. For this to happen, sufficient resources are needed, including for the inspection of smaller companies. For employers, the results are relevant because they highlight important organisational prerequisites for conducting systematic work environment management and for strengthening their ability to comply with current regulations. The systematic review points out in particular the importance of an integrated approach where work environment management is part of regular processes, which helps to create internal pressure in the organisation to prioritise work environment issues. A prerequisite for this is the knowledge and competence of managers in the field. Employees' knowledge and competence are also important to ensure that work environment management is not neglected. For trade unions, the results are relevant as they highlight the importance of collaboration in integrated OSH practices, where the different workplaces and expert resources in the workplace need to be involved in the work.

6. Need for further research

The systematic review has focused specifically on the impact of legislation on work environment management and the conditions for achieving good compliance.

In previous research, correlations have more often been examined in relation to various work environment outcomes, such as health and safety. The studies included in this review have specifically examined the intermediate stage in the chain from law to OSH outcomes in a European context. From these studies it can be concluded that there is a wide range of both contexts investigated and scientific methods, indicating that the research area is both complex and varied. Conditions differ between countries, within countries, between sectors and within sectors. It would therefore be relevant to have follow-up systematic reviews that compare contexts more clearly, or go into depth in certain specific areas. A systematic review that takes a global perspective may also be relevant, although it would probably show even more variation than a review of European research. Further research could also focus on other types of literature not included in this review, such as government reports and other grey literature.

One area that has only been dealt with peripherally in this systematic review but which, judging by the number of excluded studies, is growing, is safety culture and safety climate, or more specifically psychosocial safety climate. Such studies can be highly relevant to the field in a broader sense. Summaries of research on this exist (73), but further research focusing on how safety culture and safety climate relate to laws and regulations would be relevant.

One observation from the systematic review is that only a few studies have dealt with the role of occupational health care in work environment management. This may partly reflect a lack of research on this issue, and partly reflect the fact that occupational health care services are generally not used in strategic work environment management. Further research could clarify if and how this resource could be used more.

A further observation is that comparative studies between countries and sectors are often valuable in pointing out differences in how rules are interpreted and applied in different contexts. Here, further research could focus in particular on the interaction between regulations and work environment management from a comparative perspective.

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