



# **OECD Employer & Worker Surveys on the Impact of Artificial Intelligence on the Labour Market**

## Methodology Report

A survey commissioned by the OECD

Report prepared by

Kantar Public Germany

Elke Himmelsbach  
Arnold Riedmann  
Alexandra Strauß

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## 1 Introduction

As part of its Future of Work initiative, the OECD has commissioned Kantar Public to collect representative and cross-nationally comparable employer- and worker-level survey data on the impact of Artificial Intelligence (AI) in the workplace. The survey examines how and why artificial intelligence (AI) is being implemented and what consequences its implementation has on employment, the nature of tasks to be performed and the qualification and training of employees, amongst others. The involvement of workers and worker representatives in the implementation of new technologies at the workplace is also subject of the survey.

This report describes the methodological procedure and the fieldwork outcomes of both the employer and the worker surveys in the following countries and languages:

AT	Austria	German
CA	Canada	English and French
DE	Germany	German
FR	France	French
IE	Ireland	English
UK	The United Kingdom	English
US	The United States	English

The employer survey was conducted as a telephone survey (CATI = Computer Assisted Telephone Interviewing) among representatives of the management of companies with 20 or more employees in the sectors “Manufacturing (NACE C)” and “Finance and Insurance (NACE K)”.

The worker survey was implemented as an online survey using the Kantar Profiles Access Panels, targeted only to workers employed in the same sectors.

The main fieldwork phase for both surveys was between mid-January and mid-February 2022.

## 2 Universe and sampling

### 2.1 Employer survey

The universe for the employer survey was defined as companies with 20 or more employees in the manufacturing (NACE C) and in the finance and insurance sectors (NACE K).

The definition of the target unit as “company” (and not “establishment” or “local unit”) implied that in case of multi-site companies (e.g. banks or insurances with local subsidiaries) only the headquarters was meant to be interviewed and to provide information for the entire company with all its subsidiaries, production units etc. in the country.

The sampling design used for the survey can be described as a multi-stratified random sampling procedure. For sampling, the defined universe was divided into up to 8 cells, defined by the sector of activity (NACE C or K) and four firm size classes (20-49, 50-249, 250-499 and 500 or more employees). For smaller countries, the two largest size classes were combined to create size class 250+. For each of the 8 cells, targets were set beforehand, based on the available universe statistics.

Both sectors of activity are generally of equal importance for the survey. The gross samples were nevertheless drawn disproportionately by sector and size:

- In terms of sectors of activity, the targeted ratio was 67% Manufacturing/NACE C to 33% Finance and Insurance/NACE K. for the employer survey reflects the lower number of NACE K companies of 20 or more employees in each country, particularly in the smaller countries.
- As for size, large companies were intentionally over-sampled in order to have enough interviews with large companies available for analysis. Though there are only few large companies in the universe, these employ a large share of the workers in their sector.

Within each of the 44 cells of the sampling matrix as defined by country, sector and firm size (7 countries \* 2 sectors \* 3 size classes respectively 4 in the United States), the samples were drawn strictly at random.

In total, 2,100 interviews were targeted: 300 interviews in each of the seven participating countries, of which (200 in NACE C (Manufacturing) and 100 in NACE K (Finance and Insurance)).

This unequal distribution in terms of size was redressed by way of the application of a design weight, (see chapter 6.3 for details on the weighting). The disproportionalities in terms of the two sectors were not redressed by weighting as the two sectors reflect only a very selective section of the overall universe of companies and analyses summarizing the results across both sectors are not intended (for details on the weighting see chapter 6).

The gross samples for the employer survey were drawn from the address databank of the international address provider Dun & Bradstreet (D & B). Dun & Bradstreet is one of the most long-standing and renowned international business data providers, based in the United States. The company claims to have the largest data bank worldwide, with addresses of about 250 million businesses globally. Dun & Bradstreet addresses are commonly used for many national and international business surveys, among them for example all waves of the Eurobarometer business survey waves conducted on behalf of the European Commission in the last decade.

The only exception in terms of the sampling frame is Ireland where the initial sample was drawn from Bill Moss, a local address provider that offers superior coverage of firms in Ireland. Due to the very limited sample available for Ireland overall, additional addresses from Dun & Bradstreet were added to the sample at a later stage, following a thorough check on any overlaps between the two databases

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(elimination of duplicates). With the exception of the Dun & Bradstreet sample drawn during the fieldwork phase, all addresses drawn for the survey included telephone numbers. For some of the D & B addresses for Ireland, telephone numbers had to be found using internet sources.

Within each of the cells (6-8 cells per country; 44 in total) defined for the stratification of the gross sample, addresses were drawn strictly at random.

Within a contacted company, the target respondent was the person with the best overview of advanced technologies applied within the company and their impact on the workplace. In companies with fewer than 250 employees, it was assumed that this would usually be the owner, general manager or a technical manager. In large companies, the head of technology or the head of production were considered as the best-informed persons. The introductory text read

*I would like to talk to the person who has the best overview of the advanced technologies applied in this company.*

*[if size1 < 250:] Usually, this is the owner or manager of the company, but it can also be a specific manager for technology.*

*[if size1 = 250 or more AND industry1, code 1:] Usually, this is either the managing director of the company or the head of technology.*

*[if size1 = 250 or more AND industry1, code 2:] Usually, this is either the managing director of the company or the head of technology or the head of production.*

In this introduction to the survey, the AI was intentionally not mentioned in order to avoid any potential net sample bias related to the familiarity with the topic, with non-users supposed to be less inclined to participate in the survey due to lack of interest in and affinity with AI. The consideration was that a broader term such as “advanced technologies” would lead to a lower content-related participation bias.

## 2.2 Worker survey

The universe for the worker survey was defined as dependent employees in the manufacturing or finance and insurance sectors, aged 16 years or older.

As the main purpose of the research was to compare the sectors, a quota of 50% for each sector was applied to each country with enough panellists to meet both the overall target and the target for each sector. For Austria and Ireland, where the universe and thus the number of eligible panellists are much lower, no quota was applied and the overall achievable sample size was reduced.

The aim was to collect 400 worker interviews per sector in each country, plus 10% oversampling of this target to allow some room for excluding data that did not pass a series of quality checks (see Chapter 5).

Exceptions to this were made for Austria and Ireland. For Ireland, only 490 interviews in total were guaranteed and for Austria no more than 800 interviews were expected on a best effort basis, not allowing for any oversampling.

The samples for the worker survey were all drawn from online access panels. The main panel used was the Kantar Profiles Access Panel. In view of the relatively small universe of the survey (only dependent employees in two specific sectors of activity), it was anticipated that this panel would not be sufficiently large for achieving the targeted number of interviews. Therefore, a number of further access panels from partner institutes were foreseen and used for the survey:

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Table 1: Access Panels used for sampling, by country

Country	Access Panels used for sampling (Name and location of company headquarters)
AT	Kantar (UK); Cint (Sweden); Toluna (USA)
CA	Kantar (UK); Lucid (USA)
DE	Kantar (UK); Cint (Sweden); Gapfish (Germany)
FR	Kantar (UK); Cint (Sweden); Panelbase (UK)
IE	Kantar (UK); Toluna (USA); Dynata (USA); Splendid Research (Germany); Dalia Research (Germany); Cint (Sweden)
UK	Kantar (UK); Cint (Sweden); Panelbase (UK)
US	Kantar (UK); Cint (Sweden); Lucid (USA)

## 3 Development and translation of the Questionnaires

The starting point for both surveys was a first questionnaire draft provided by the OECD. The English master questionnaire was then further developed jointly by the OECD and Kantar Public. Both survey instruments were tested in pre-test interviews conducted in two countries. In the following, the pre-tests and the scripting of the questionnaires are briefly summarised.

### 3.1 Questionnaire for the employer survey

The CATI script for the employer survey was programmed by Kantar in the NIPO ODIN software, firstly in the English master version. It was then tested by the Kantar Public team in Munich and subsequently by the OECD team before the launch of pre-test fieldwork.

The main aims of the pre-test were to test the introduction to the survey (clear and appealing entry text; effective routing to the targeted respondent), to check the questionnaire for understandability and to measure the interview duration. For the checks on understandability and on a uniform interpretation of the questions by different respondents, the pre-test questionnaire included some cognitive elements. For this, a number of open-ended debriefing questions were asked to the respondent, e.g. about details of the AI technologies used in the company and on respondent's interpretation of key questions. After the finalisation of each interview, interviewers were also asked a few questions about observations made during the interview.

