Swedish Agency for Work
Environment Expertise

Occupational health and safety measures in the Swedish business sector during the coronavirus pandemic

– a snapshot from 2020

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Preface

In its role as a national knowledge center for workplace health and safety issues, the Swedish Agency for Work Environment Expertise has, among other responsibilities, the task of illuminating the status of developments in the work environment in Swedish industries.

The purpose of this report—*Occupational health and safety measures in the Swedish business sector during the coronavirus pandemic: a snapshot from 2020*—is to provide a snapshot of health and safety measures applied by companies in Sweden during the coronavirus pandemic in 2020, with a focus on the industries to which the companies belong. The pandemic caused by the COVID-19 virus (SARS-CoV-2) has had a major impact on working life. There is a great need for knowledge of the pandemic, for which reason the Agency is conducting analyses based on newly collected data from the Swedish business sector concerning how work is organized and how work environment management is handled, along with health and safety measures applied during the coronavirus pandemic. In this report, the Agency presents the results of analyses based on responses to our survey concerning the coronavirus pandemic. The author of the report, Annette Nylund, who holds a licentiate degree and is a senior analyst at the Swedish Agency for Work Environment Expertise, conducted the regression analyses included in the report. Jakob Johannesson, who holds a B.Sc. in statistics and is a data analyst at Solita AB, was responsible for database management and also calculated weighted averages with the assistance of Hans-Olof Hagén, Ph.D., a senior consultant who also participated in other methodological matters. David Hallman, associate professor in occupational health science at the University of Gävle, reviewed the methodology used to produce the report. Statistics Sweden collected the survey data and contributed other register-based statistics through Microdata Online Access (MONA).

I would like to warmly thank everyone who contributed to the production of this report, especially those who responded to the survey. Without you, these analyses would not have been possible.

Gävle, August 23, 2021

Nader Ahmadi,
Director General

Summary

In the fall of 2020, the Swedish Agency for Work Environment Expertise conducted an electronic survey concerning how work was organized and how work environment management was handled prior to the pandemic in 2019, as well as some overarching questions regarding health and safety measures applied in 2020. The survey was sent to enterprises in both the business and public sectors. The survey responses from the management of private companies regarding health and safety measures in 2020 are used in the report. The responses are combined with register data on company structure as well as education and staff structure. The analyses include about 2500 private companies. Both selection and statistical processing were carried out in such a way as to allow the study results to be generalized to the Swedish business sector at large. This approach has been tested with favorable results. The analyses focus specifically on the various industries in the business sector but are intended to help illustrate the overarching health and safety measures that companies in the Swedish business sector applied during the pandemic.

Three different health and safety measures are included in the analyses. More than half of all companies in the Swedish business sector did not take any specific measures to address the corona pandemic other than to remind their employees to *wash their hands more often and maintain social distancing on the premises*. Companies in goods-producing industries were more likely than their service-producing counterparts to state that they have limited their health and safety measures to reminding employees to *wash their hands more often and maintain social distancing on the premises*. The other half of the companies in the Swedish business sector either applied *several different health and safety measures* or primarily adopted *telework*. The incidence of *telework* is higher in the service industries and lower in manufacturing, but there are also large differences in incidence among the various industries involved in the production of goods and services. *Telework* is most prevalent in knowledge-intensive industries involved in the production of both goods and services, with an average of 25% of companies in the business sector adopting this health and safety measure as the primary intervention in the first year of the pandemic. The incidence of *several different health and safety measures* is roughly the same in the various industries: the average proportion in the Swedish business sector is just over 20%. Accommodation and food service activities are a noteworthy exception, where twice as many companies (44%) applied *several different health and safety measures*.

In addition to presenting the actual incidence of health and safety measures in the report, the analysis also includes information about whether and how different production conditions contribute to explaining the incidence of the three health and safety measures *(washing hands more often and social distancing on the premises, several different health and safety measures, or mainly telework)*. One of the production conditions is the main industry production activity (measured as the various industries). Another production condition is the size of the company, which indicates its strength, resources, and complexity. Further included factors are related to staff, such as education level, which represents a measure of the technological level of the company and the quality of the work tasks. Other aspects of staff structure are age, gender, and foreign background.

One key finding of the regression analysis is that a high average incidence of these three measures during the pandemic in an industry does not mean that the industry's focus of production activity explains the incidence of the health and safety measures applied. The actual incidence of the measures for each industry differs from the extent to which the main focus of production activity in the industry can explain the incidence. A high incidence of health and safety measures can generally be attributed to the proportion of women and the average age in companies in the business sector. For one of the measures, *washing hands more often and social distancing on the premises*, education level also contributes to explaining the incidence.

For example, the actual incidence of the health and safety measure of *washing hands more often and social distancing on the premises* is highest in the goods-producing industries, but only in a few cases does the focus of production activity contribute to explaining the incidence; these cases are in the service industries cited as contributing to the high incidence of the measure. This suggests that the level of this measure can largely be explained by other production conditions, especially within the goods-producing industries. In general, the incidence of the health and safety measure of *washing hands more often and social distancing on the premises* in the business sector is attributable to other production factors: large companies, higher education level, higher proportion of women, and higher average age in the company.

The results of the analysis also indicate that a high incidence of *telework* as a health and safety measure during the pandemic in a given industry does not mean that the main focus of production of these activities is synonymous with the underlying cause of this incidence. In fact, those production activities that cite this measure actually have low incidence. In general, however, a high proportion of women and low average age within the company are cited as contributing factors for the measure *telework* in the business sector.

The focus of production activity in some industries can contribute to explaining why several different measures have been adopted; they can be found in both goods-producing and service-producing industries, such as the capital-intensive manufacturing industry and agriculture and within two knowledge-intensive service-producing industries. In general, small companies also contribute to explaining the incidence of several different measures. The single factor that helps to explain the measure most clearly is high average age: the higher the average age among the staff, the higher the incidence of *several different health and safety measures.*

A summary of how companies in the Swedish business sector report that they conducted operations in 2020 complements the overview of the three health and safety measures and the results of how different production conditions contribute to explaining their incidents. The majority of the companies report that they continued to conduct business as usual during the first year of the pandemic. These companies are more likely to be found in the goods-producing industries than in the service-producing industries. Nevertheless, there are companies in both the goods and service sectors that report that they did not conduct business as usual. Twice as many companies in the service sectors report this observation, compared with their counterparts in goods production. In contrast, the proportion of companies reporting that they plan to resume, expand, or start new operations is the same or almost as high in the service sectors as in manufacturing. On average, 36% of companies in the business sector cite the coronavirus pandemic as the main reason for the impact on the scope of their business activities.

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1. Introduction

Background

The Swedish Agency for Work Environment Expertise is tasked with examining the status and development of the work environment in various industries. Whenever possible, the analyses should be based on a gender perspective.

The purpose of the Agency's work environment analyses is to contribute knowledge that furthers the development of work environment policy so that it can focus on becoming even more long term and strategic in the field of occupational health and safety. The objective is to contribute to evidence-based policy development and to the fulfillment of the Government's Work Environment Strategy 2021–2025 (the Government's written communication 2021/21:92). In light of the coronavirus pandemic, questions naturally arise regarding how the work environment in the Swedish business sector has changed as a result, and the way in which work environment management is affected must also be addressed.

In the autumn of 2020, the Swedish Agency for Work Environment Expertise conducted an electronic survey with questions aimed at the management of both public and private enterprises regarding work environment management and the organization of associated efforts. When these analyses were initially planned, the intention was to highlight work organization and learning on the job, as well as work environment management in 2019 from a longer-term perspective. Initially, the primary aim of analyses based on information in the electronic survey, which is part of a project at the Agency for Work Environment Expertise, was to highlight good working conditions and work environment management, including the relationship between these factors and other factors, such as business development and personal development for employees; for example, circumstances for men and women, with or without children, as well as for older workers and recent entrants to the labor market.

In order to monitor and analyze the development of healthy workplaces over time, from a salutogenic perspective, the Agency has taken the initiative to compile new and existing data concerning the work environment in the Swedish labor market.

In conjunction with the outbreak of the pandemic, the survey was expanded to include information regarding the health and safety measures applied by enterprises during the 2020 coronavirus pandemic, in accordance with *The Public Health Agency of Sweden's regulations and general guidelines relating to everyone's responsibility to prevent Covid-19 infections, etc.* (HSLF-FS 2020:12[1]).

The studies are based on assumptions about what influences work environment management and risks in the work environment. The point of departure is the assumption that the work environment and work environment management are largely governed by the main focus of production activity, as well as the resources, strength, and complexity of the business activities (Arbetsmiljöverket, 2013, 2014, 2016, 2017a,b; Nylund, Parding & Hagén, 2020; Russell, Maitre & Watson, 2015). The survey also took into account whether the organization operates in a market and whether it is tax financed. Nevertheless, previous studies also show that serious work environment events (crises) and thus serious work environment risks in the form of occupational accidents have a considerable impact on work environment management, regardless of the main focus of production activity and the resources and scope of the business activities, and regardless of the staff structure in the Swedish labor market (Swedish Work Environment Authority, 2013, 2016). The coronavirus pandemic is considered to be a serious event, a crisis situation that subjects enterprises and their employees to great stress and risks. Consequently, analyses of the work environment and work environment management need to include all relevant information, as far as practically possible.

Purpose

The purpose of this report is to provide a snapshot of the health and safety measures applied in Sweden in 2020 in response to the coronavirus pandemic, with a focus on the various industries and size categories to which the private companies belong in the Swedish business sector. In addition, the results of regression analyses are also presented to shed light on the reasons for the measures that have been taken. The regression analyses take into account a number of different background factors that are assumed to influence work environment management. The various industries act as a measure of production activities, alongside size categories that act as a measure of the strength, resources, and complexity of the companies. Four other factors relate to individuals. This is due to the basic hypothesis that the main focus of the production activity

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1   This report does not claim to present a comprehensive picture of the regulatory framework on infection control and Covid-19 but refers to the Public Health Agency: https://www.folkhalsomyndigheten.se/smittskydd-beredskap/utbrott/aktuella-utbrott/covid-19/foreskrifter-och-allmanna-rad/.

of a company serves as the primary explanation for its health and safety measures, alongside size and other production factors that also contribute to the incidence of these measures in the Swedish business sector. Therefore, this analysis addresses various production conditions that contributed to explaining the application of health and safety measures in companies during the coronavirus pandemic during 2020 in the Swedish business sector. At the end of the report, an overview of the impacts of the coronavirus pandemic on planned production in the various industries is presented. All analyses of the health and safety measures are based on survey data in which the companies themselves describe their situationusing standardized response options. These survey responses are supplemented by register data concerning the main focus of production activity, size, and staff structure of the companies.

Limitations

This study is limited to private companies in the Swedish business sector—more precisely, to companies operating in one market. In this context, this means that the study also excludes companies in the sectors of public administration, education, health care, and social services. The reason for this exclusion is that they are mainly tax financed. The analysis is limited to three main questions below.

Three main questions and analyses

The study elucidates the following questions:

1. Which of the following three health and safety measures did the companies primarily adopt during the coronavirus pandemic in 2020?

– no special measures other than *frequent hand-washing and social distancing on the premises*

– *telework*, otherwise as normal as possible

– *several different health and safety measures applied*

2. What production factors help to explain the health and safety measures adopted by the companies during the coronavirus pandemic in 2020?

Data regarding the production factors included in the analysis are listed here; for more information, please see the *Register data* subsection. The discussion of other supplementary data is addressed once again in the *Closing reflections* of the report.

- industry: main focus of production activity

- company size: resources, strength, and complexity of business activities

- education level: measure of the human capital, quality of tasks, and technology level

- other aspects of staff structure, such as age, gender, and foreign background

3. Did the company change how it conducted business in 2020? If so, what were these changes, and to what extent were they due to the coronavirus pandemic?

The structure of the analyses in the report follows the three questions. The first part of the report highlights which of the three health and safety measures were primarily used by companies in different industries in 2020. The second analysis investigates how the production activities to which the companies belong and other production conditions contribute to explaining the incidence of the three different health and safety measures in the Swedish business sector. These other conditions are the size of the companies, differences in average education level, and differences in staff structure, such as gender, foreign background, and age. The third analysis examines the impact of the coronavirus pandemic on the production of these companies in 2020.

All analyses have taken into account the number of companies each company represents in its industry and size category (according to the routine of stratified random sampling). Therefore, the analysis aims to shed light on the Swedish business sector.

Data

Data were obtained through the electronic survey *The work organizing in the Swedish working life 2019*, which consists of standardized survey questions posed to the management of companies regarding how work is organized and how work environment management is handled. These data have been supplemented with register data from Statistics Sweden regarding the production activity and other production conditions at these companies. The more different types of register data that are matched with survey data, the fewer observations that are included in the calculations due to partial non-response in the different register data. Over 2500 companies are included in the various calculations.

Survey questions

The Agency tasked Statistics Sweden to collect data for the survey *The work organizing in the Swedish working life 2019* in the autumn of 2020[2]. The questions addressed in this report can be found in the survey under theme R, *Changes during 2020*, which consists of a total of 12 response options divided among three questions. The survey questions are referred to as R1, R2, and R3. The survey questions and the response options are presented here in aggregate form.

Survey question R1: Is the company conducting business as planned in 2020?

1. ☐ The company has conducted business more or less as usual in 2020.

Response options concerning how the company conducted business changed in 2020.

2. ☐ It has not been possible for the company to conduct business as planned (business as usual); the company has shut down operations, or will do so.

3. ☐ The company has scaled back its operations.

4. ☐ The company has scaled back operations, but is in the process of reinstating or will reinstate business operations to the previously planned (return to business as usual).

5. ☐ The company expanded or increased the volume of its existing services/production.

6. ☐ New services/production have been or will be launched in the company.

7. ☐ The company has both expanded existing services/production and launched new services/production or has plans for both.

Table 2 in part 3 of this report presents the responses to survey question R1, according to various industries.

The question below was asked as a follow up to question R1.

Survey question R2: If you chose any of response options 2–7 in answer to question R1, is the coronavirus pandemic the main reason? Response option No, or response option Yes.

Table 2 in part 3 of this report presents the responses to survey question R2, according to various industries.

Survey question R3: How do you proceed to create a good working environment in your company during the coronavirus pandemic?

Choose the response option that best describes your situation.

1. ☐ Company employees are on site and no special health and safety measures have been applied other than *frequent hand-washing and social distancing on the premises*.

2. ☐ Those who are able to *telework* from home are doing so; otherwise, we try to keep things working as normally as possible.

3. ☐ *Several different measures have been applied*; the pandemic has had a major impact on our business activities and thereby on the work environment.

Figures 1–3 present the responses to survey question R3 according to various industries, while Figure 4 presents the responses according to size category, in part 1 of the report.

Knowledge of the complexity of work environment management in relation to certain production activities has increased during the pandemic. Given the increased knowledge of the complexity, it would have been desirable to inquire about several aspects of work environment management in 2020 in order to compare them in an index. This would have provided a more detailed, consolidated, and possibly nuanced indicator of the health and safety measures applied during the pandemic. However, there was little opportunity in this study to develop new survey questions related to the pandemic, since the survey was quality tested and prepared for distribution just as the pandemic was identified.

Selection—survey

The selection of enterprises for the survey was based on assumptions about their size and production activity, which are assumed to affect work environment management and work environment risks (see also the *Background* section above). The survey also took into account whether the enterprise operates in a market and whether it is tax financed. Two sampling frames were created and used to delimit and identify the organizations according to whether they are private companies, or other types of enterprises, such as government agencies, workplaces, household businesses, or associations. All enterprises in the two sampling frames are part of Swedish working life and each had at least five employees. However, the survey did not include any sole business proprietors (such as the self employed).

The sampling frame for companies is limited to those operating in a market, which is limited here to companies in business sector industries (economic activities at the division level within A to N and R to T [Statistics Sweden, 2007]). This sampling frame is consistent with the 2018 Statistics Sweden innovation survey. These companies represent the business sector.

The other sampling frame used in the survey includes workplaces (e.g., agencies and municipal workplaces within public administration [O], or education [P], or human health and social work activities [Q] and other enterprises (household enterprises and associations) or enterprises (that operate in public administration [O], or education [P], or human health and social work activities [Q] [Statistics Sweden, 2007]).

Together, the two sampling frames include almost 10,000 organizations. The sampling frames were created using data from the Statistics Sweden August 2020 "Företagsdatabas" (Statistical Business Register, FDB). The total number of companies and workplaces in the sampling frames was 111,949, of which 87,547 were companies in business sector industries and 24,402 were other enterprises and workplaces. The majority of all enterprises are companies in business sector industries, which in this survey represent about 78% of the enterprises that make up the overall sampling frame for the survey (Statistics Sweden, 2021).

A non-response analysis of companies was conducted, which suggested that there are no systematic differences in background information between responding and non-responding companies[3]. It is therefore reasonable to use the survey data from the responding companies for the analyses and to generalize the results to the Swedish business sector. As yet, no non-response analysis has been conducted for the other enterprises included in the survey. Consequently, the analyses in this report are limited to including responses only from companies in the Swedish business sector.

The Board of Swedish Industry and Commerce for Better Regulation (NNR) and the Swedish Association of Local Authorities and Regions (SALAR) were consulted about the survey.

Register data
In addition to survey data, register data from Statistics Sweden's Statistical Business Register (FDB) are used, mainly with respect to company sales and assets (https://www.scb.se), and from Statistics Sweden's longitudinal database LISA, which contains detailed data on health insurance, parental insurance, and unemployment insurance at the individual level (Statistics Sweden, 2019). LISA enables the study of how individuals

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3   Organization of Swedish working life 2019 non-response analysis (Ref. no.: 20/00263) (Swedish Agency for Work Environment Expertise, 2021). Published together with the Swedish report.

transition over time (e.g., between gainful employment, unemployment, and other labor market activities) and the study of illness in different populations. LISA can also create key figures relating to the structure of education, training, and other parameters pertaining to staff structure for all enterprises, both companies and other types of organizations.

The following production conditions, which are based on the latest available register data from Statistics Sweden, are included as explanatory factors in the analysis model. The discussion of other supplementary data is addressed once again in the *Closing reflections* of the report.

- The industry illustrates the main focus of the production activity of the company according to the established international standard for industrial classification (Statistics Sweden, 2019); companies are classified based on whether they are goods-producing industries (collective name for all activities that do not provide services) or services. Activities that meet the classic definition of manufacturing are classified based on whether they are capital intensive (C3), knowledge intensive (C2), or labor intensive (C1) in all calculations for the report. This factor provides information for each company that is unique to each industry in 2020.

The following factors are general production-related circumstances that apply to all companies, regardless of production activity:

- Company size illustrates the impact of the resources and strength of the company, as well as the complexity of business production activities in 2020

- Education level is measured according to an established international standard for education nomenclature (Statistics Sweden, 2019) as a measure of human capital, quality of tasks, and level of technology of the company, 2018

- Other parameters related to staff structure in the company, such as age and gender in 2018 (Statistics Sweden, 2019) and foreign background in 2018, are also included according to the company's nomenclature (Statistics Sweden, 2002)

The two production conditions, i.e., industry and size categories, act as reporting groups in the analyses, especially in parts 1 and 3, and as production condition variables alongside other structural production factors in the regression analyses.

Analytical methods

First, the actual occurrence of health and safety measures and the impact of the coronavirus pandemic on business activities in 2020 are calculated as weighted average incidences and presented for each industry and size category.

Since each company responding to the survey represents a larger number of companies in the same industry and size category (according to the routine of stratified random sampling), a grossing-up factor has been calculated according to a standardized method used by Statistics Sweden. The grossing-up factor takes into account the number of companies in each industry by size category and the number of these companies that responded. The grossing-up factor is used to present fair averages for each industry and size category, and to ensure that the results of the regression analysis are accurate.

Regression analysis

Multifactorial regression analyses have been carried out to identify the relationships between different production conditions and the health and safety measures applied by the companies during the coronavirus pandemic in 2020. Whether these relationships also indicate causality is a matter of ongoing discussion in the use of regression analysis. The risk of statistical relationships without cause and effect is reduced if the factors included in the model are based on theory and previous studies. There is always some risk of overestimating the results since the models contribute only part of the explanation, but also because the explanatory factors are chosen based on their ability to highlight subcomponents of the same phenomenon. As often, the structural explanatory factors in the model are not entirely independent of one another, for which reason relationships are easily over-or underestimated.

The current model includes factors that, according to previous studies (based on work environment research), are assumed to impact the probability of applied one, several, or no health and safety measures (Swedish Work Environment Authority, 2013, 2014, 2016, 2017b, 2019). In addition, four of the six production conditions precede the time of collection of the survey questions on health and safety measures; the register data essentially pertain to the year(s) prior to the coronavirus pandemic, which opens the door to temporal causality. The calculated grossing-up factor presented above is also used in the regression analyses, thereby contributing to a more accurate description of the presence or absence of the measures in different industry and size categories of companies.

The report describes associations that show significant results with sufficiently high estimates and odds ratios; interpreted in conjunction with one another. The results describe how the different production

conditions contribute to explaining the incidence of a health and safety measure by the companies during the coronavirus pandemic in 2020.

The regression analysis consists of three logistic analysis models that together serve as the main model of the analysis, where each response option to survey question R3 is contrasted with the other two response options in three separate analyses. For example, those who stated that the company had not applied any specific health and safety measures other than *frequent hand-washing and social distancing on the premises* are contrasted with companies that applied *telework* or *several different measures* during the coronavirus pandemic in 2020, and vice versa. The choice of logistic model is appropriate given that the dependent variables, i.e., the variables to be explained (the three health and safety measures), are binary variables, i.e., their value is 0 *or* 1. One advantage of carrying out the three logistic regressions instead of relying on a pooled regression model is that more information is provided about the three health and safety measures, since they are calculated separately. The current dataset also limits the choice of methodology since it does not obviously allow for the evaluation and ranking of the three measures, which means that there is no obvious zero option (0) in the analysis, as required by certain models. Part 2 of the report presents a summary of the results of the three logistic regression models, which Appendix 1 presents more fully (see also the discussion regarding an alternative design in the *Closing reflections*).

Some initial tests have been conducted to determine how the models should be designed, including the relationships between survey question R3 ("What are you doing to create a good work environment in your company during the coronavirus pandemic?") and survey question R1 ("Is the company conducting business as planned this year [i.e., 2020]?"), as well as between R3 and survey question R2 ("Is the coronavirus pandemic the main underlying reason for the answer to question R2?"). There is a low positive correlation (Pearson correlation) between survey question R3 and response option 1 to survey question R1 ("The company has conducted business more or less as usual in 2020") (15%). The correlation is low, but the probability level is high for the value to be credible, i.e., the value has very high significance. There is also a low positive correlation between response option 1 to survey question R3 ("The company's employees are on site and no special health and safety measures have been applied other than *frequent hand-washing and social distancing on the premises*") and the response option "Yes" to survey question R2 ("If you chose any of response options 2–7 in answer to question R2, is the coronavirus pandemic the main reason?") (12%); the value has very high significance. None of the regression analyses that are ultimately presented includes survey question R1 or R2.

The regression analysis model was created using the stepwise inclusion of variables to see how they contribute to the quality of the model, measured as the explanatory power. All six of the included factors contribute to the quality. In three calculations respectively, every included background factor's importance for each health and safety measure during the pandemic is studied given all the other background factors. The six explanatory factors are presented in the *Register data* subsection.

One quality measure for the regression models is the Akaike information criterion (AIC), which estimates the relative quality of the statistical model for a given set of data and compares it with another model. The less information the model excludes, the higher the relative quality of the model. The AIC of one model is compared with the AIC of another. Comparative calculations of AIC are described as the *relative likelihood* of the model. Two measures are reported: one that includes only the intercept (i.e., the constant), and one that includes both the intercept and the covariances. In general, the lower the AIC, the less information loss, the better.

A rule of thumb used to identify the robustness of the analysis is that the results of the analysis, according to "Type 3 Analysis of Effects" and "Analysis of Maximum Likelihood Estimates" in SAS statistical software, are in agreement.

Some comparisons of the current results with those in previous reports are carried out as a means of considering the implications of the results.

Part 1

The first part of the report highlights which of the three health and safety measures were mainly applied by companies in different industry and size categories during the coronavirus pandemic in 2020. The actual occurrence measured as incidence of *hand-washing and social distancing on the premises or telework or adopting several different measures* is presented. The measures take into account the number of companies in each industry and size category, but without taking other factors into account. The results can be generalized to shed light on the Swedish business sector. Sections 2 and 3 present the results for the industry and size, respectively. Industry is the main reporting group for the incidence of health and safety measures.

2. Health and safety measures in different industries during the pandemic

This section presents the results that illustrate which of the three health and safety measures were preferentially adopted by companies within different industries in 2020. More than half of all companies applied the measure *frequent hand-washing and social distancing on the premises*. The remainder, comprising almost half of the measures applied, is divided more or less equally between the health and safety measures *telework* and *several different health and safety measures*. The analyses in this section are based on survey question R3: "How do you proceed to create a good working environment in your company during the coronavirus pandemic?" (see also section 1. *Introduction, Survey questions*). Figures 1 to 3 (one figure per health and safety measure) present the incidence of health and safety measures for each industry. The industries appear with their corresponding positions in these figures, with goods-producing industries on the left and service-producing industries on the right, while the average proportion of companies in the business sector (A to N and R to T) is presented in the bar on the far right of each chart.

Frequent hand-washing and social distancing

More than half of all companies applied the measure *frequent hand-washing and social distancing on the premises* in 2020. Companies belonging to the goods-producing industries report this health and safety measure to a greater extent than do service companies. Of industries in the business sector, all but two goods-producing industries report higher than average use of this measure. These two industries below average are: Knowledge-intensive manufacturing (C2); and Electricity, gas, steam and air conditioning supply; and Water supply; sewerage, waste management and remediation activities (D + E); hereafter referred to as "Energy, Water & Waste [D + E]"). Within the service sector, most industries report lower than average application of this measure. The above-average service industries are: Transportation and storage (H); Wholesale and retail trade; repair of motor vehicles and motorcycles (G); and Accommodation and food service activities (I). Other service activities; Activities of households as employers; Undifferentiated goods- and service-producing activities of households for own use (S + T); hereafter referred to as "Other service activities [S + T]") report essentially average results. Six industries (of seventeen) report below average values for the measure *frequent hand-washing* and *social distancing on the premise*s.