The pre-test was conducted in Germany and in the United States. Translations for the German pre-test questionnaire version were made by the Kantar Public team.

Fieldwork for the pre-test was launched on 26 October 2021 and finalised by 12 November 2021. Overall, 60 interviews were conducted, of which 31 in Germany and 29 in the USA, roughly evenly split between each sector (31 in NACE C; 29 in NACE K).

Overall, the pre-test proved that the survey concept worked well. Experiences from the pre-test interviews suggested that the survey was reaching the right target respondents and collecting information relevant to the OECD's research objectives. In the manufacturing sector, the most frequently named examples were process automation and robots for different tasks in production, partly using cameras for steering. Some employers, particularly in the U.S., also named rather "traditional" IT technologies such as smartphones and laptops as examples for AI. In the finance and insurances sector, software used for fraud detection as well as voice assistance systems used in customer support were the most frequently named examples.

The feedback of respondents was generally positive, describing the survey as interesting and relevant. Interviews for the employer pre-test however turned out to be far too long, with 18 minutes net duration in Germany (not including any debriefing questions) and 23 minutes in the United States, instead of the 10 minutes targeted for each country.

The following changes were made in order to shorten the questionnaire and to improve understandability:

- A refinement of the AI definition read out during the interview, with fewer examples provided for the use of AI in private life and an additional example for the use of AI in each sector. The reason for this change was that a considerable share of non-adopters in the United States mentioned



unexpected or very vague examples when being asked about the AI technologies they had in mind when answering the questions.

- A cognitive post-interview question showed that HR managers were the group most likely to indicate that they were not the most appropriate interviewee within the company. As a result, the introduction and screening section of the questionnaire was edited to remove a specific reference to this group as target respondents.
- Deletion of numerous questions asked to non-adopters of AI about their views on the application and impact of AI in the sector. These questions yielded a high share of “Don’t know” responses, indicating that respondents may have had difficulty understanding the questions or been unwilling to answer, perhaps due to the lack of professional experience with AI. These questions were cut in order to capture the same detailed information from adopters, whose answers were considered more relevant, less speculative and of higher quality.
- Deletion or reformulation of a small number of other questions which proved to be difficult to understand (as indicated by a high proportion of “Don’t know” responses) or did not render interesting, differentiated results.

The CATI script was revised accordingly. The English master script for the main survey was again tested both by the Kantar Public team and the OECD team.

## 3.2 Questionnaire for the worker survey

The survey script for the worker survey was programmed in Dimensions software and first tested locally by the Kantar team and by the OECD team. The final pre-test version was translated by the German Kantar Public team and the German language script was tested by the local team before the pre-test with the real target groups.

The pre-test within the online access panel was also conducted in two countries, the United States and Germany. The aim was to collect about 110 interviews in each country to check whether the questionnaire was implemented correctly and well-understood by the target group.

The pre-test was launched on 3<sup>rd</sup> November 2021. The last interview was conducted on 10<sup>th</sup> November 2021. Overall, 219 interviews were completed, evenly split across the two sectors.

The (uncleaned) average interview duration in the pre-test was 8 minutes at the median and 16 minutes at the mean. Thus, there was no need to shorten the worker questionnaire.

In the pre-test the questionnaire had a few additional debriefing questions at the end of the main questionnaire. Overall the questionnaire was considered as being easy. When asked “How easy or difficult was it to answer the questionnaire overall?”, 53% answered “very easy”. 41% considered it “somewhat easy”. Only 5% of the pre-test sample (n = 11 respondents) mentioned that it was somewhat difficult to answer.

**Table 2: Ease of pre-test questionnaire**

	Germany	United States	Total	Total
Base	109	110	219	100%
Very easy	47	70	117	53%
Somewhat easy	52	38	90	41%
Somewhat difficult	9	2	11	5%
Very difficult	-	-	-	0%
No answer	1	-	1	0%

The difficulties mentioned by respondents classified as adopters were:

- Where does AI start and where does it end?
- Unaware of how my company handles some AI
- Had a hard time thinking about the AI things we have here at work
- Not sure how to answer these questions

The difficulties mentioned by respondents classified as non-adopters:

- difficult to think of situations that don't exist
- how AI impacts the workers
- if you are less familiar with AI, you can often only answer with don't know
- do not know what AI is used in building the equipment in my company
- they were all a little hard to answer, wasn't sure of many questions

The examples of AI applications respondents of the worker survey had mostly in mind were in line with expectations and with the examples provided at the beginning of the interview. In the manufacturing sector, the most frequently named examples were robots for different tasks in production. Self-driving vehicles, AI assisting in HR duties such as sorting out job applications or AI used for machines maintenance or voice assistance systems, were further examples mentioned by workers from the manufacturing sector. In the finance and insurance sector, voice assistance systems as e.g. applied in waiting lines, were the most frequently named example. Other examples named were chatbots and AI-based data entry or data analysis software. A few respondents from both sectors also named systems that help to monitor and assess the work done by the employees.

In the worker survey, only some minor changes to the wording were made after the pre-test. The new master version was again tested by both the Kantar Public and the OECD teams. After the conclusion of these tests, the master version was overwritten with the respective national language versions. Each programmed language-country version was tested again before being released for the main fieldwork.

## 3.3 Definition of Artificial Intelligence in the surveys

For the success of the survey, the definition of what Artificial Intelligence is was of key importance. In order to ensure that all respondents had a similar picture of what to consider as AI, they received the following explicit definition with examples:

### Q012 - adefinition: AI definition

Text

#### [Not back](#)

In the questions that follow, the term 'artificial intelligence' is used. No matter how familiar you are with the term, please have the following definition in mind when answering the subsequent questions:

Artificial intelligence - or 'AI' in short - is, what enables smart computer programs and machines to carry out tasks that would typically require human intelligence.

Some examples where AI can be found in your everyday life include:

- Siri, Alexa and other smart assistants,
- Netflix or YouTube recommendations, and
- Self-driving cars

Some examples where AI can be found in your sector include:

[IF Finance and Insurance sector]: Robo-advisors, chatbots used for customer service, and fraud detection software

[IF manufacturing sector:] Robots that use cameras to check items for flaws, software used to predict prices and demand and technology that predicts when machines should be serviced

Only after having been given this definition, respondents were asked about the application of AI in their company and – if so – whether they were using AI-based systems for their own work.

Feedback from interviewer teams showed that, in spite of this explicit definition illustrated with examples, it was not totally clear for a small number of respondents whether or not AI is applied in their company.

## 3.4 Supporting fieldwork material

In order to support participation in the employer survey, a motivation letter was developed by the OECD team in cooperation with Kantar Public. The latter bore the logo of the OECD and the signature of an OECD representative. In the letter, the background and aims of the survey were explained and hints on the most suitable person for answering the interview provided.

In addition to the motivation letter, a data privacy sheet was set up, explaining the handling of the data, the rights of the respondent and other related information.

Both the motivation letter and the data privacy sheet were set up in English and translated into German (by the Kantar Public team) and French (by professional translators).

The motivation letter and data privacy sheet were sent by email to all contacted company representatives who were interested in the material and willing to provide their email address for this purpose in (one of) the initial phone call(s).

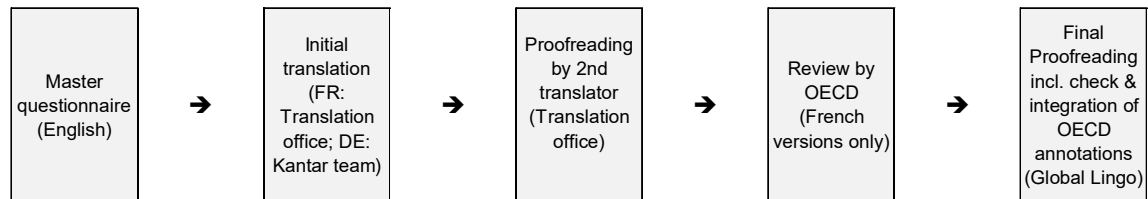
As a measure to motivate respondents for participation, the letter explained that the OECD would publish a report based on the results of the survey, downloadable from the end of 2022 onwards from the OECD webpage.

## 3.5 Translations for the main survey

The final English master questionnaire versions of both the employer and the worker surveys were translated by professional translators into French, and all translations were proofread by local native speakers. The French-language versions for France and Canada were additionally checked by native speakers via the OECD.

For the German version, the pre-test translation made by the Kantar Public team was revisited and adapted to the master used for the main survey. Additionally, the final German master version was proofread by a professional translator from a translation agency.

**Figure 1: Steps of the translation process**



## 4 Fieldwork and fieldwork outcomes of the Main Survey

### 4.1 Employer survey

#### 4.1.1 Fieldwork period

Fieldwork for the employer survey was scheduled to take 5 weeks in total, from 17 January to 18 February 2022.

In Austria, Canada, France and Germany, fieldwork for the employer survey was launched as scheduled on 17 January 2022. In the United States, this was a bank holiday so fieldwork there started one day later. In Ireland and the United Kingdom, interviewing started on 19 January.

For various reasons, the start and end dates of fieldwork differed slightly between countries as the following table shows:

**Table 3: Fieldwork period by country – main employer survey**

country	Fieldwork start	Fieldwork end
Austria – AT	17 <sup>th</sup> January 2022	21 <sup>th</sup> February 2022
Canada – CA	17 <sup>th</sup> January 2022	21 <sup>th</sup> February 2022
Germany – DE	17 <sup>th</sup> January 2022	11 <sup>th</sup> February 2022
France – FR	17 <sup>th</sup> January 2022	21 <sup>th</sup> February 2022
Ireland – IE	19 <sup>th</sup> January 2022	18 <sup>th</sup> February 2022
United Kingdom - UK	19 <sup>th</sup> January 2022	24 <sup>th</sup> February 2022
United States of America – US	18 <sup>th</sup> January 2022	21 <sup>th</sup> February 2022

#### 4.1.2 Interviewer teams

The CATI interviews for the employer survey were coordinated centrally by Kantar Public in Munich. While the interviews in Germany, Ireland and the United Kingdom were done by the CATI studios of Kantar, fieldwork for Austria, Canada, France and the United Kingdom was outsourced to the CATI service provider FFIND. The latter four countries were internally coordinated by a FFIND coordination hub located in Palermo (Italy), this hub was in turn coordinated by Kantar Public Munich for this survey.

**Table 4: Fieldwork providers and location of CATI centres, by country**

country	Fieldwork provider	Telephone studio
AT	FFIND	CATI from home
CA	FFIND	London, UK
DE	Telquest (part of Kantar)	Leipzig, Germany
FR	CATI from home	CATI from home
IE	Kantar UK	London, UK
UK	Kantar UK	London, UK
US	FFIND	London, UK

In total, across all 7 countries, 119 telephone interviewers were working for the study, all of whom had previous experience in interviewing companies or establishments. Only native speakers of the respective languages were working on this survey.

**Table 5: Size of interviewer teams working for the employer survey**

country	Number of interviewers
AT	12
CA	15
DE	36
FR	13
IE	17 (of which 15 also working for the UK sample)
UK	27 (of which 15 also working for the Irish sample)
US	15

### 4.1.3 Number and structure of completed interviews

All in all, in the seven countries participating in the survey, 2,100 interviews were targeted, comprising 1,400 in the Manufacturing sector (NACE C) and 700 in the Finance and Insurance sector (NACE K).

In all countries but Ireland, the targeted overall net sample size and the envisaged sector structure were achieved. In Ireland, the targeted number of interviews was achieved for the Manufacturing sector, but not for the Finance and Insurance sector. There, only n=53 instead of the targeted n=100 interviews were completed. In view of the very limited sample available for the survey (reflecting a smaller universe of financial firms in Ireland compared to the other participating countries), this can be considered a good result.

**Table 6: Targeted and achieved net samples, by country and sector**

COUNTRIES	Manufacturing		Finance and Insurance		Total	
	TARGET	ACTUAL	TARGET	ACTUAL	TARGET	ACTUAL
AT	200	200	100	100	300	300
CA	200	200	100	100	300	300
DE	200	200	100	100	300	300
FR	200	200	100	100	300	300
IE	200	200	100	53	300	253
UK	200	200	100	100	300	300
US	200	200	100	100	300	300
Total	1,400	1,400	700	653	2,100	2,053

As regards the size structure, deviations between the targeted and achieved net samples are bigger in some countries than in others. This is mainly due to the fact that the targets for the larger size-classes (particularly 250 or more employees) had been set very ambitiously and on a best effort basis. In Austria and Ireland, size targets were not specified as it was anticipated to be challenging to achieve the targeted overall number of interviews for the sector in view of the small universe.

The following table shows the targeted and achieved size structures by country and sector.

**Table 7: Targeted and achieved net samples, by size**

COUNTRIES	Size-class	Manufacturing		Finance and Insurance	
		TARGET	ACTUAL	TARGET	ACTUAL
AT	20-49 employees	95	95		42
	50-249 employees	80	80	100	39
	250 or more employees	25	25		19
CA	20-49 employees	80	80	45	45
	50-249 employees	80	80	40	40
	250 or more employees	40	40	15	15
DE	20-49 employees	70	70	30	30
	50-249 employees	70	70	40	40
	250 or more employees	60	60	30	30
FR	20-49 employees	70	70	40	40
	50-249 employees	70	70	35	35
	250 or more employees	60	60	25	25
IE	20-49 employees		73		20
	50-249 employees	200	98	100	20
	250 or more employees		29		13
UK	20-49 employees	70	71	40	40

	50-249 employees	70	77	35	35
	250 or more employees	60	52	25	25
US	20-49 employees	70	70	30	30
	50-249 employees	70	70	30	30
	250 or more employees	60	60	40	40

The size indicated in the table above for “actual” sample reflects the number of employees as indicated by respondents at the beginning of the interview.

#### 4.1.4 Interview duration

Interviews for the employer survey were meant to take 10 minutes on average. Interviewers with adopters were meant to take longer than that, interviews with non-adopters were in turn expected to be considerably shorter than 10 minutes.

The table below shows the actual interview duration as measured in the questionnaire time stamps (sum of the time stamps per question block)<sup>1</sup>. All in all, interviews took about 11 minutes. While interviews with AI adopters took about 15 minutes on average, those with non-adopters took close to 9 minutes.

**Table 8: Interview duration, as sum of the time stamps per question bloc**

Country	AI-adopters	Non-adopters	Ratio Adopters/Non-adopters (n)	Mean duration all
AT	15.71 min	9.86 min	107:193	11.95 min
CA	16.77 min	10.41 min	143:157	13.44 min
DE	13.66 min	8.50 min	97:203	10.17 min
FR	15.42 min	9.64 min	114:184	11.84 min
IE	12.58 min	6.48 min	93:160	8.72 min
UK	12.63 min	6.31 min	62:138	7.61 min
US	15.76 min	10.10 min	127:173	12.49 min
ALL	14.96 min	8.66 min	743:1310	10.94 min

<sup>1</sup> For the United Kingdom and Ireland, the interview duration measured in the time stamps deviates substantially from the duration measured in the CATI studio. In the CATI studio, overall a duration of 12 minutes and 15 seconds was measured for Ireland whereas for the United Kingdom the measured duration was shorter (10 minutes and 46 seconds) due to the lower incidence of companies using Artificial Intelligence.



## 4.1.5 Fieldwork results

The table below shows the number of addresses used for the survey. Sum 1 indicates the number of valid and presumably<sup>2</sup> eligible addresses, i.e. the number of addresses after subtracting quality neutral non-response such as wrong targets (private households etc.), invalid telephone numbers or screen-outs due to a wrong sector or wrong size (fewer than 20 employees). Sum 2 is the number of these addresses that could actually be reached by phone. On the basis of these data and the number of interviews, the response and cooperation rates can be calculated:

- The response rate indicates the share of interviews conducted out of the presumably valid and eligible valid addresses (sum 1). Across the 7 countries, the average response rate was 6.2%, ranging from 4.8% in the United States to 12.9% in Ireland. The exceptionally high Irish response rate results from the fact that in Ireland, each address was worked with particular emphasis in view of the very limited universe and thus the limited sampling frame available. In order to reach the very ambitious targets set for Ireland, addresses in Ireland were called more often than elsewhere before classifying them as non-response. This is reflected in the low number of addresses classified as “other non-contacts” (answering machine, busy or no answer).
- The cooperation rate indicates the share of interviews obtained among the companies that could be reached by phone and which were presumably eligible for the survey. The cooperation rate across the 7 countries was 11.6%, ranging from 7.4% in Germany to 16.8% in Austria.