The bars for goods-producing industries are light red, shown on the left side of the figure, while the bars for service-producing industries are red, shown on the right side.

Figure 1. Percentages of companies according to industry in the Swedish business sector that primarily applied the health and safety measure *frequent hand-washing and social distancing on the premises* during the pandemic, weighted averages, 2020.

Hand-washing and social distancing

Percentage of companies per industry

Industry	
(A) Agriculture, forestry and fishing	85%
(B) Mining and quarrying	65%
(C1) Labor-intensive Manufacturing (10–15, 18, 22, 25, 31–33)	71%
(C2) Knowledge-intensive Manufacturing (20–21, 26–30)	42%
(C3) Capital-intensive Manufacturing (16–17, 19, 23–24)	60%
(D + E) Electricity, gas, steam and air conditioning supply (D); Water supply;…	42%
(F) Construction	72%
(G) Wholesale, retail trade; repair of motor vehicles, motorcycles	55%
(H) Transportation and storage	63%
(I) Accommodation and food service activities	52%
(J) Information and communication	17%
(K) Financial and insurance activities	29%
(L) Real estate activities	46%
(M) Professional, scientific and technical activities	25%
(N) Administrative and support service activities	47%
(R) Arts, entertainment and recreation	43%
(S + T) Other service activities (S); Activities of households as employers;…	50%
Average in the Swedish business industries	53%

All bars indicate the weighted averages incidence of hand-washing and social distancing according to how many organizations each company represents per industry and size class.

■ Goods-producing industries   ■ Service-producing industries   ▨ Average in the Swedish business sector
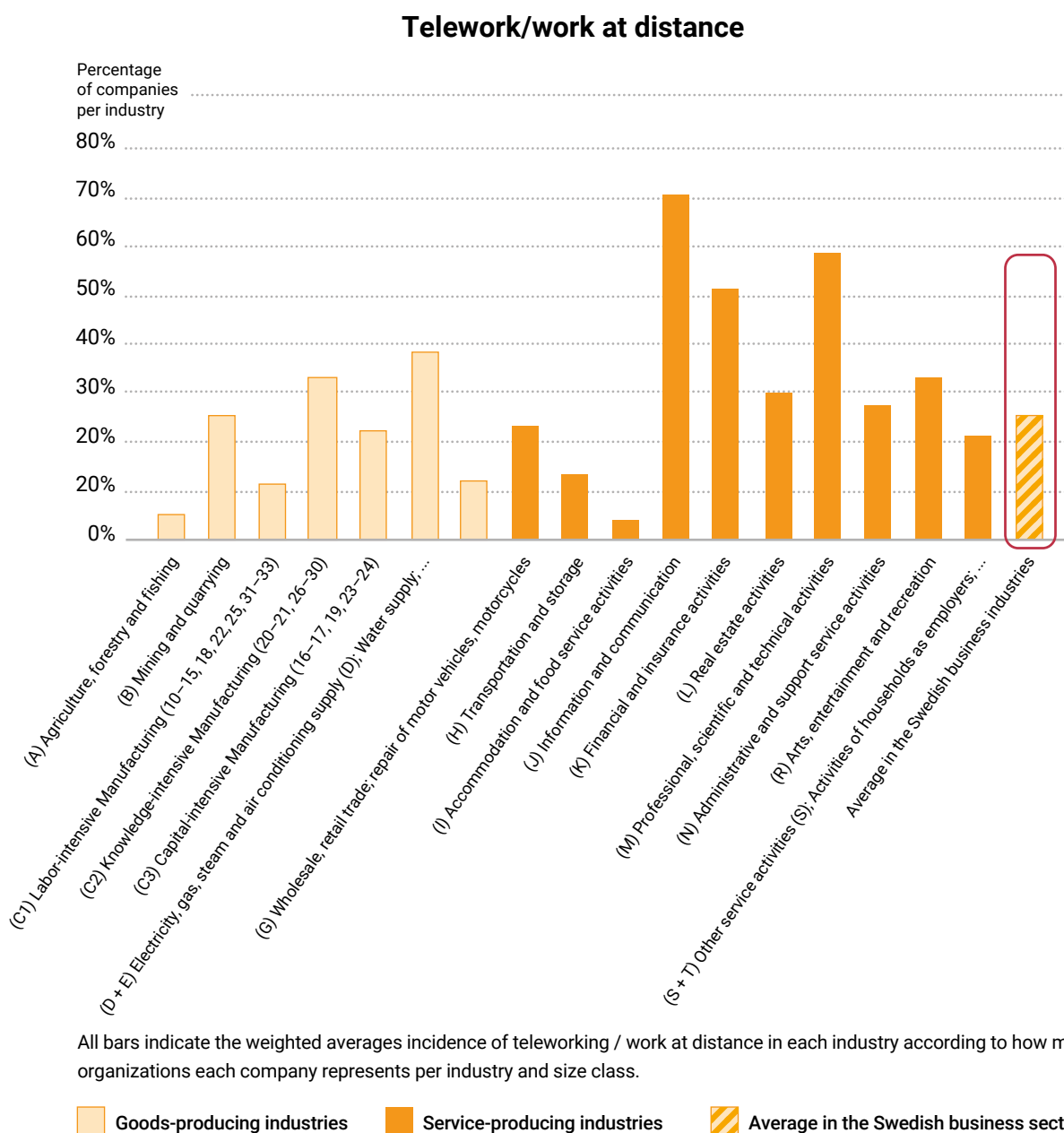
Telework

Twenty-five percent of companies state that they preferentially elected to apply the measure *telework* in 2020. Industries that reported below-average values for applying *frequent hand-washing and social distancing indoors* applied the health and safety measure *telework* at a higher rate. This is also the case for the two goods-producing industries that were lowest on the previous measure reported (see Figure 1 above). In general, the incidence of *telework* is significantly lower in the various goods-producing industries than in services. However, there are also large differences in incidence between the various goods- and service-producing sectors, respectively. Knowledge-intensive industries involved in both goods and service production report the highest incidence of *telework*. Among the knowledge-intensive service industries, the most common are Information and communication (J), Financial and insurance activities (K), and Professional, scientific and technical activities (M). Adoption of this measure within these service sectors is almost twice as high as in Knowledge-intensive manufacturing (C2) and Energy, Water & Waste (D + E), which are the goods-producing industries with the highest incidences. In turn, they are twice as likely as companies in other goods-producing industries to report applying *telework*. For example, companies in labor-intensive manufacturing and construction report low incidence of *telework*; this measure is probably less applicable or feasible in these industries. However, the lowest incidence of *telework* is found among companies in Accommodation and food service activities (I). The on-site nature of this business activity makes *telework* less appropriate or almost impossible as a comprehensive measure. This is an indication that *telework* is obviously not suitable to all types of services, for which reason it is not a suitable health and safety measure for all types of business. Other businesses that report low application of *telework* as the main health and safety measure can be found within Agriculture, forestry and fishing (A). The reasons may be partly the same as for Accommodation and food service activities—i.e., the nature of the business activity makes this measure inappropriate or impossible. *Telework* is not as obvious a choice in Agriculture, forestry and fishing, which are solitary activities that largely take place outdoors.

In Figure 2, the bars for goods-producing industries are light orange, shown on the left side of the figure, while the bars for service-producing industries are orange, shown on the right side.

Telework as a health and safety measure is a separate response option in the online questionnaire used in this analysis, but it is not a unique response option, since *telework* can also be included as a measure in the third option, which entails *several different health and safety measures*. Moreover, *telework* can essentially be viewed as a work organizational issue used in parallel with health and safety measures, but the question regarding *telework* in 2020 does not reflect whether or not this is the case. However, it can be noted that the relative incidence of *telework* in various

Figure 2. Percentages of companies according to industry in the Swedish business sector that primarily applied the health and safety measure *telework* during the pandemic, weighted averages, 2020.

Telework/work at distance

Percentage of companies per industry

All bars indicate the weighted averages incidence of teleworking / work at distance in each industry according to how many organizations each company represents per industry and size class.

Legend:
- Goods-producing industries
- Service-producing industries
- Average in the Swedish business sector

industries in 2020, as presented in Figure 2, is relatively consistent with Statistics Sweden's account of *telework* in different industry groups in 2020 (https://www.scb.se/pressmeddelande/en-av-tre-jobbar-hemifran/).

Other data collected in the current survey focus on *telework* as a work organizational issue in 2019. This report does not include these data in its presentation of health and safety measures during the pandemic in 2020. However, it is noteworthy that in the year prior to the pandemic, the work organizational form *telework* was used regularly, to a greater or lesser extent, by about 36% of all companies (see also the Swedish Agency for Work Environment Expertise, 2021).

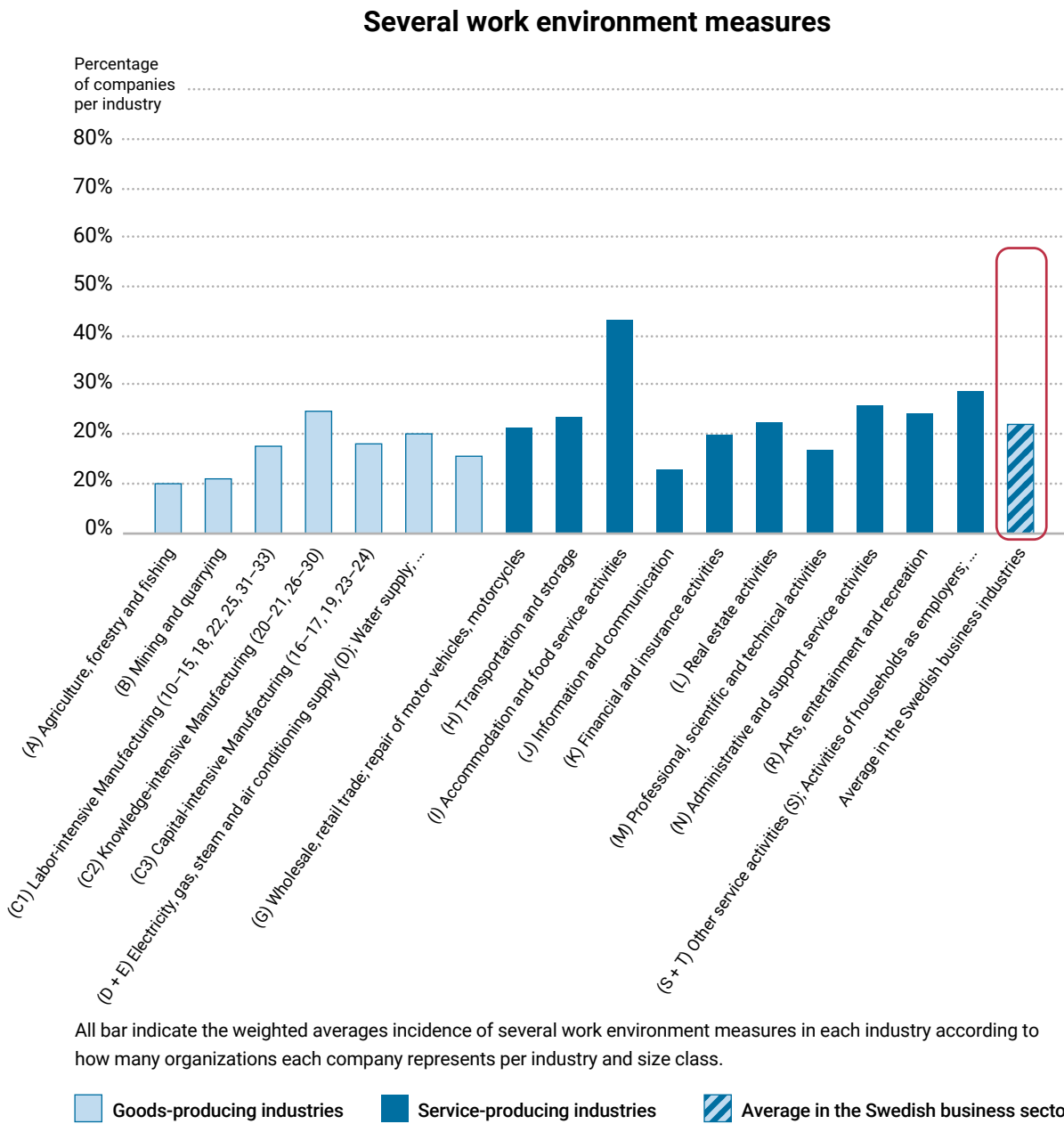## Several different health and safety measures

More than 20% of companies report that they applied *several different health and safety measures* in 2020. The highest proportion of companies in each industry that reported implementing *several different health and safety measures* can be found in Accommodation and food service activities (I), cited by as many as 44% of the companies. These business activities have been affected by both general (HSLF-FS 2020:12 through 2020:31) and specific restrictions (HSLF-FS 2020:37; SFS 2021:526)[4] during the coronavirus pandemic. Figure 3 also shows a more even distribution among the proportions of companies in other industries that report taking *several different health and safety measures*. Most of them remain close to the average for companies in the business sector. The lowest proportions can be found in Agriculture, forestry and fishing (A), Mining and quarrying (B), and Information and communication (J). Mention should be made that prior studies have shown that companies within Information and communication often demonstrate the lowest degree of several health and safety measures. The degree to which several measures are adopted is one way of measuring systematic work environment management[5] (Swedish Work Environment Authority, 2013, 2017b).