**Table 9: Summary of fieldwork outcomes, by country**

Disposition Code	AT	CA	DE	FR	IE	UK	US	Total
	n	n	n	n	n	n	n	n
Total sampling frame	4,214	6,128	5,508	5,999	2,421	6,408	7,015	<b>37,693</b>
Addresses not used	0	0	0	0	0	1,256	456	<b>1,712</b>
Total addresses used	4,214	6,128	5,508	5,999	2,421	5,152	6,559	<b>35,981</b>
Neutral non-responses:								
- Quota full	8	7	5	12	0	25	16	<b>73</b>
- Screen-out (<20 employees or wrong sector) (1)	21	37	87	24	81	66	88	<b>404</b>
- wrong target (no company etc.)	169	190	132	142	114	161	161	<b>1,069</b>
- invalid number (2)	137	78	85	71	262	336	98	<b>1,067</b>
<b>SUM 1 (used addresses – neutral non-responses)</b>	<b>3,879</b>	<b>5,816</b>	<b>5,199</b>	<b>5,750</b>	<b>1,964</b>	<b>4,564</b>	<b>6,196</b>	<b>33,368</b>
<b>Other non-contacts:</b>								

<sup>2</sup> There are several criteria defining the eligibility of a company for the survey. Some of these (e.g. invalid number or answering machine of a private household) can be determined without having established a call contact with a person at the company, others can be determined only after having talked to somebody at the address. The final eligibility for this survey becomes clear only during the interview, in the questions asking for the confirmation of the sector and for the number of employees.

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- Answering machine or busy (3)	1,258	1,903	553	1,751	70	664	2,300	<b>8,499</b>
- No answer (4)	830	1,756	582	1,731	244	458	1,550	<b>7,151</b>
<b>SUM 2</b> (used addresses – neutral non-responses & other noncontacts)	<b>1,791</b>	<b>2,157</b>	<b>4,064</b>	<b>2,268</b>	<b>1,650</b>	<b>3,442</b>	<b>2,346</b>	<b>17,718</b>
Open appointments (5)	90	75	18	47	6	54	81	<b>371</b>
Declined/refusal (6)	1,383	1,759	2,663	1,916	865	1,541	1,955	<b>12,084</b>
Interrupted interview (7)	16	23	3	5	19	15	10	<b>91</b>
Contacted, callback possible (8)	0	0	1,046	0	471	1,273	0	<b>2,790</b>
Other error (9)	0	0	34	0	36	259	0	<b>329</b>
<b>Completed interviews</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>253</b>	<b>300</b>	<b>300</b>	<b>2,053</b>
Response rate (completes/sum 1)	7,7%	5,2%	5,8%	5,2%	12,9%	6,6%	4,8%	<b>6,2%</b>
Cooperation rate (completes/sum 2)	16,8%	13,9%	7,4%	13,2%	15,3%	8,7%	12,8%	<b>11,6%</b>

## Notes:

- (1) Companies out of scope according to the information from the sampling frame were not included in the gross sample, but the information from the frame was not always confirmed by respondents. This category includes only screen-outs at the beginning of the questionnaire, based on the answers of respondents.
- (2) Invalid numbers include dead numbers and telephone numbers that ended up at a Fax or Modem
- (3) Answering machines were particularly frequent in the Finance and Insurance sector where most companies have frequent client contact and work with service numbers. For interviewers it is difficult to get beyond these service lines with pre-connected response robots.
- (4) Telephone not attended.
- (5) Open appointments include both fixed appointments that could not be scheduled before the end of fieldwork and soft appointments where a later recall was allowed by the contact person in the company, but without specifying a date.
- (6) This category includes all kind of refusals by the contact person or the targeted respondent.
- (7) Interviews that were interrupted because the respondent ran out of time or did not want to finalise the interview.
- (8) Addresses that could be contacted but where no final result (interview or definitive refusal) was obtained during the fieldwork period though a recall was considered possible by the interviewer. This category was not used by the CATI studios of the fieldwork partner FFIND.
- (9) Technical errors, e.g. technically interrupted calls.

## 4.2 Worker survey

### 4.2.1 Fieldwork period

The main worker survey was launched on 13 January 2022 in all countries. The last interview was conducted on 16 February 2022. The fieldwork period lasted approximately 5 weeks. The first country to finalise fieldwork was the US, where the last interviews were made on 2 February (3 weeks of field time). Almost all countries had finalised fieldwork within 4 weeks. Only in Ireland 5 weeks were required to complete the survey with the agreed sample size.

**Table 10: Fieldwork period by country – main worker survey**

country	Fieldwork start	Fieldwork end
Austria – AT	13 January 2022	7 February 2022
Canada – CA	13 January 2022	10 February 2022
Germany – DE	13 January 2022	9 February 2022
France – FR	13 January 2022	9 February 2022
Ireland – IE	13 January 2022	16 February 2022
United Kingdom – UK	13 January 2022	10 February 2022
United States of America – US	13 January 2022	2 February 2022

### 4.2.2 Number and structure of completed interviews

In all countries, targets were achieved, and exceeded in Austria. Overall, 5,726 interviews were completed, of which 51% in the manufacturing sector and 49% in the finance and insurance sector.

**Table 11: Comparison of target and actual sample at field end**

COUNTRIES	Manufacturing		Finance and Insurance		Total	
	TARGET	ACTUAL	TARGET	ACTUAL	TARGET	ACTUAL
AT	up to 400	457	up to 400	379	up to 800	836
CA	440	439	440	440	880	879
DE	440	440	440	440	880	880
FR	440	440	440	440	880	880
IE	ca. 245	253	ca. 245	237	490	490
UK	440	441	440	440	880	881
US	440	440	440	440	880	880
Total	2,845	2,910	2,845	2,816	5,690	5,726

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To match the structure of the universe within each sector in each country in terms of gender, age, education and size of the employing company, the sample was weighted after fieldwork (see Chapter 6).

Given the low incidence rate of the target groups, it was not possible to apply more quotas on gender, age and education within each sector and country. However, Kantar were able to apply a sampling strategy which aimed at reaching the universe structure as close as possible. This strategy required a longer fieldwork time than usual:

- During the first week, only the 'difficult' target groups were invited in all countries, i.e. low education, younger workers, and males.
- Depending on the progress in the country, these restrictions were opened step-by-step during the second week.
- Countries with slow progress and low incidence rates (or a lower proportion of the target group within the population) were prioritising the survey over other surveys.
- In Ireland, Kantar had to launch the survey in several local panels to finally reach the target sample after 5 weeks of fieldwork.

Overall, 55% of all panellists who clicked on the survey link were screened out based on one of the following questions:

- Q003 – employeageyear: n = 42 were not 16 years or older
- Q006 – employed: n = 4,516 were currently not employed or self-employed,
- Q007 sector: n = 5,415 were neither employed in the manufacturing sector nor in the finance and insurance sector

The disposition code "closed over quota" contains all respondents who qualified in the screening questions but were not admitted to the survey as the target quota for the sector had already been met. This was applied mostly to respondents working in the manufacturing sector as this quota was met first. Once the quota for manufacturing was met, only interviews with respondents from the Finance and Insurance sector were admitted while those from the manufacturing sector were screened out.

About 8% of all panellists who clicked on the survey link did not finish the survey, which is typical for surveys of this length and target group.

Table 12: Overview of participation – main survey

Disposition Code	AT	CA	DE	FR	IE	UK	US	Total
	n %	n %	n %	n %	n %	n %	n %	n %
Participation (click on survey link)	3,927 100%	2,815 100%	1,610 100%	2,727 100%	2,418 100%	3,057 100%	1,633 100%	18,187 100%
- Screenouts	-2,825 72%	-1,524 54%	-580 36%	-1,331 49%	-1,813 75%	-1,411 46%	-489 30%	-9,973 55%
- Closed over quota	-31 1%	-202 7%	-20 1%	-209 8%	-5 0%	-500 16%	-71 4%	-1,038 6%
- Dropouts or incompletes	-235 6%	-210 7%	-130 8%	-307 11%	-110 5%	-265 9%	-193 12%	-1,450 8%
Completes (uncleaned raw datasets)	836 21%	879 31%	880 55%	880 32%	490 20%	881 29%	880 54%	5,726 32%
- Data quality cleaning	-89 2%	-42 2%	-34 2%	-75 3%	-48 2%	-53 2%	-51 3%	-392 2%
Completes (cleaned data)	747 19%	837 30%	846 53%	805 30%	442 18%	828 27%	829 51%	5,334 29%

The final net sample for the analysis has been cleaned, whereby respondents not meeting the quality requirements were excluded so that the final sample size for analysis comprises 5,334 interviews across all countries. The data cleaning procedure is described in Chapter 5.