The bars for goods-producing industries are light blue, shown on the left side of the figure, while the bars for service-producing industries are blue, shown on the right side.

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4 This report does not claim to present a comprehensive picture of the regulatory framework for infection control and Covid-19 within the restaurant business, but refers to the Public Health Agency of Sweden: https://www.folkhalsomyndigheten.se/smittskydd-beredskap/utbrott/aktuella-utbrott/covid-19/verksamheter/tillsynsvagled-ning-gallande-restauranger-och-krogar/.

5 The measurement of the degree of developed systematic work environment management follows the regulation AFS 2001:1. In practice, this measurement implies that the more measures taken, the higher the degree of systematic work environment management.

Figure 3. Percentages of companies according to industry in the Swedish business sector that *applied several different health and safety measures* during the pandemic, weighted averages, 2020.

Several work environment measures

All bar indicate the weighted averages incidence of several work environment measures in each industry according to how many organizations each company represents per industry and size class.

□ Goods-producing industries   ■ Service-producing industries   ▨ Average in the Swedish business sector

3. Company size and health and safety measures during the pandemic

This section presents the results that illustrate which of the three different health and safety measures that companies in different size categories adopted in 2020. Company size is a reflection of various levels of resources, strength, and complexity among companies. The results are presented in aggregate in Figure 4.

The actual incidence of *several different health and safety measures and telework* both increase with the size of the company. The reverse is found concerning the measure *frequent hand-washing and social distancing on the premises*, where actual incidence increases as the companies become smaller. Understandably, larger companies apply *several different measures*, since they are often involved in a variety of production activities, which may require different types of health and safety measures. In addition, large companies have access to more resources, including for work environment management. Figure 4 presents the average proportions of companies in the business sector reporting the three health and safety measures (see the selected area in the figure). The results concerning company size categories and the application *of several different measures* are in line with previous analyses of the degree of developed systematic work environment management in Swedish working life (Swedish Work Environment Authority, 2013, 2017b).

When comparing the average incidence of the three different health and safety measures in the business sector for the different size groups with the average for companies in the business sector, the smallest size groups stand out in the results. One reason is that the majority of all companies are small. The two smallest size groups represent 75% of companies in the population and, given that more than half of the companies state that they only adopted the health and safety measure *frequent hand-washing and social distancing on the premises*, this is reflected in the average results for companies in the business sector.

Nevertheless, if we add information about the size category in which most employees work—large and medium-sized companies—we find that the majority of employees fall under *several different health and safety measures and telework*.

Figure 4 presents the incidence of the three health and safety measures according to company size, taking into account how many other companies each company represents according to industry and size category in the business sector (i.e., the incidence of health and safety measures is calculated as a weighted average).

Figure 4. Percentages of companies in different size categories according to industry in the Swedish business sector that applied various health and safety measures during the pandemic, according to size, weighted averages, 2020.

All three work environment measures
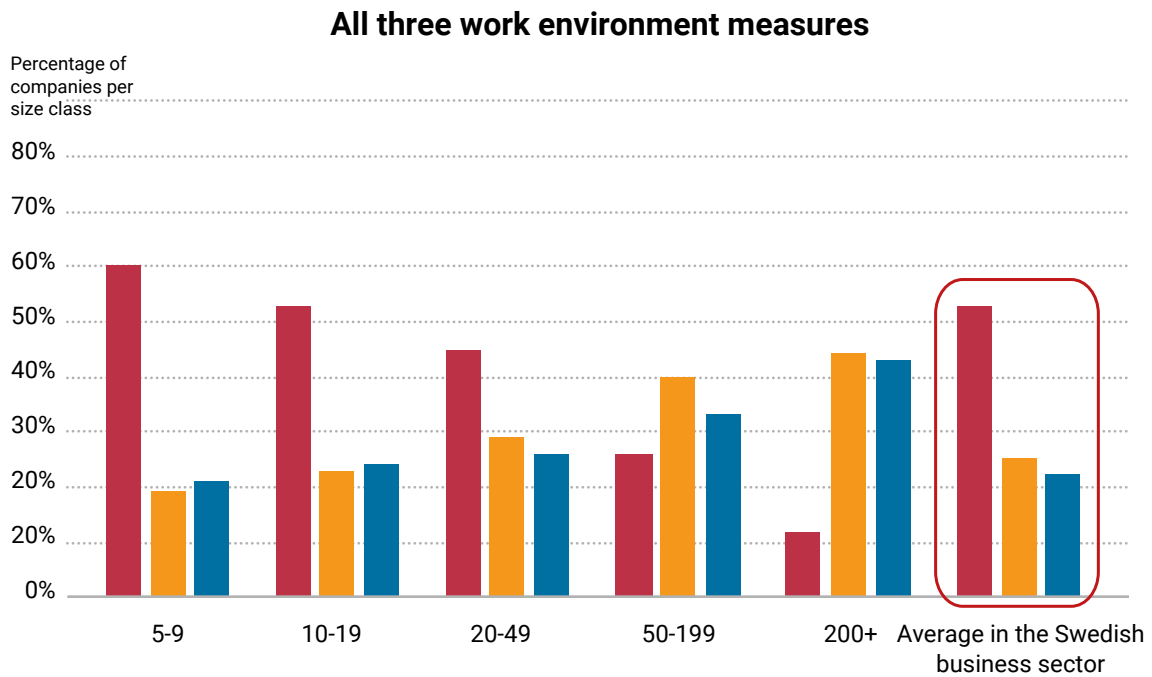
The bars in three colors indicate the weighted average incidence of the three work environment measures according to how many organizations each company represents per industry and size class.

■ Hand-washing and social distancing   ■ Teleworking/work att distance   ■ Several different measures

Part 2

Section two of the report explores how the production conditions of the companies, including industry, as an indicator of production activity, explain the application of the three different health and safety measures. The other conditions included are company size, average education level, and differences in staff structure, such as gender, foreign background, and age. Section 4 presents the results according to health and safety measure and according to production factor. The results are presented in Table 1. Figures 5 to 7 in section 5 illustrate the production activities, measured as industries, that help to explain the prevalence of the three health and safety measures. The analysis is performed at the company level but interpreted at the overarching Swedish business sector during 2020. It includes the relevance of the models with comments on the type of factor and significance (reliability). When presenting the factors and their various sub-values in Table 1, only significant results with clearly different values are reported, i.e., those factors that help to explain the incidence of the measure. More information about the interpretation of results can be found in sections 1. *Introduction, Regression analysis* and in *Closing reflections*, as well as in *Appendix 1*, where Table 3 presents all the partial results of the regression analysis.

4. Production factors that explain health and safety measures

Relevance of the analysis model

The analysis result indicates a relationship between the production conditions of the companies and the incidence of the three different health and safety measures. Since the production factors precede the measures, time causality is assumed, for which reason the association can be viewed as time causal. Therefore, it can also be stated that the included production conditions of the companies help to explain the incidence of the three different health and safety measures (hereafter often referred to as "explains").

The point of departure for this analysis is that work environment management is governed by the company's main focus of production, i.e., production activity (measured as industries), as well as by its resources, strength, and complexity (measured as company size) (see also section 1. *Introduction, Background*). The regression analysis therefore includes company size and industry as explanatory factors. In addition to the proportion of small and large companies in different industries, other factors such as education level and other staff structure also differ. Consequently, the analysis considers the impact of each of these six different production factors at a time, given the five other factors, on

the health and safety measures of the companies in the three analyses. The multivariable regression analysis model tests which of the different production conditions explain why the company applied one of the three health and safety measures, as opposed to the other two. Consequently, three analyses were carried out: one each for what characterizes companies that chose to apply the measures *frequent hand-washing and social distancing on the premises, telework,* and *several different health and safety measures*. Multivariable regression analyses were used throughout.

The results of the regression analyses show that the basic model used, i.e., the explanatory factors it includes, with a high level of probability contribute to explaining the three health and safety measures. In two of the three calculated models, the *types* of explanatory variables included are very highly significant since there is less than a 1% probability that chance influenced the outcome. In the third logistic model, which considers the case in which several health and safety measures were adopted, all types of explanatory variables are highly significant, except for education level, which is associated with a 5% level of significance. However, the fact that all included *types* of explanatory factors are highly significant does not mean that all sub-values (sub-groups) of the factors are significant. Nor does it mean that all values are sufficiently large for meaningful interpretation. This report interprets those results, values, that are significant and meaningful to interpret (see also Appendix 1).

Production factors that best explain each health and safety measure

Below are the results for how the included production factors help to explain the incidence of the three different health and safety measures. The results can be summarized under three options: 1) The production factor result shows positive deviation and thereby explains the higher incidence of the measure (**green** in Table 1). 2) The production factor shows negative deviation, which explains why the measure is not used (**red** in Table 1). 3) The production factor or its sub-variables do not differ in comparison with the reference variable used, for example, another production activity (measured as industry). The result is then interpreted as meaning that the factor does not explain (or independently help to explain) the incidence of the measure. The presentation is simplified and focuses mainly on positive associations between production factors and health and safety measures, with some exceptions where negative associations are also interpreted. The aggregate results according to measure and model are presented here, in support of data interpretation. The analysis is based on the Swedish business companies and the results are generalized to the Swedish business sector, which may be important to keep in mind when reviewing the results. Table 1 presents the main results.

Model 1 —*Hand-washing & social distancing* as a health and safety measure indicates a high proportion of women in the company, especially women with an advanced formal education level, explaining the measure *Hand-washing & social distancing during 2020*. The largest size category of companies (200+) and the focus of production of three industries also explain the incidence of this health and safety measure in the Swedish business sector. These industries are in Information and communication (J), Professional, scientific and technical activities (M), and Arts, entertainment and recreation (R). Four other industries explain the absence of this measure.

Model 2 —*Telework* as a health and safety measure indicates an association between a higher proportion of women in the company and the measure *telework*, but also an association with lower average age of employees. The two smallest size categories of companies and the focus of production of five industries explain the incidence the health and safety measure in the Swedish business sector during 2020. These industries are Agriculture, forestry and fishing (A), Labor-intensive manufacturing (C1), Construction (F), and Transportation and storage (H). Four other industries explain the absence of this measure.

Model 3 —*Several different health and safety measure* as a health and safety measure indicates a higher average age and a lower proportion of women in the company in the Swedish business sector during 2020. In addition, the results indicate that the smaller the size category, the higher the chance of the measure; similar is applied as a result of the production activity of the following four industries: Agriculture, forestry and fishing (A); Labor-intensive manufacturing (C1) and Capital-intensive manufacturing (C3); Information and communication (J); and Professional, scientific and technical activities (M). Accommodation and food service activities (I) is the only industry that explains the absence of this measure.

The results for the respective production factors are described after the table.

Table 1. Production factors that help to explain the incidence of the *three different health and safety measures* in the Swedish business sector during the coronavirus pandemic, 2020.

	Model 1. Hand-washing and social distancing on the premises		Model 2. Telework		Model 3. Several different measures	
Proportion of women	Higher proportion of women	***	Higher proportion of women	***	Lower proportion of women	***
Proportion with foreign background	(Higher proportion with foreign background)	***	-	***	-	***
Average age	Higher average age	***	Lower average age	***	Higher average age	***
Average education level	Higher education level	***	-	***	-	**
5–9 employees	-	***	The smaller the company, the higher	***	The smaller the company, the higher	***
10–19 employees	The smaller the company, the higher	***	The smaller the company, the higher	***	The smaller the company, the higher	***
20–49 employees	The smaller the company, the higher	***	-	*	The smaller the company, the higher	***
200+ employees	The smaller the company, the higher	***	-	***	The smaller the company, the higher	***
50–199 employees (comparison group)						
(A) Agriculture, forestry and fishing	Low proportion A	***	High proportion A	***	High proportion A	***
(B) Mining and quarrying	#	#	#	#	#	#
(C1) Labor-intensive manufacturing	Low proportion C1	***	High proportion C1	***	(High proportion C1)	*
(C2) Knowledge-intensive manufacturing	-	**	-	***	-	***
(C3) Capital-intensive manufacturing	Low proportion C3	***	#	#	(High proportion C3)	**
(D + E) Electricity, gas, steam and air conditioning supply (D); Water supply; sewerage, waste management and remediation activities (E)	-	***	Low proportion D + E	***	#	#
(F) Construction	Low proportion F	***	High proportion F	***	#	#
(G) Wholesale and retail trade; repair of motor vehicles and motorcycles	-	***	-	***	#	#
(H) Transportation and storage	-	**	High proportion H	***	- -	***
(I) Accommodation and food service activities	-	***	High proportion I	***	Low proportion I	***
(J) Information and communication	High proportion J	***	Low proportion J	***	High proportion J	***
(L) Real estate activities	#	#	-	***	-	***
(M) Professional, scientific and technical activities	High proportion M	***	Low proportion M	***	High proportion M	***
(N) Administrative and support service activities	-	***	-	***	-	***
(R) Arts, entertainment and recreation	High proportion R	***	Low proportion R	***	-	***
(S + T) Other service activities (S); Activities of households as employers; Undifferentiated goods- and service-producing activities of households for own use (T)						

*The probability of significance for the obtained value *** 1-% level, ** 5-% level, * 10-% level; not significant #. Odds ratios "close" to 1 (-).*
Financial and insurance activities (K), the number of observations are too few to be included in the analysis. See appendix 1 for all values (results).