## 5 Data editing and cleaning

### 5.1 Employer survey

Two kinds of data checks were undertaken for each country's data set. Firstly, a check syntax had been prepared and was run in order to verify that all filters worked as intended and all data were stored correctly. With this check syntax, all values not foreseen in the questionnaire are flagged as mistakes or missings etc.<sup>3</sup> In addition, the data were cross-tabulated and checked on plausibility, comparing the (unweighted) measures of key variables (such as the share of enterprises applying AI) between countries, sectors and sizes and flagging any unexpected large differences.

These tests were done in three stages:

- After having completed about 50 interviews in a country, a first initial data check was done.
- Another data check followed after completion of about 50% of the targeted interviews.
- A final data check was carried out after finalisation of fieldwork in a country.

The datasets of all countries passed these checks without any issues - all variables were available and correctly stored etc.

In the interim dataset, however, it was noted that the proportion of companies that reported having adopted AI was considerably lower for the United Kingdom than for other countries, particularly in the Finance and Insurance sector. This result was unexpected, particularly in view of the importance and specific characteristics of the banking sector in London, by far the most important stock exchange location in Europe. Following this observation, a number of checks were undertaken in order to be able to exclude any flaws in the sampling, interviewing and data-processing steps for the survey:

- An additional check of the script as appearing on the monitors of interviewers proved that the correct (sector-specific) examples for AI were shown, i.e. examples from the Finance and Insurance sector for all addresses attributed to this sector.
- An interim debriefing of the interviewers in charge of the survey in the UK and Ireland did not reveal any noteworthy differences between the reaction of respondents in the UK and Ireland on the questions related to the self-assessment of AI users or non-users. Interviewers reported that respondents were sometimes unsure whether AI is applied in their companies. But this was the case in both countries and interviewers did not identify any obvious quantitative differences between the UK and Ireland in this regard.
- Systematic additional checks of the syntax for "reading in" the data file and all further data processing steps did not reveal any mistake (such as e.g. accidentally switched codes) introduced in this step of work.
- Another check of the wording in the questions related to the AI definition and application in the UK version for any (accidental) deviation from the intended master text did not reveal any issue either. As the questionnaire was set up in English, inaccuracies in translations can also be excluded.
- A thorough check of the sample composition, including checks on finer sector differentiations than the ones used for the sampling and steering of fieldwork, was carried out. In this step, a

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<sup>3</sup> An example would be values out of range, if e.g. only values from 1 to 10 are allowed according to the questionnaire, any other value in the data would be flagged as a mistake. Another example are filters: If for example a question is meant to be asked to all respondents but cases are missing in this question in the data-set, the interviews with missing data there are flagged as a mistake.

reason potentially explaining some of the differences was identified: The finer sector structures of the gross sample for the UK, as resulting from the conversion of US SIC to NACE codes, deviate from that of the gross samples in the other countries, including a much higher share of companies attributable to financial intermediation NACE 6430 (trusts, funds, etc.), classified in the Dun & Bradstreet database as US SIC 6159 (Miscellaneous business credit institutions)<sup>4</sup>. This is not a flaw of the Dun & Bradstreet database, but this subsector is actually much larger in the United Kingdom than in the other countries included in the survey. Companies in this subsector tend to be small and, according to the survey results, tend to have a lower AI incidence than those of UK companies attributed to any of the other subsectors of Finance and Insurance. However, this can only explain a portion of the lower AI incidence measured for the United Kingdom.

## 5.2 Worker survey

For the worker survey, the procedure of data checks and cleanings was more extensive than for the CATI employer survey. This is mainly attributable to the situation in which CATI studies the interview situation is well controlled, as interviewers are thoroughly trained and constantly supervised during the interviews, while for online situations done by individuals the interview situation is less controlled. In a totally voluntary online interview with no material incentives, a thorough completion can be assumed as the motivation to take part in the survey is basically intrinsic. For interviews done with panellists receiving some form of material remuneration for their participation, the risk that some respondents do not answer the survey properly is higher. In order to filter out interviews that were not answered properly, e.g. because questions and answer items were not really read but just skimmed, it is good practice to apply a number of technical checks to the data derived from online panel surveys. The following editing and cleaning rules were applied to the sample of the worker study:

### Editing of the variable 'interview duration':

When calculating the arithmetic mean or median for this variable, distortions can arise due to implausible time measures, which probably result from interruptions. We replaced the time measurements over 80 minutes by the label "not specified". This affects the 62 records with the longest duration and creates a stricter threshold for the subsequent speeder analysis by reducing the maximum interview length from 508 minutes to 79 minutes.

The records with the longest interviews will not be excluded from the net sample, as these long durations are only indicating that the respondent interrupted the survey and completed it sometime later. The editing of this variable only has an impact on the calculation of the time indicators in the subsequent

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<sup>4</sup> Dun & Bradstreet confirmed that a much higher share of companies in the UK than in the other countries is classified as US SIC 6159, applying the same rules of collecting and classifying addresses to all countries. Based on the material available to us, the sector composition according to the finer NACE structures cannot be asserted for sure: On the one hand, figures of the finer sector composition of the Finance and Insurance sector were available only for the United Kingdom, not for the other countries. On the other hand, the US SIC codes the Dun & Bradstreet address database is based on can on the finer sector levels (below NACE 1-digit) not be made fully compatible with NACE or UK SIC codes. For the survey, conversions had to be made, applying the conversion rules recommended for this by Eurostat. When analysing the UK sample of the survey in more detail, including internet research on a random selection of addresses and a comparison to the finer NACE sector structures according to the official statistics (IDBR UK business workbook 2021), it was however found that the conversion within NACE K did quite often not lead to the most appropriate finer NACE code. But this equally holds for all six countries where the Dun & Bradstreet database was used for this survey and the finer US SIC structure as well as the resulting converted finer NACE structure differ substantially between the UK and the other countries included in the survey.

speeder check, which thus comprises the remaining 5,664 records with presumably valid time measurements.

The original duration times are still available in the variable 'duration\_raw'.

## Time analysis and speeder check:

The median length of the survey is 7.6 minutes across all countries and target groups. It reduces slightly to 7.5 minutes due to the editing of the time measures. The editing measure explained above reduces the average time from 11.4 to 9.6 minutes.

The differences in interview length between countries are only small and are presumably driven by language differences (some languages take longer to read out than others) and the different shares of adopters and non-adopters. Respondents who work in companies that have adopted AI were presented more questions (median 95 vs. 70 questions) and required more time than non-adopters (median 8.1 vs 6.8 minutes). Within the group of employees working in companies that use AI, the non-users of AI took more time to answer the questionnaire than those employees who indicated that AI is used at their workstation. However, the difference is not as big as between adopters and non-adopters. Therefore, Kantar implemented different time limits for identifying speeders for adopters and for non-adopters.

The standard Kantar rule of identifying speeders in online access panels is to remove anyone completing the questionnaire faster than 40% of the median duration. For the sample of adopters the speeder limit is 3.27 minutes, which means that 223 interviews are affected and thus excluded from the cleaned sample.

For the sample of non-adopters the speeder limit is 2.74 minutes, meaning that 99 interviews were affected and thus excluded.

In total, the speeder analysis excluded 322 interviews from the final net sample.

## Analysis of item non-response:

For each respondent, Kantar calculated the share of non-response in the new variable "sharenadk". This indicator of non-response is based on the individual number of questions asked.

The following overview shows what this non-response share looks like for those with the highest share.

**Table 13: Distribution of item non-response**

share of non-response based on questions asked	n	%
>40%	136	2%
>30 – 40%	115	2%
>20 – 30%	247	4%
>10 – 20%	851	15%
>0 – 10%	2,811	49%
0%	1,566	27%
Total	5,726	100%



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There is no generic rule for excluding observations with item non-response (“Don’t know” or “No answer” to a question. It is possible that respondents who often answered with “Don’t know” wanted to finish the questionnaire as quickly as possible. But it is also possible that these respondents were reading carefully, evaluating the answer options and decided that “Don’t know” best reflected their opinion and their knowledge. The employer survey showed that even among company representatives, there is a considerable uncertainty on which technologies to consider as AI. On the worker side, similar doubts may have arisen.