Each production factor separately

The results are also presented according to production factor, to support interpretation of the data. The production activity (industry) is not equally responsible for explaining all three health and safety measures, but for several of the industries, it does explain the presence or absence of at least one of the three measures. Company size, education level, and staff structure are also, in various ways and to various degrees, the cause of all three health and safety measures. The result for each production factor is analyzed, while the other production factors are held constant.

Staff structure

The study includes three individual factors that are counted as staff structure, all of which help to explain at least one of the three health and safety measures. Mean age explains the presence or absence of all three measures. The other two factors are centered around one of these three measures.

Gender

Gender as a factor is measured as the proportion of women in the company and primarily has a positive association with the model for the measure *frequent hand-washing and social distancing on the premises*. The model for *telework* also demonstrates a positive association with a high proportion of women, i.e., according to both models, the higher the proportion of women, the higher the incidence of the measures. The model for *several different health and safety measures applied* shows the reverse, i.e., a negative association, where the fewer the number of women employed by the company, the higher the incidence of *several different health and safety measures applied* and vice versa. This latter result stands out compared with the results of other studies over the past decade; for example, systematic work environment management is more extensively developed in industries with a higher proportion of women (Swedish Work Environment Authority, 2013, 2017b).

Foreign background

Foreign background is associated with significant results in all three models, but with low values for two of the models, while the third model shows a borderline positive association with the measure *frequent hand-washing and social distancing on the premises*. This can be interpreted as meaning that the more people of foreign background there are in the company, the higher the incidence of the health and safety measure *frequent hand-washing and social distancing on the premises*. The results for this factor in the other two models, i.e., *telework* and s*everal different health and safety measures applied*, indicate negative associations. Given the low values, further interpretation will not be done, so no conclusions are drawn regarding foreign background. For more information, please see *Closing reflections*.

Age

Higher average age of the staff in the company is associated with *several different health and safety measures applied* and with the measure *frequent hand-washing and social distancing on the premises*. These results are logical, since it appears that lower average age explains the incidence of *telework.*

Education level

Education level measures the human capital and captures the quality of the tasks and technological level of the company. Education level largely explains the measure *frequent hand-washing and social distancing on the premises,* with an unequivocally positive association: the higher the education level in the company, the higher the incidence of this health and safety measure. Concerning the two other models, *telework* and *several different health and safety measures applied,* associations are negative, albeit too weak to draw any conclusions.

Company size

Company size helps to explain the presence of the two health and safety measures *telework* and *several different health and safety measures* as well as the absence of the measure *frequent hand-washing and social distancing on the premises.* The smaller the company, the higher the incidence of *several different health and safety measures applied.* The two smallest size categories also explain the incidence of *telework,* while the largest size category explains the incidence of the measure *frequent hand-washing and social distancing on the premises.* Notably, the results indicate that during the pandemic, small companies help to explain the application of several measures.

Production activity—industries

The analysis includes 16 groups of industries [6] and their respective primary focus of production activities as explanatory production factors. Fifteen of them are compared with the industry labeled Other service activities (S + T). Just as in previous sections, manufacturing is categorized as capital intensive, knowledge intensive, or labor intensive. For the sake of clarity, the presentation regarding importance of the production activities to the incidence of each measure has been simplified so that it focuses mainly on positive associations between the industries and the health and safety measures, with particular focus on the third model: *applying several different health and safety measures.* One significant conclusion is that the primary focus of production in each industry is not equally important as an explanation for all three health and safety measures, but that for most of the industries, it does explain the presence or absence of at least one of the three measures. A significant and positive value for the production activity means that the production activity explains the incidences of the health and safety measures, not only the other production factors, i.e., the structural factors.

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6   The industry Financial and insurance activities (K) has too few companies included in the study to be in the regressiomodel.

In the model for *frequent hand-washing and social distancing on the premises*, half of all industries (seven) demonstrate values that are assumed to drive the presence or absence of the health and safety measure. The explanation as to why the health and safety measure is used is associated with nearly half of these industries; in **three** industries there is a positive association. The nature of the four other industries helps to explain why measures are not applied and are associated with a negative association.

The model for *telework* demonstrates that the focus of production for eight industries helps to explain either the presence or absence of the measure, which is one additional industry compared with the model for the measure *hand-washing and social distancing on the premises*. The **five** industries that demonstrate positive associations with the measure for *telework* demonstrate essentially no associations with the measure *hand-washing and social distancing on the premises*. In contrast, the four that demonstrate negative associations with telework do demonstrate positive associations with hand-washing and social distancing on the premises. Obviously, these two measures are mutually exclusive concerning these industries.

The third model shows that there were fewer industries that help to explain the presence or absence of *several different health and safety measures*; one of the results demonstrates low significance. **Five** industries explain the presence and one industry explains the absence of *several different measures*. The results show that the focus of production within Agriculture, forestry and fishing (A) helps to explain the incidence of several measures. In other studies, this industry is noteworthy in particular for fatal accidents at work (Swedish Work Environment Authority, 2020). Capital-intensive manufacturing (C3) also helps to explain the incidence of several measures, which is in line with the findings of studies of work environment risks (Swedish Work Environment Authority, 2016). However, companies in Information and communication (J) and Professional, scientific and technical activities (M) also help to explain *several different health and safety measures*. Usually, these production activities are not prominent in studies concerning a high presence of several health and safety measures, such as systematic work environment management (Swedish Work Environment Authority, 2013, 2017b).

5. Illustration of industries in which the focus of production activity helps explain the incidence of health and safety measures

The first part of the report, section 2 (part 1), presents results that highlight the actual incidence of the three health and safety measures applied by companies in various industries in 2020. Section 2 discusses incidence, regardless of the explanation underlying the health and safety measure, due to the basic hypothesis that the primary production activities of the companies (measured as industries) are the main factor governing work environment risks and work environment management.

As also assumed, other factors also have an impact, as described in section 4 (part 2), which presents the results of analyses regarding how six different factors, including industry production activity, help to explain the three health and safety measures.

Section 5 combines the presentation of the results of the actual occurrence of the measures according to industry in section 2 with the results of the impact of production activity (industry) when all six production conditions are taken into consideration in the analysis based on the results from section 4. The aggregate results are illustrated by supplementing the previous figures that presented information concerning actual occurrence of the three health and safety measures according to industry (Figures 1 to 3) with information from the regression analysis in this report, conveying results concerning the production activities that serve to explain the incidence of the three health and safety measures (Table 1). Consequently, two perspectives on the industry are illustrated in the same figures (i.e., 5 to 7). One perspective is the actual occurrence of each health and safety measure, where the industry is the reporting group for incidence. The other perspective relates to the production activities that explain the incidence of each health and safety measure, given the other production conditions. The regression results for the production activities (industries) that serve to explain the incidence of the three measures with positive and significant results and with sufficiently high associations are indicated using different colors and patterns in the respective figures.

In the figures, if the bar for an industry in a reporting group is high, but without specifically being marked, this indicates that the incidence of the health and safety measure can mainly be explained by production conditions other than the production activity. The other production conditions are company size, education, or other staff structure, which are also included in the regression analysis. In other words, Figures 5 to 7 indicate the occurrences measured as the incidence of any of the three health and safety measures in the various industries (as reporting groups). The figures also illustrate which industry production activity explains the incidence of any of the three measures, given the other production factors that also explain the high incidence of each health and safety measure

applied during the pandemic. Values that are meaningful to interpret and significant at the 1% level are highlighted here, unless otherwise stated (see also Appendix 1). For the sake of clarity, the presentation of the results is simplified, for which reason the results focus only on positive associations between the production activities and the health and safety measures. The results highlight the explanatory factor of focus of production for private companies and are generalized to the business sector.

Frequent hand-washing and social distancing on the premises

Figure 1 (part 1), previously presented, shows the percentage of companies according to industry that applied the health and safety measure *hand-washing and social distancing on the premises* within the industry reporting group, without explaining what contributes to the incidence of the measure. In this subsection, the figure is supplemented with additional information concerning which production activities help to explain the incidence of the health and safety measure. The supplementary results stem from the regression analysis (part 2, Table 1).

The results show that the main production activities of the three industries explains the presence of the health and safety measure *hand-washing and social distancing on the premises* (see Figure 5). The result also indicates that the main production of four industries helps to explain its absence. This result is not presented in the figure. The three industries' production activities that explain the incidence of the measure are shown by black-dotted bars; both of these black-dotted bars and the two red bars show the incidences, while the red bars represent the industries that show incidences, but in which the focus of production does not explain the occurrence.

The main production activities that explain the measure can be found among the service companies, which are in: Information and communication (J); Professional, scientific and technical activities (M); and Arts, entertainment and recreation (R). In industries associated with significant values, incidence is explained not only by the other structural production factors, but also by the main production activity.

Figure 5 illustrates the actual incidence of the health and safety measure in all the different industries (all bars). It also shows which industries that have a high average incidence of the measure during the pandemic. The industries with high incidences are not the same as those explaining the incidences (black-dotted bars). The result, therefore, indicates that the health and safety measure largely is not driven by the main production activities of the companies. This is especially true in the goods-producing industries that have high incidences. Instead, the measure is driven by companies with a certain focus on production in service industries. The logical conclusion is that the highest incidence of the health and safety measure in the goods-producing industries and in the other service-producing industries can therefore largely be explained by factors other

than the production activities. In general, the regression results show that companies that have applied this measure have employees characterized by a high education level, a high proportion of women, and a high average age. And that the company belongs to the largest category of companies (200+).

Figure 5. Percentages of companies according to industry in the Swedish business sector that primarily applied the health and safety measure *frequent hand-washing and social distancing on the premises*, and whether the industries' production activities also explain the applying of the measure during the pandemic.

Hand-washing and social distancing

All bars indicate the incidence of hand-washing and social distancing on the premises in each industry, while the black-dotted bars represent industry production activities that also explain, with high significance and high values, the incidence of the measure.
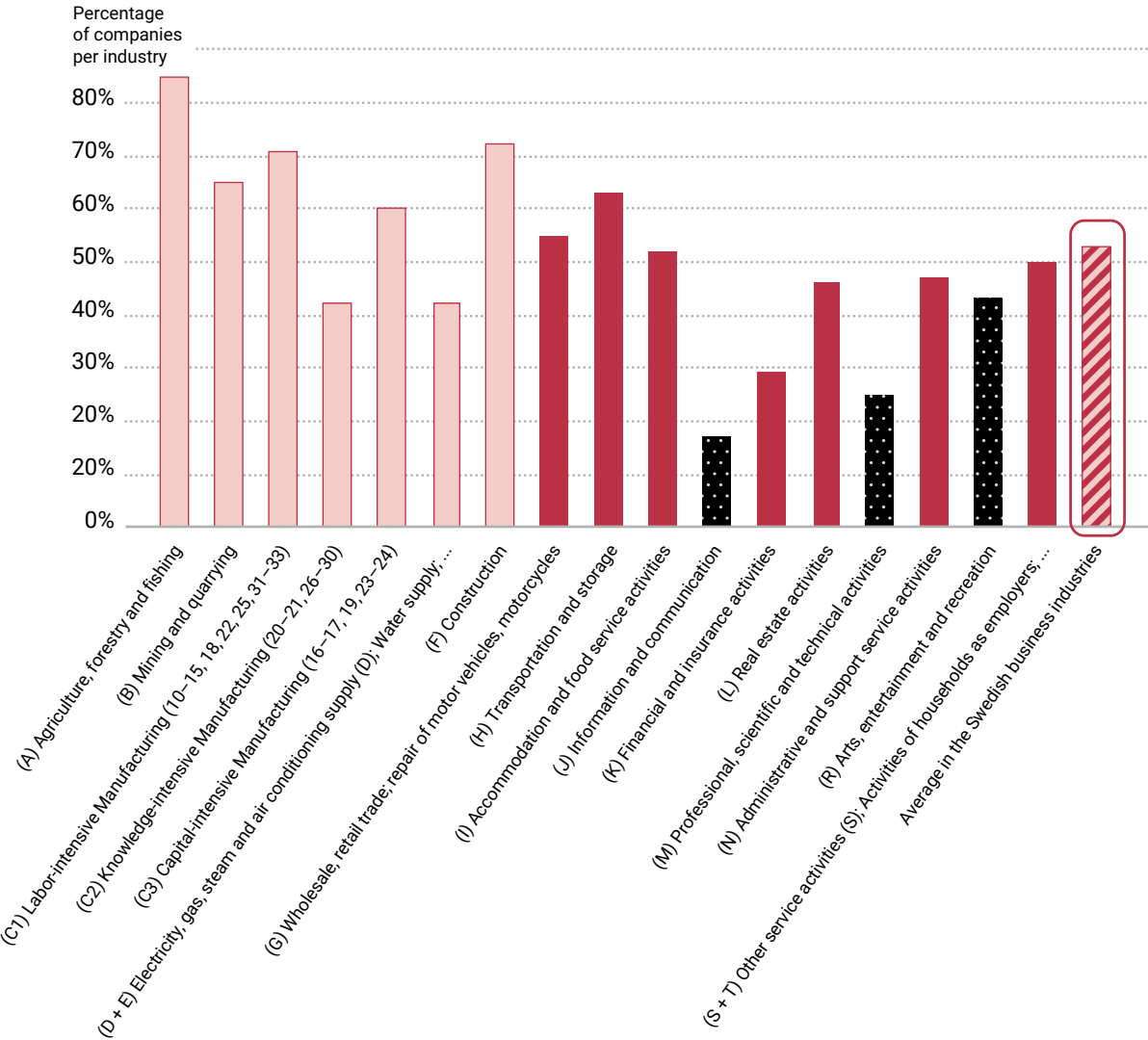
All bars indicate the weighted averages incidence of hand-washing and social distancing according to how many organizations each company represents per industry and size class.