Kantar marked the observations with a non-response share of >40% with ‘maldk’ and if there are additional signs of lack of attention or implausibility, then the observation was removed from the net sample.

The non-response analysis identified 136 observations with maldk.

## Straightliner analysis:

The straight-lining analysis checks whether someone is indiscriminately clicking through matrix questions with the same answer code each time. Matrix questions are questions where answer items are presented in the form of rows and columns to collect feedback on a number of different aspects. The answer scale mapped in the columns is often – though not necessarily - a 5-point Likert scale.

If in an online survey a respondent always ticks the same answer (e.g. “strongly agree” for all items), this may be a sign of not really considering the answer before ticking it as ticking always the same answer in a row saves time when answering the survey. However, it should not be ruled out that even a thoughtful and correct answer can produce the same straightlining pattern. Some respondents may for example always choose a common middle answer category such as “neither nor” because they have difficulties to decide for any of the other options. Such aspects should be considered in the analysis of straightlining and the subsequent cleaning of the data-set.

All matrix questions included in the survey were checked for straightlining. For this purpose, the matrix questions were grouped into 5 content-related sets of variables. The first of these sets, for example, is composed of the following five questions:

- Q015 – aiusesfinance (9 items)
- Q016 – aiusesmanufacturing (6 items)
- Q017 – aiappsmanufacturing (6 items)
- Q022 – aiheardfinance2 (9 items)
- Q024 – aiheardmanufacturing2 (10 items)

If a respondent clicked the same answers to all items of these questions actually asked in the individual interview<sup>5</sup>, the interview from this respondent was flagged as straightliner. The answer scales in these questions were just simple yes-no- don’t know/no answer scales. It is not impossible, although unusual, for a company to use AI in all areas. Therefore, these observations were additionally checked for whether the answer behaviour makes sense. The larger the company, for example, the more plausible the use of AI in all listed areas was considered.

In addition, the following matrix questions on attitudes were checked for straightlining behaviour:

IF same answer code from Q030 – impactdecisionsuser to Q037 – attitudesuser

IF same answer code from Q042 – impactdecisionsnonuser to Q049 – attitudesnonuser

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<sup>5</sup> An AI user from the Manufacturing sector got 6 to 12 items within this set of variables, an AI-non-user from Manufacturing had to answer 10 items. An AI user from the Finance and Insurance sector had to answer 9 items, non-users from this sector were also asked 9 items.

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IF same answer code from Q050 – impactperformancesector to Q055 attitudessector

IF in Q074 – skillsattitudesnonuser always same code 1 or 2 or 4 or 5

In most of these questions, 5-point Likert scales were used.

All in all, the straightlining analysis identified 599 observations and marked them by malstraight.

## Plausibility checks:

Another way of identifying interviews of potentially bad quality are plausibility checks. In these, combinations of answers to selected questions are analysed for their plausibility. Answer combinations that were allowed in the programmed questionnaire, but are highly implausible to occur in reality, are flagged in this step. The following combinations of answers seem to be less plausible:

IF never heard of AI in Q010 – familiarity, code 2, but respondent also says he/she works with AI in Q018 – how, code 1 => It is possible that the first answer was a mistake, but all subsequent answers are plausible.

This plausibility analysis identified 29 observations and marked them by malcontent.

If the year of starting to work with the current employer in Q084 – “employeetenure” - is earlier than the year of birth in Q003 plus a minimum age of 14 years, this indicates either a misunderstanding or inattention to the survey question.

This plausibility analysis identified 255 observations and they were marked by malcontent2.

## Summary of flaws identified in the data checks:

The data file includes a variable ‘maltotal’, which indicates how many of these three types of quality issues (non-response, straightlining and implausibility) occurred within an interview. This results in the following distribution:

**Table 14: Overview of quality issues – main survey workers**

# of quality issues	n	%
3	8	0%
2	174	3%
1	969	17%
None	4,575	80%
Total	5,726	100%

There were 8 interviews where all three types of quality issues occurred. In 174 interviews, two quality issues occurred and in 969 interviews, at least one of them was identified.

We removed all respondents with two or more quality issues from the sample. This affected a total of 182 interviews.

## **Summary of the results of data cleaning**

**Table 15: Overview quality check results – main survey workers**

Disposition code	n	%
Raw data sample	5,726	100%
Speeder	-322	6%
Combination of non-response and other checks	-182	3%
Cleaned net sample	5,334	93%

As there are 112 observations which are excluded because of both speeding and other quality checks, the total reduction of the raw sample to the cleaned sample is only 392 (7%).

Hence, the remaining clean net sample for the analysis has n = 5,334.

**Table 16: Overview of clean net sample size by country – main survey workers**

Disposition Code	ALL	AT	CA	DE	FR	IE	UK	US
Raw data sample	5,726	836	879	880	880	490	881	880
Speeder (S)	322	84	30	28	68	40	40	32
Combination of non-response and other checks (C)	182	31	26	13	32	23	26	31
<i>Combination of (S) and (C)</i>	<i>112</i>	<i>26</i>	<i>14</i>	<i>7</i>	<i>25</i>	<i>15</i>	<i>13</i>	<i>12</i>
Cleaned net sample - absolute	5,334	747	837	846	805	442	828	829
Cleaned net sample - in %	93	89	95	96	91	90	94	94

## 6 Weighting

### 6.1 Weighting of the employer survey

#### 6.1.1 Available weighting factors

The data set includes company-proportional as well as employee-proportional weighting factors. In view of the disproportionalities of the sample, for any bivariate content-related analysis done with the data set, the application of weighting is essential. The weights made available with the data set redress the various disproportionalities introduced into the sampling of the survey:

There are four weighting factors provided in the data set:

- **Weightemp1: Employee-proportional weighting factor**  
“Weightemp1” weights the data according to the structure of the universe of employees working in companies with 20 or more employees in sectors NACE C and K in a given country. This factor should be used for comparisons between the data sets from the employer and the worker survey (e.g. for comparing the share of employees working in companies where AI is used between the employer and the worker surveys).
- **Weightemp2: Company-proportional weighting factor**  
The factor “weightemp2” is a factor that weights the data according to the structure of the universe of companies of the Manufacturing and Finance sectors employing 20 or more workers in a given country. It is scaled to the national net sample size, i.e. it sums up to the total number of interviews made in the country.
- **Weightemp1prop: As weightemp1, but weightemp1prop additionally corrects for the disproportionalities between the countries - interviews from countries with a large universe get accordingly higher weights than interviews from countries with a small universe. These country disproportionalities are redressed per sector.**
- **Weightemp2prop: As weightemp2, but additionally corrects for the disproportionalities between the countries - interviews from countries with a large universe get accordingly higher weights than interviews from countries with a small universe. Country disproportionalities are redressed per sector.**

For most analyses, the application of weightemp2 or weightemp1 is appropriate. Weightemp1prop or weightemp2prop are recommended only for very specific analyses as the disproportionalities between the smallest (Ireland) and the largest country (United States) included in the survey are extremely large so that in any analyses of this type (e.g. “In the 7 countries included in the survey, AI is used by xy% of the companies in sector C/K.”), the results obtained for Ireland hardly play a role<sup>6</sup>. Moreover, the 7 countries included in the survey are a very selective selection among all OECD countries.

For the calculation of the employer survey weights, the variables country, industry3 (sector of activity) and size3 (size category according to the respondent) were used.

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<sup>6</sup> Within the universe of companies in the Manufacturing sector, for example, the proportional weight for Ireland makes up for just 1% of the universe of the 7 countries.

## 6.1.2 Universe structures and weighted structures

The following two tables compare the universe structures and the weighted structures of the net sample.

The first column of tables titled as “Structure” shows the distribution of the universe within each country, based on official statistics (see bottom line beneath each country for the source of the universe figures). The column in the middle (weightemp1) is a count of the net sample, weighted with the employee proportional factor weightemp1 redressing the net sample to the structure of the universe within the respective country. Weightemp1 is adjusted to the national net sample size. The comparison of values in “structure” and “weightemp1” shows only minimal deviations.

“Weightemp1prop” shows identical percentage distributions as “Weightemp1”, but additionally corrects for the disproportionalities between the countries. This is reflected in the net weighted net sample sizes which in this perspective vary in accordance with the difference in the size of the national universe. Thus, the overall net sample of Ireland, the smallest within this set of countries, is “weighted down” to just 19 interviews in total while the net sample of the United States is “weighted up” to a net sample size of 1.070 interviews in this perspective.

**Table 17: Employee proportional weighting of the employer survey data – universe structure and weighted structures**

Q001 code 1		Structure	
Austria	<b>Universe (workers)*:</b>	575.011	100.302
	<b>sizebands</b>		
	code 1 20 to 49 workers	11,6%	7,3%
	code 2 50 to 249 workers	28,3%	20,5%
	code 3 250 workers or more	60,2%	72,3%
	<b>total</b>	100%	100%

\*Source: Statistik Austria: Leistungs- und Strukturstatistik 2019

weightemp1	
<b>manufacturing</b>	<b>finance</b>
N = 200	N = 100
11,5%	7,3%
28,3%	20,5%
60,2%	72,3%
100%	100%

weightemp1prop	
<b>manufacturing</b>	<b>finance</b>
N = 34	N = 7
11,5%	7,3%
28,3%	20,5%
60,2%	72,3%
100%	100%

Q001 code 2		Structure	
Canada	<b>Universe (workers)*:</b>	1.297.366	649.895
	<b>sizebands</b>		
	code 1 20 to 49 workers	13,6%	5,3%
	code 2 50 to 249 workers	33,1%	13,5%
	code 3 250 workers or more	53,4%	81,2%
	<b>total</b>	100%	100%

\*Source: OECD statistics 2016

weightemp1	
<b>manufacturing</b>	<b>finance</b>
N = 200	N = 100
13,6%	5,3%
33,1%	13,5%
53,4%	81,2%
100%	100%

weightemp1prop	
<b>manufacturing</b>	<b>finance</b>
N = 76	N = 47
13,6%	5,3%
33,1%	13,5%
53,4%	81,2%
100%	100%

Q001 code 7		Structure	
France	<b>Universe (workers)*:</b>	2.171.425	644.177
	<b>sizebands</b>		
	code 1 20 to 49 workers	14,5%	5,3%
	code 2 50 to 249 workers	28,4%	10,3%
	code 3 250 workers or more	57,1%	84,3%
	<b>total</b>	100%	100%

\*Source: Insee: DSND-DADS 2019

weightemp1	
<b>manufacturing</b>	<b>finance</b>
N = 200	N = 100
14,5%	5,4%
28,5%	10,3%
57,1%	84,3%
100%	100%

weightemp1prop	
<b>manufacturing</b>	<b>finance</b>
N = 127	N = 46
14,5%	5,4%
28,5%	10,3%
57,1%	84,3%
100%	100%

Q001 code 3		Structure	
Germany	<b>Universe (workers)*:</b>	6.610.522	834.571
	<b>sizebands</b>		
	code 1 20 to 49 workers	10,1%	3,5%
	code 2 50 to 249 workers	27,0%	15,9%
	code 3 250 workers or more	62,9%	80,6%
	<b>total</b>	100%	100%

\*Source: DESTATIS: Statistisches Unternehmensregister, 2019

weightemp1	
<b>manufacturing</b>	<b>finance</b>
N = 200	N = 100
10,1%	3,5%
27,0%	15,9%
62,9%	80,6%
100%	100%

weightemp1prop	
<b>manufacturing</b>	<b>finance</b>
N = 386	N = 60
10,1%	3,5%
27,0%	15,9%
62,9%	80,6%
100%	100%

Q001 code 4		Structure	
Ireland	<b>Universe (workers)*:</b>	201.313	91.248
	<b>sizebands</b>		
	code 1 20 to 49 workers	11,3%	7,2%
	code 2 50 to 249 workers	30,9%	16,3%
	code 3 250 workers or more	57,8%	76,5%
	<b>total</b>	100%	100%

\*Source: CSO Ireland: Business Demography 2019

weightemp1	
<b>manufacturing</b>	<b>finance</b>
N = 200	N = 53
11,3%	7,2%
30,9%	16,3%
57,8%	76,5%
100%	100%

weightemp1prop	
<b>manufacturing</b>	<b>finance</b>
N = 12	N = 7
11,3%	7,2%
30,9%	16,3%
57,8%	76,5%
100%	100%

Q001 code 5		Structure	
UK	<b>Universe (workers)*:</b>	2.000.209	902.471
	<b>sizebands</b>		
	code 1 20 to 49 workers	14,1%	4,3%
	code 2 50 to 249 workers	31,0%	11,5%
	code 3 250 workers or more	55,0%	84,2%
	<b>total</b>	100%	100%

\*Source: Office of National Statistics ONS: IDBR 2021

weightemp1	
<b>manufacturing</b>	<b>finance</b>
N = 200	N = 100
14,1%	4,3%
31,0%	11,5%
55,0%	84,2%
100%	100%

weightemp1prop	
<b>manufacturing</b>	<b>finance</b>
N = 117	N = 65
14,1%	4,3%
31,0%	11,5%
55,0%	84,2%
100%	100%

Q001 code 6		Structure	
US	<b>Universe (workers)*:</b>	11.125.455	5.863.661
	<b>sizebands</b>		
	code 1 20 to 49 workers	8,9%	4,2%
	code 2 50 to 249 workers	19,6%	10,8%
	code 3 250 workers or more	71,5%	84,9%
	<b>total</b>	100%	100%

\*Source: US SUBS 2019

weightemp1	
<b>manufacturing</b>	<b>finance</b>
N = 200	N = 100
8,9%	4,2%
19,6%	10,9%
71,5%	84,9%
100%	100%

weightemp1prop	
<b>manufacturing</b>	<b>finance</b>
N = 649	N = 421
8,9%	4,2%
19,6%	10,9%
71,5%	84,9%
100%	100%

**Table 18: Company proportional weighting of the employer survey data – universe structure and weighted structures**

Q001 code 1		Structure	
Austria	<b>Universe (employees)*:</b>	4.124	508
	<b>sizebands</b>		
	code 1 20 to 49 workers	52,0%	45,3%
	code 2 50 to 249 workers	35,8%	40,6%
code 3 250 workers or more	12,1%	14,2%	
	<b>total</b>	100%	100%

Source: Statistik Austria: Leistungs- und Strukturstatistik 2019

weightmp2	
<b>manufacturing</b>	<b>finance</b>
N = 200	N = 100
52,0%	45,3%
35,8%	40,6%
12,2%	14,2%
100%	100%

weightmp2prop	
<b>manufacturing</b>	<b>finance</b>
N = 38	N = 12
52,0%	45,3%
35,8%	40,6%
12,2%	14,2%
100%	100%

Q001 code 2		Structure	
Canada	<b>Universe (companies)*:</b>	10.320	2.060
	<b>sizebands</b>		
	code 1 20 to 49 workers	59,6%	56,8%
	code 2 50 to 249 workers	36,0%	34,5%
code 3 250 workers or more	4,4%	8,7%	
	<b>total</b>	100%	100%

Source: OECD Statistics 2018

weightmp2	
<b>manufacturing</b>	<b>finance</b>
N = 200	N = 100
59,6%	56,8%
36,0%	34,5%
4,4%	8,7%
100%	100%

weightmp2prop	
<b>manufacturing</b>	<b>finance</b>
N = 95	N = 48
59,6%	56,8%
36,0%	34,5%
4,4%	8,7%
100%	100%

Q001 code 7		Structure	
France	<b>Universe (companies)*:</b>	13.917	2.009
	<b>sizebands</b>		
	code 1 20 to 49 workers	56,7%	49,4%
	code 2 50 to 249 workers	32,9%	30,5%
code 3 250 workers or more	10,4%	20,1%	
	<b>total</b>	100%	100%

Source: Eurostat: 2018/19 (manufacturing) / SIRENE: SDBS 2019 (Finance)

weightmp2	
<b>manufacturing</b>	<b>finance</b>
N = 200	N = 100
56,7%	49,4%
32,9%	30,5%
10,4%	20,1%
100%	100%

weightmp2prop	
<b>manufacturing</b>	<b>finance</b>
N = 129	N = 47
56,7%	49,4%
32,9%	30,5%
10,4%	20,1%
100%	100%