Legend:
- Goods-producing industries
- Service-producing industries
- Average in the Swedish business sector
- Industries that explain the measure with significance at the 1% level

Telework

Figure 2 (part 1), previously presented, shows the percentage of companies according to industry that applied the health and safety measure *telework* within the industry reporting group, without explaining what contributes to the incidence of the measure. In this subsection, the figure is supplemented with additional information concerning what main production activities help to explain the incidence of the health and safety measure. The supplementary results stem from the regression analysis (part 2, Table 1).

The main production activities of five industries explain the incidence of *telework* (see Figure 6). These five have been marked with black-dotted bars; both of these black-dotted bars and the two different yellow bars show incidences, while the yellow bars represent those industries in which the main production does not explain the occurrence.

The main production activities that explain the measure are: Agriculture, forestry and fishing (A), Labor-intensive manufacturing (C1), Construction (F), Transportation and storage (H), and Accommodation and food service activities (I). In industries associated with significant values, incidence is explained not only by other structural production factors, but also by the main production activity. The figure also shows that the incidence of *telework* is high in service industries, but is not high in the two service industries where the main production activity explains the incidences. Consequently, the figure also indicates that the very high incidence of health and safety measures in service industries is explained by factors other than the main production—in this case, by the high proportion of women and young people.

Figure 6. Percentages of companies according to industry in the Swedish business sector that primarily applied the health and safety measure *telework*, and whether the industries' production activities also explain the applying of the measure during the pandemic.

Telework/work at distance

All bars illustrate the incidence of *telework* in each industry, while the black-dotted bars represent industries' production activities that also explain, with high significance and high values, the incidence of the measure.
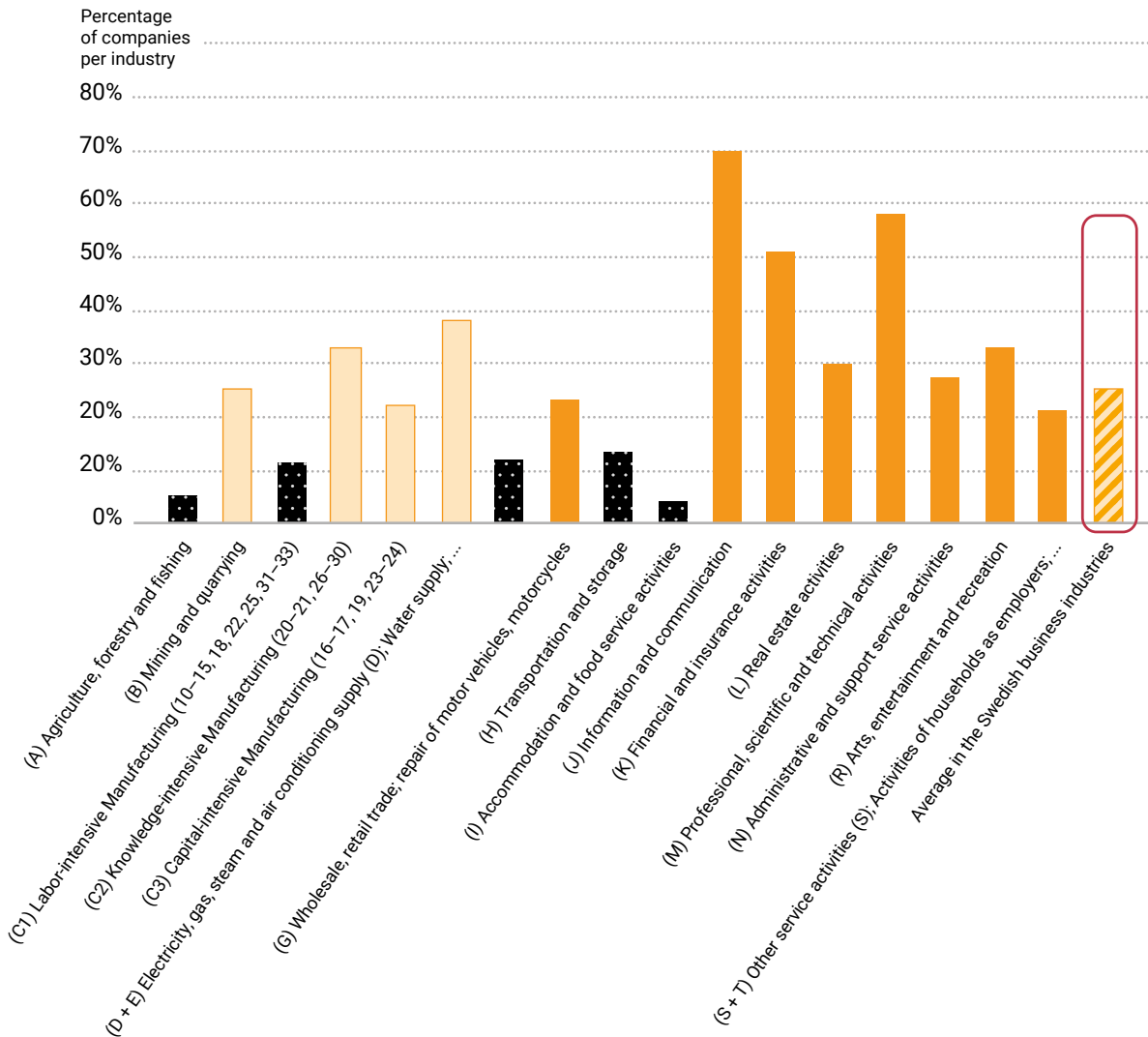
All bars indicate the weighted averages incidence of teleworking / work at distance in each industry according to how many organizations each company represents per industry and size class.

- ▨ Goods-producing industries
- ▨ Service-producing industries
- ▨ Average in the Swedish business sector
- ▨ Industries that explain the measure with significance at the 1% level

Several different health and safety measures

Figure 3 (part 1), previously presented, shows the percentage of companies according to industry that applied *several different health and safety measures* within the industry reporting group, without explaining what contributes to the incidence of the measure. In this subsection, the figure is supplemented with additional information concerning what main production activities help to explain *several health and safety measures*. The supplementary results stem from the regression analysis (part 2, Table 1).

The production activities of four industries helps to explain the incidence of *several different health and safety measures* (see Figure 7). These four (a fifth has low significance) have been marked with black-dotted bars; both the black-dotted bars and the blue bars show incidence, while blue bars represent the industries that show incidence, but in which the main production activities do not explain the incidence. The production activities that explain the incidence of *several different health and safety measures* are: Agriculture, forestry and fishing (A); Labor-intensive manufacturing (C1), albeit at a relatively low 10% significance level and with a low value of almost zero (*); Capital-intensive manufacturing (C3), with significance at the 5% level (**); Information and communication (J); and Professional, scientific and technical activities (M). In industries associated with significant values, incidence is explained not only by other structural production factors, but also by the focus of production activity.

In the reporting of actual occurrence, Accommodation and food service activities (I) are noteworthy, having the largest proportion of companies that applied several different measures, but the main production activities of the industry do not explain this incidence. The logical conclusion from the results is that since the production activities of the industry do not explain the incidence of the measure, the explanation must lie in other production factors. In general, this health and safety measure can be explained by high average age and small company size: the smaller the company, the higher the incidence. A low proportion of female employees helps to explain the absence of this health and safety measure.

Figure 7. Percentages of companies according to industry in the Swedish business sector that primarily adopted the health and safety measure *several different health and safety measures*, and whether the industries' production activities also explain the applying of the measure during the pandemic.

Several work environment measures

All bars illustrate the incidence of several different measures in each economic activity, while the black-dotted bars represent industries' production activities that also explain, with high significance and high values, the incidence of the measure.
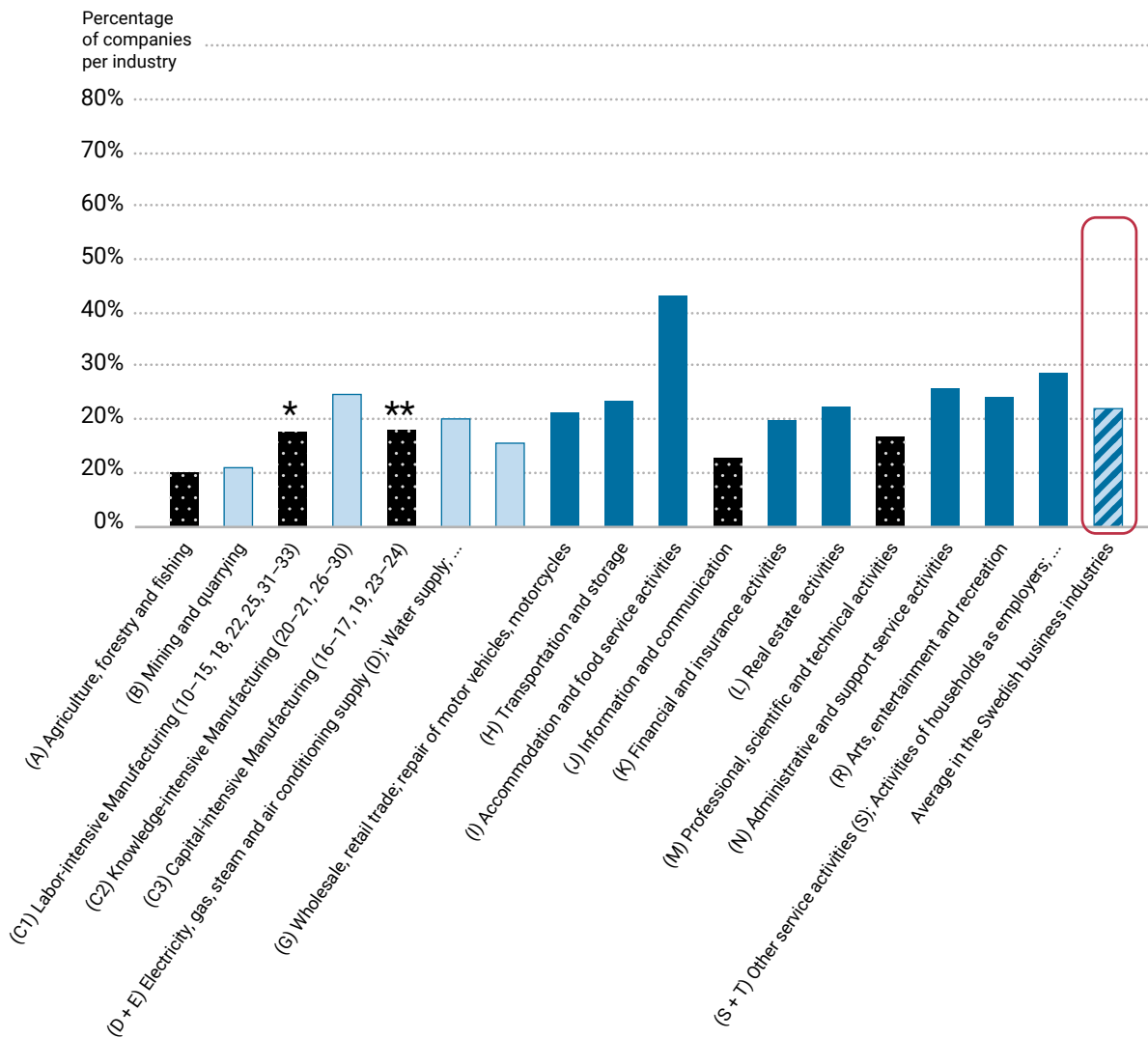
All bar indicate the weighted averages incidence of several work environment measures in each industry according to how many organizations each company represents per industry and size class.

*The probability of the significance of the value ** 5 percent level, * 10 percent level*

Legend:
- Goods-producing industries
- Service-producing industries
- Average in the Swedish business sector
- Industries that explain the measure; all other black-dotted bars show values at the 1% level

Part 3

The third part of the report examines the impact of the coronavirus pandemic on the scope and production of the companies in 2020. The study has taken into account the number of other companies each company represents in its industry and size category, for which reason the results are generalized to describe the business sector. The results are presented in section 6.

6. All industries have been affected, but the service sectors have been affected the most

The analysis shows what industries most frequently reported that they were able to continue to conduct business as usual, what industries have undergone the greatest changes in their business activities, and the extent to which the coronavirus pandemic was responsible in both cases. The analyses in this section are based on two survey questions: R1 (with seven response options) and R 2 (with two response options: Yes/No) (see section 1). Table 2 reports what industries have changed.

Impact on industries has been both negative and positive
A slight majority, 55%, of companies in the Swedish business sector report that they continued to conduct business as usual in 2020. The industries in which the highest proportion of companies state that they have conducted business as usual mainly relate to goods production: Agriculture, forestry and fishing (A), Mining and quarrying (B), Capital-intensive manufacturing (C3), Energy, Water & Waste (D + E), and Construction (F). In these industries, over 70% state that they conducted business as usual. Two of these industries also include the highest proportion of companies that state that they increased production volume in combination with newly started production: Agriculture and forestry (A) and Mining and quarrying (B). Some service sectors also report conducting business as usual to a high degree, especially Real estate activities (L) and Financial and insurance activities (K).

Meanwhile, 45% of companies did not conduct business as usual. These companies reported how business activities were affected. Companies in both goods-producing and service-producing industries reported that they did not conduct business as usual. Nevertheless, twice as many companies in the service sectors report this observation, compared with goods-producing industries. Twenty percent of all companies in the business sector stated that they had scaled back. This proportion is twice as high in the service sectors as in the goods-producing industries.

In Accommodation and food service activities (I), almost half of the companies report a reduction in business activities, along with the following industries, in descending order to just above average: Arts, entertainment and recreation (R), Administrative and support activities (N), and Transportation and storage (H). Other service activities (S + T) has the highest proportion of companies that reported scaling back business activities. The two manufacturing industries that reported scaling back business activities the most, Labor-intensive manufacturing (C1) and Knowledge-intensive manufacturing (C2), both have near average prevalences of 21% and 18%, respectively. A relatively large proportion of companies in the business sector (13%) state that they are in the process of resuming regular business activities, or will be doing so, while a small proportion of companies in the business sector (2%) report that operations have been or will be shut down. In four industries, no companies report closure; these industries are within manufacturing. In all service sectors, a small proportion of companies report having closed or planning to do so. The industry that reports the greatest number of closures is Financial and insurance activities (K); at the same time, companies in this industry represent the highest proportion that started or plan to start new operations.

About 10% of companies in the business sector overall state that the volume of business activities has increased or that new activities have been added. Of this group of companies in the business sector, 7% report an increase in the volume of business activities. The remainder state that new business activities have started or are being planned. The proportion of companies reporting that they plan to resume, expand, or start new operations is the same or almost as high within the service sectors as within manufacturing.

A relatively high proportion of companies within all industries report that they were impacted by the pandemic in 2020 and that this is the main reason for not conducting business as usual. On average, 36% of companies within the business sector cite the coronavirus pandemic as the main reason for the impact on their business activities.

Table 2 presents the impact on the companies in 2020 according to the industry to which they belong, i.e., the main focus of production of the company. Industries in which the proportion of companies conducted significantly less business than usual in 2020, as well as those that state that they scaled back business activities to a significant extent, are marked in **red**. Companies that report, to a greater extent than average, that they have resumed business activities, plan to do so, or plan to expand, are marked in **green** in the table. The last row, the average values, reflects the proportions of all companies in the industries of the business sector (A to N and R to T).

Table 2. Percentage of all companies in the Swedish business sector that report impact on the business activities, and the proportion that cite the coronavirus pandemic as the primary reason, for each economic activity, weighted averages, 2020.

|		Closure or planned closure	Cutbacks	Plans to resume	Expanded volume	New production	Both expanded volume and new production	Proportion that cite pandemic as main reason
A	Agriculture, forestry and fishing	0%	1%	6%	10%	0%	6%	13%
B	Mining and quarrying	0%	6%	9%	5%	0%	4%	9%
C1	Labor-intensive manufacturing	1%	21%	15%	8%	2%	3%	40%
C2	Knowledge-intensive manufacturing	0,4%	18%	30%	6%	1%	2%	52%
C3	Capital-intensive manufacturing	0%	10%	14%	9%	0%	2%	25%
D+E	Electricity, gas, steam and air conditioning supply (D); Water supply; sewerage, waste management and remediation activities (E)	0%	7%	2%	3%	1%	1%	9%
F	Construction industry	1%	13%	7%	6%	1%	1%	18%
G	Wholesale and retail trade; repair of motor vehicles and motorcycles	0,4%	14%	13%	10%	1%	2%	36%
H	Transportation and storage	3%	26%	15%	6%	2%	1%	41%
I	Accommodation and food service activities	5%	48%	12%	2%	0%	0,1%	62%
J	Information and communication	4%	17%	14%	7%	1%	3%	37%
K	Financial and insurance activities	8%	8%	11%	3%	3%	1%	18%
L	Real estate activities	2%	4%	6%	4%	2%	0%	12%
M	Professional, scientific and technical activities	4%	17%	17%	6%	1%	2%	36%
N	Administrative and support service activities	4%	36%	14%	2%	1%	1%	51%
R	Arts, entertainment and recreation	12%	38%	17%	5%	0%	3%	67%
S+T	Other service activities (S); Activities of households as employers; Undifferentiated goods- and service-producing activities of households for own use (T)	8%	24%	13%	2%	0%	4%	45%
	Average in the Swedish business sector	**2%**	**20%**	**13%**	**7%**	**1%**	**2%**	**36%**

Weighted averages based on the number of organizations each company represents according to industry and size category.

The larger the company, the greater the extent of downsizing

The differences between how companies in various size categories in the Swedish business sector conducted business during the coronavirus pandemic in 2020 are relatively small. The presentation of the results has therefore been simplified to a few comments. All size categories except the largest (200+) mainly demonstrate near-average proportions in all possible options concerning impact on business activities. In Table 2, the column headings show possible options, while the last row shows the average incidence for the various health and safety measures in the business sector. Notably, the larger the company, the higher the proportion that say that business has not been conducted as usual or as planned. At the same time, a higher proportion of the two largest size categories (20% and 23%, respectively) say that business activities will resume at the previous level; the average value within the business sector is 13%. In addition, to a greater extent than others, companies in the largest size category state that they have both expanded their volume and started new business activities, 11% and 13%, respectively, while the aggregate average value for the business sector is 9%.

However, there are some differences in the proportions of companies in varying size categories in the Swedish business sector that state that the coronavirus pandemic is the main underlying reason for the change in business activities in 2020. A trend is seen in which the larger the company, the larger the proportion reporting that changes in business activities were mainly due to impact of the coronavirus pandemic (see Figure 8).

Figure 8. Percentages of companies in the Swedish business sector that cite the impact of the coronavirus pandemic, according to size category, weighted averages, 2020.
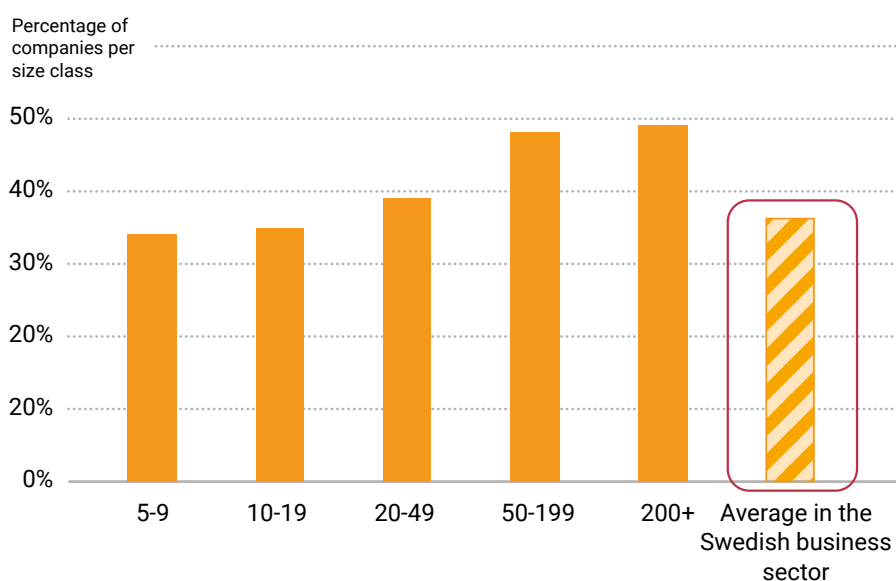
The bars indicate the weighted average incidence of the impact of the coronavirus pandemic according to how many organizations each company represents per industry and size class.

Closing reflections

The closing reflections aim to tie together the findings of the different parts of the report: the actual incidence of the three different health and safety measures in different industries (part 1), how various production factors, including industry, help to explain the different health and safety measures (part 2), and the effects of the pandemic on companies' business activities in the Swedish business sector (part 3). This section also includes a discussion of the additional knowledge that could help to explain the adoption of health and safety measures, in order to shed light on cause and effect. Beyond this, there is a discussion of the requirements a study must meet for it to be used to assess whether the business sector adopted sufficiently effective health and safety measures in 2020.

Explanatory production factors

Individual factors explain high incidence of health and safety measures in industries

The findings of the report show that actual high incidence of health and safety measures in an industry during the coronavirus pandemic does not mean that the main production activity of the industry helps to explain the high incidence of the health and safety measure. These results indicate that other factors explain the incidences. The results indicate that various structural resource factors, especially human resource factors, are important for the high incidence of all three health and safety measures applied during the pandemic, as was company size. Still, for certain industries the main production activities help to explain the incidence of the health and safety measures. But as always, the result of the regression model used, i.e., the actual presence of the measures of incidence, will be higher or lower for each company since the model estimates the average. The structural factors in the model will measure the normal value of the incidence. Therefore, if the industry factor is significant for certain industries, it means that the average company in these industries deviates sufficiently to give significant results. Consequently, some industries may display a positive industry effect, despite the low actual prevalence of the three health and safety measures.

The three health and safety measures are *frequent hand-washing and social distancing on the premises, telework,* and *applying several different health and safety measures.*

The health and safety measure of *washing hands more often and social distancing on the premises* is most commonly found in the goods-producing industries, but the production activities in these industries does not help to explain the high incidence of the measure. However, the production activities of some service industries do explain the incidence of the health and safety measure. The conclusion is that the highest incidence of the measure, which is within goods-producing industries, can mainly be explained by structural human resource factors, as well as by company size—in this case, large companies.

The health and safety measure *telework* occurs most commonly within service-producing industries, but the nature of these industries does not help to explain the high incidence of this measure. Instead, the main production activities of other goods- and service-producing industries, along with structural human resource factors and small companies, explain this prevalence.

The percentage of companies that applied *several different health and safety measures* is roughly the same in the various industries; accommodation and food service activities are a noteworthy exception, where twice as many companies (44%) applied several different measures. However, the focus of production of accommodation and food service activities does not help to explain the health and safety measure; rather, the characteristics that explain the incidence are structural human resource factors and small companies. However, it is likely that this high incidence can also be explained in part by the fact that these business activities in accommodation and food service activities have been affected by both general (HSLF-FS 2020:12 through 2020:31) and specific restrictions during the coronavirus pandemic (HSLF-FS 2020:37; SFS 2021:526), as well as by the "pressure" that arises as a result of reduced demand for the service. Among the service industries, the production activities of a couple of knowledge-intensive industries helps to explain the incidence of *several different health and safety measures*. Knowledge-intensive service industries are not usually notable for more extensive work environment management (Swedish Work Environment Authority, 2013, 2017b). They are not typically characterized by high work environment risks, either, but rather the opposite (Swedish Work Environment Authority, 2016, 2020). A few of goods-producing industries that usually demonstrate both higher work environment risks and more highly developed systematic work environment management help to explain the incidence.

However, the analyses are not intended to explain what factors contribute to the three different measures within each industry; rather, industry is a factor that, along with the other more general structural factors, helps to explain the incidence of measures in companies in the Swedish business sector.

Company size contributes in a different way during the pandemic

As the results show, company size helps to explain the incidence of the health and safety measures. Small companies help to explain the incidence of the two health and safety measures *telework* and s*everal different health and safety measures*. Large companies help to explain the limited measure of *washing hands more often and social distancing on the premises*. The results indicate that company size was of importance during the 2020 pandemic, but not to the same extent as reported in studies of serious work environment risks posed by occupational accidents, or in studies of the scope of more developed work environment management. Previous studies of more extensively developed work environment management indicate an association with company size (Swedish Work Environment Authority, 2013, 2017b); similarly, the degree of hazardous work is largely associated with large companies (Swedish Work Environment Authority, 2016). The results of the regression analysis of health and safety measures during the coronavirus pandemic indicate that the incidence of several measures during the pandemic can primarily be explained by factors other than company size. As discussed above, the result indicates that especially human resource factors are important for the high incidence of all three health and safety measures. The various explanations warrant more consideration, but one hypothesis is that those companies that had not previously applied several different measures did so to a larger extant than others during the pandemic, including both small companies and knowledge-intensive service companies. It might also be possible that downsizing by large companies in 2020 may have affected health and safety measures. With downsizing, fewer people are employed, which possibly also means that fewer people are on site in workplaces in these companies (see also section 1. *Introduction* and the presentation of certain introductory analyses in the creation of the regression model).

Additional conditions that are not measured by the production factors in the model may also need to be included to develop the analysis of causality. Any other factors that could or should be included depending on the question to be answered (see also the section below, *Do the analyses say anything about the adequacy of the measures?*). Still, we have some suggestions for forthcoming analyses.

Indications of differences in measures due to the proportion of employees of foreign background

The results show differences in the measures applied due to the proportion of people of foreign background in the company; there is a negative association with applying the health and safety measures *telework* and *several different health and safety measures*. In a given company, the fewer the number of employees of foreign background, the greater the incidence of applying *telework* or *several different health and safety measures*. However, the foreign background group shows a positive association with applying the limited health and safety *measure of washing hands more often and social distancing on the premises*. For companies, this means that the greater the number of employees of foreign background, the higher the incidence of implementing this measure. The results are highly reliable since the difference is statistically significant, but the odds ratios are low, for which reason no conclusions have been drawn from these results. However, it should be mentioned that previous studies show that foreign background is an indicator of work environment risks associated with occupational accidents, which have increased over time (Swedish Work Environment Authority, 2016). A recent study of European conditions highlights the association between migrant workers and increased risk of musculoskeletal disorders during the pandemic (European Agency for Safety and Health at work, 2021).

Developed work environment management analysis model

Moving forward, development of the analysis model is of interest. It would have been desirable for the dependent variable of the regression analysis to be a well-developed index that could be ranked. With such a dependent variable, alternative models to the three binary logistic regressions could be used. For example, a multinomial logistic regression model could predict the incidence of the various possible outcomes for a categorically distributed dependent variable. One way that such an analysis could be carried out using existing variables is that the health and safety measure *washing hands more often and social distancing on the premises* could be a zero alternative, *telework* could be 1, and *implementing several different measures* could be 2. An alternative model would be a general linear regression model (GENMOD) that takes into account the conversion of categorical variables into numerical variables. Such a model could rank the dependent variables in a way similar to the multinomial logistic regression model. GENMOD ranks the values of the dependent variable between 0 and 1. However, it is equally unclear how the three measures could be valued in this model, which means there is no obvious zero option in the analysis, as the model requires. One way would be for the health and safety measure *washing hands more often and social distancing on the premises* to have a value of 0, t*elework*

to have a middle value, and *implementing several different measures* to have a value of 1. However, it can be assumed that the results of these alternative analysis models would be influenced by the fact that more than half of all companies indicated that they mainly use *washing hands more often and social distancing on the premises*, while the other two measures are used by fewer companies. If the assumption is correct, the results can be expected to be relatively consistent with the results of the logistic model for the health and safety measure *washing hands more often and social distancing on the premises*.

For planned future analyses, relatively comprehensive indices could be developed regarding how work is organized and how work environment management is handled, while changes could be studied over time.

In-depth knowledge of how work is organized and how work environment management is handled

Initially, the Agency's analyses were intended to develop ways of highlighting business activities from a longer-term perspective. The main purpose is to highlight good working conditions, in order to monitor and analyze the development of healthy workplaces over time from a salutogenic perspective. This includes studying associations with other factors, such as business development and personal development for employees (e.g., circumstances for men and women, with or without children, as well as for older workers and recent entrants to the labor market with respect to productivity).

Industry studies could provide in-depth knowledge of the importance of individual-related factors

Future studies could be carried out regarding the conditions that help to explain how work is organized and how work environment management is handled in order to help advance industry knowledge in the Swedish business sector. These studies could also better describe the importance of individual-related human factors for various forms of work environment management within different industry groups. The industry analyses could also apply knowledge of how work was organized and how work environment management was handled at companies before the pandemic, which could possibly help to provide a better understanding of the factors that may have influenced the adoption of measures during the pandemic (see also the following section, *Importance of telework and other approaches to work*).

Importance of telework and other approaches to work

Telework is one of the health and safety measures applied during the coronavirus pandemic, with about 25% of all companies reporting that they adopted this health and safety measure as the most important of the three health and safety measures. *Telework* can also be included as one of several measures in the third option, which entails *several different health and safety measures*. In addition, companies may use *telework* as one of several organizational approaches to work.

The report presents some data on *telework* in the year prior to the pandemic. *Telework* was used regularly, to a greater or lesser extent, by about 36% of all companies, which is well in line with other statistical data regarding this approach to work (Swedish Agency for Work Environment Expertise, 2021).

Further studies could examine *telework* as an organizational approach to work before the pandemic, and any impact it may have had on health and safety measures during the pandemic. Such an analysis may also include other work organizational approaches. The analyses could be carried out at the aggregate level for the business sector and for various industry groups. In particular, the analysis could highlight the differences between companies with low and high proportions of women, which would be interesting because the results of this report indicate a positive association between a high proportion of women and *telework*. The high proportion of women in a company helps to explain the *telework* measure, which is viewed as a positive development, especially given the likelihood that new technology is used. The positive association holds for women on average, although it mainly pertains to younger women.

Do the analyses say anything about the adequacy of the measures?

More than half of all companies in the Swedish business sector that participated in the study did not implement any measures other than *washing hands more often and social distancing on the premises* in 2020. Companies in manufacturing are more likely than service companies to state that they limited their health and safety measures to *washing hands more often and social distancing on the premises*. This can be viewed as a potential opportunity for further health and safety measures, as recommended by the Public Health Agency of Sweden and county medical officers: "all operations in Sweden must ensure that they take appropriate measures to avoid the spread of Covid-19" (HSLF-FS 2020:12 through 2020:31; see note 1), and also as recommended by the Swedish Work Environment Authority's advice and checklists for infection risk and prevention (https://www.av.se/halsa-och-sakerhet/ sjukdomar-smitta-och-mikrobiologiska-risker/smittrisker-i-arbetsmiljon/

coronaviruset/smittrisker-pa-arbetsplatsen/?hl=covid-19). It should also be noted that while the focus of production of goods-producing companies does not help to explain the incidence of the measure during the pandemic, the focus of production of a few service industries does help to do so. In addition, a high proportion of women, high average age, and high average education level among employees of a company help to explain why no health and safety measures were applied other than *washing hands more often and social distancing on the premises*. Furthermore, the answer to the question may be influenced by the fact that a proportion of companies within both goods and service production states that they have not engaged in business as usual, although twice as many companies in the service sectors report this observation, compared with goods-producing companies. The majority of all companies in the Swedish business sector report that they engaged in business as usual in 2020; these companies were more likely to be in goods-producing companies than in services.

Nevertheless, the analyses in this report are not intended to be used to assess whether additional health and safety measures should have been adopted. In order to make such an assessment, the measures should be considered in relation to their objective(s). One relevant approach would be to relate the health and safety measures applied by companies to the rate of sick leave or, better still, of Covid-19 cases and Covid-19 mortality in 2020, taking into account production-conditions, as in the analyses in this report, and, if possible, also taking occupation into account (European Agency for Safety and Health at work, 2021). The results of such an analysis could contribute to the monitoring of the overall objective during the coronavirus pandemic in Sweden, i.e., that the measures intended to keep the number of Covid-19 cases low over time, perhaps as low as can reasonably be expected, do so given their nature. An even more complex objective is for companies in the business sector to implement health and safety measures in a way that is safe for employees and others (e.g., customers), but also in such a way as to allow society to "function" during the pandemic. It is not clear how to assess whether the measures applied by companies in the Swedish business sector achieved the objective during the corona pandemic in 2020. One possible way to assess would be to compare the measures taken in Swedish companies with measures taken in companies in other countries with similar objectives and to compare the measures taken in the different countries with parameters such as economic outcome (GDP) and unemployment. Previous research on how policy goals can be studied based on past crises has been published (e.g., Hafiz, Oei, Ring & Shnitser, 2020; Myndigheten för arbetsmiljökunskap, 2020) and new initiatives have been taken regarding the coronavirus pandemic (e.g., Fondation Europeenne de la science, 2021; Max-Planck-gesellschaft zur förderung der wissenschaften EV, 2020).

The post-Covid-19 era: new business activities, approaches to work and work environment management methods

The third and final part of the report addresses whether companies conducted business as usual in 2020 and what impact the coronavirus pandemic had on the scope of business activities. A slight majority of companies in the Swedish business sector (55%) report that they continued to conduct business as usual in 2020. These companies are more likely to be found in the goods-producing industries than in the service sectors. Of those that were unable to conduct business as usual, service companies account for a higher proportion of closures. This result is probably also a short-term effect, part of an already ongoing trend in structural change that can be expected to have been accelerated by the coronavirus pandemic. Previous studies concerning the development of the economy and the business sector show that various types of "crises" accelerate structural change (Lindbeck, 2012; Schön, 2007). It can therefore be expected that Sweden and the rest of the world will enter the post-Covid 19 era with both new business activities and new ways of conducting business, which means there will also be a need for new ways of conducting work environment management (Nylund, 2017; Statistics Sweden, 2011; Swedish Work Environment Authority, 2019).

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Appendix 1

The three analytical models calculate the chance of the dependent variable (that it is 1 and not 0) at different values of the independent variables (Maximum Likelihood Estimates) by dividing the chance of its being applied by the chance of its not being applied, i.e., the odds (the odds ratio).

An odds ratio that is "close" to 1, even if there is a statistically significant difference from 1, is considered in this study to be of no practical importance since it is of small magnitude—i.e., there is no interpretable difference in the incidence of the measure compared with the relevant group (variable). In simple terms, it would not make sense to interpret a very small difference as an actual difference. The factors highlighted are clearly over/underrepresented—a clearer difference compared with the value of 1—and have a statistically significant difference in value. In this study, an odds ratio greater than 1, when the value is significantly different from 1 (the ratio is at least 1.3 or higher), is interpreted as a measure that has been applied to a great extent. Odds ratios less than 1 (the ratio is at least 0.7 or less) indicate that a measure has been applied to a lesser extent. For example, an odds ratio that is "close" to 2 indicates that there a measure was twice as likely to have been applied.

Table 3. Production factors that help to explain the incidence of the *three different health and safety measures* during the pandemic, 2020.

Parameter	Model 1. Hand-washing and social distancing			Model 2. Telework			Model 3. Several different measures		
	Value	Signifi-cance	Odds-ratio	Value	Signifi-cance	Odds-ratio	Value	Signifi-cance	Odds-ratio
Intercept	−2.01	***		4,13	***		1.35	***	
Proportion of women	0.73	***	2.1	0.28	***	1.3	−1.09	***	0.3
Percentage with foreign background	0.20	***	1.2	−0.14	***	0.9	−0.12	***	1.0
Average age	0.28	***	1.3	−1.26	***	0.3	0.63	***	2.2
Average education level	4.38	***	79.8	-5.58	***	0.004	−0.18	**	1.0
5–9 employees	−0.93	***	0.2	0.74	***	3.5	0.39	***	1.9
10–19 employees	−0.60	***	0.3	0.32	***	2.3	0.26	***	1.7
20–49 employees	−0.31	***	0.4	−0.04	*	1.6	0.24	***	1.6
200+ employees	1.25	***	1.9	−0.49	***	1.0	−0.64	***	0.6
50–199 employees (comparison group)		***							
(A) Agriculture, forestry and fishing	−1.28	***	0.2	1.34	***	4.0	0.71	***	2.6
(B) Mining and quarrying	−0.12	#	0.8	−0.34	#	0.8	0.36	#	1.8
(C1) Labor-intensive manufacturing	−0.68	***	0.5	0.79	***	2.3	0.06	*	1.3
(C2) Knowledge-intensive manufacturing	0.11	**	1.1	−0.17	***	0.9	−0.18	***	1.1
(C3) Capital-intensive manufacturing	−0.30	***	0.7	−0.06	#	1.001	0.17	**	1.5
(D + E) Electricity, gas, steam and air conditioning supply (D); Water supply; sewerage, waste management and remediation activities (E)	0.23	***	1.2	−0.49	***	0.6	0.12	#	1.4
(F) Construction	−0.38	***	0.7	0,.43	***	1.6	−0.04	#	1.2
(G) Wholesale and retail trade; repair of motor vehicles and motorcycles	−0.09	***	0.9	−0.13	***	0.9	0.00	#	1.3
(H) Transportation and storage	−0.09	**	0.9	0.43	***	1.6	−0.44	***	0.8
(I) Accommodation and food service activities	0.22	***	1.2	1.44	***	4.5	−0.85	***	0.5
(J) Information and communication	1.13	***	3.0	−1.34	***	0.3	0.52	***	2.1
(L) Real estate activities	0.07	#	1.0	−0.24	***	0.8	−0.15	***	1.1
(M) Professional, scientific and technical activities	0.52	***	1.6	−0.78	***	0.5	0.38	***	1.8
(N) Administrative and support service activities	0.15	***	1.1	−0.19	***	0.9	−0.22	***	1.02
(R) Arts, entertainment and recreation	0.48	***	1.5	−0.63	***	0.6	−0.23	***	1.008
(S + T) Other service activities (S); Activities of households as employers; Undifferentiated goods- and service-producing activities of households for own use (T)									
AIC	97474,490[1]		81978,258[2]	78304,080[1]		60127,147[2]	73669,944[1]		69836,326

The probability of significance for the obtained value (Pr > Chi sq.) *** 1% level, ** 5% level, * 10% level; not significant #.
(K) Financial and insurance activities, the number of observations is too small to be included in the analysis. [1] Intercept and
[2] Intercept and covariance (see section 1. *Introduction, Analytical methods subsection*).

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