Q001 code 3		Structure	
Germany	<b>Universe (companies)*:</b>	42.423	2.787
	<b>sizebands</b>		
	code 1 20 to 49 workers	50,2%	33,1%
	code 2 50 to 249 workers	39,2%	39,2%
code 3 250 workers or more	10,6%	27,7%	
	<b>total</b>	100%	100%

Source: DESTATIS: Statistisches Unternehmensregister, 2019

weightmp2	
<b>manufacturing</b>	<b>finance</b>
N = 200	N = 100
50,3%	33,1%
39,2%	39,2%
10,6%	27,7%
100%	100%

weightmp2prop	
<b>manufacturing</b>	<b>finance</b>
N = 392	N = 65
50,3%	33,1%
39,2%	39,2%
10,6%	27,7%
100%	100%

Q001 code 4		Structure	
Ireland	<b>Universe (companies)*:</b>	1.484	429
	<b>sizebands</b>		
	code 1 20 to 49 workers	49,5%	51,3%
	code 2 50 to 249 workers	38,9%	33,3%
code 3 250 workers or more	11,6%	15,4%	
	<b>total</b>	100%	100%

Source: CSO Ireland: Business Demography 2019

weightmp2	
<b>manufacturing</b>	<b>finance</b>
N = 200	N = 100
49,5%	51,3%
39,0%	33,3%
11,6%	15,4%
100%	100%

weightmp2prop	
<b>manufacturing</b>	<b>finance</b>
N = 14	N = 10
49,5%	51,3%
39,0%	33,3%
11,6%	15,4%
100%	100%

Q001 code 5		Structure	
UK	<b>Universe (companies)*:</b>	16.460	2.620
	<b>sizebands</b>		
	code 1 20 to 49 workers	55,1%	46,9%
	code 2 50 to 249 workers	37,4%	38,0%
code 3 250 workers or more	7,5%	15,1%	
	<b>total</b>	100%	100%

Source: Office of National Statistics ONS: IDBR 2021

weightmp2	
<b>manufacturing</b>	<b>finance</b>
N = 200	N = 100
55,1%	47,0%
37,3%	38,0%
7,5%	15,1%
100%	100%

weightmp2prop	
<b>manufacturing</b>	<b>finance</b>
N = 152	N = 61
55,1%	47,0%
37,3%	38,0%
7,5%	15,1%
100%	100%

Q001 code 6		Structure	
US	<b>Universe (companies)*:</b>	62.596	17.507
	<b>sizebands</b>		
	code 1 20 to 49 workers	52,0%	47,4%
	code 2 50 to 249 workers	36,3%	36,5%
code 3 250 workers or more	11,7%	16,1%	
	<b>total</b>	100%	100%

Source: US SUBS 2019

weightmp2	
<b>manufacturing</b>	<b>finance</b>
N = 200	N = 100
52,0%	47,5%
36,3%	36,5%
11,7%	16,1%
100%	100%

weightmp2prop	
<b>manufacturing</b>	<b>finance</b>
N = 579	N = 409
52,0%	47,5%
36,3%	36,5%
11,7%	16,1%
100%	100%



## 6.1.3 Error tolerance

The table below (Table 19) shows the error tolerance for the employer survey, for the subgroup of a national net sample with n=300 interviews. If considering the two sectors of activity separately, the confidence interval gets larger as the sample size is smaller.

**Table 19: Error tolerance with design factor, employer survey<sup>7</sup>**

Sample size		Proportion values in the sample																		
N =		1%	2%	3%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	70%	80%	90%	95%
50	---	---	---	---	---	---	---	---	---	---	19.9%	20.2%	20.3%	20.2%	19.9%	18.6%	16.2%	12.2%	8.8%	
100	---	---	---	---	---	---	---	12.2%	12.9%	13.4%	13.8%	14.0%	14.1%	14.0%	13.8%	12.9%	11.3%	8.5%	6.1%	
200	---	---	---	---	---	7.1%	7.9%	8.6%	9.1%	9.4%	9.7%	9.8%	9.9%	9.8%	9.7%	9.1%	7.9%	5.9%	4.3%	
300	---	---	---	---	4.8%	5.7%	6.4%	7.0%	7.4%	7.7%	7.9%	8.0%	8.0%	8.0%	7.9%	7.4%	6.4%	4.8%	3.5%	
400	---	---	---	---	4.2%	5.0%	5.6%	6.0%	6.4%	6.6%	6.8%	6.9%	7.0%	6.9%	6.8%	6.4%	5.6%	4.2%	3.0%	
500	---	---	---	---	3.7%	4.4%	5.0%	5.4%	5.7%	5.9%	6.1%	6.2%	6.2%	6.2%	6.1%	5.7%	5.0%	3.7%	2.7%	
600	---	---	---	2.5%	3.4%	4.0%	4.5%	4.9%	5.2%	5.4%	5.6%	5.6%	5.7%	5.6%	5.6%	5.2%	4.5%	3.4%	2.5%	
700	---	---	---	2.3%	3.1%	3.7%	4.2%	4.5%	4.8%	5.0%	5.1%	5.2%	5.2%	5.2%	5.1%	4.8%	4.2%	3.1%	2.3%	
800	---	---	---	2.1%	2.9%	3.5%	3.9%	4.2%	4.5%	4.7%	4.8%	4.9%	4.9%	4.9%	4.8%	4.5%	3.9%	2.9%	2.1%	
900	---	---	---	2.0%	2.8%	3.3%	3.7%	4.0%	4.2%	4.4%	4.5%	4.6%	4.6%	4.6%	4.5%	4.2%	3.7%	2.8%	2.0%	
1.000	---	---	1.5%	1.9%	2.6%	3.1%	3.5%	3.8%	4.0%	4.2%	4.3%	4.4%	4.4%	4.4%	4.3%	4.0%	3.5%	2.6%	1.9%	
1.100	---	---	1.4%	1.8%	2.5%	3.0%	3.3%	3.6%	3.8%	4.0%	4.1%	4.2%	4.2%	4.2%	4.1%	3.8%	3.3%	2.5%	1.8%	
1.200	---	---	1.4%	1.7%	2.4%	2.9%	3.2%	3.5%	3.7%	3.8%	3.9%	4.0%	4.0%	4.0%	3.9%	3.7%	3.2%	2.4%	1.7%	
1.300	---	---	1.3%	1.7%	2.3%	2.7%	3.1%	3.3%	3.5%	3.7%	3.8%	3.8%	3.8%	3.8%	3.8%	3.5%	3.1%	2.3%	1.7%	
1.400	---	---	1.3%	1.6%	2.2%	2.6%	3.0%	3.2%	3.4%	3.5%	3.6%	3.7%	3.7%	3.7%	3.6%	3.4%	3.0%	2.2%	1.6%	
1.500	---	1.0%	1.2%	1.6%	2.1%	2.5%	2.9%	3.1%	3.3%	3.4%	3.5%	3.5%	3.6%	3.5%	3.3%	3.0%	2.9%	2.1%	1.6%	
1.600	---	1.0%	1.2%	1.5%	2.1%	2.5%	2.8%	3.0%	3.2%	3.3%	3.4%	3.4%	3.5%	3.4%	3.4%	3.2%	2.8%	2.1%	1.5%	
1.700	---	0.9%	1.1%	1.5%	2.0%	2.4%	2.7%	2.9%	3.1%	3.2%	3.3%	3.3%	3.3%	3.3%	3.3%	3.1%	2.7%	2.0%	1.5%	
1.800	---	0.9%	1.1%	1.4%	2.0%	2.3%	2.6%	2.8%	3.0%	3.1%	3.2%	3.2%	3.3%	3.2%	3.2%	3.0%	2.6%	2.0%	1.4%	
1.900	---	0.9%	1.1%	1.4%	1.9%	2.3%	2.5%	2.7%	2.9%	3.0%	3.1%	3.1%	3.2%	3.1%	3.1%	2.9%	2.5%	1.9%	1.4%	
2.000	---	0.9%	1.1%	1.3%	1.9%	2.2%	2.5%	2.7%	2.8%	2.9%	3.0%	3.1%	3.1%	3.1%	3.0%	2.8%	2.5%	1.9%	1.3%	
3.000	0.5%	0.7%	0.9%	1.1%	1.5%	1.8%	2.0%	2.2%	2.3%	2.4%	2.5%	2.5%	2.5%	2.5%	2.5%	2.3%	2.0%	1.5%	1.1%	
4.000	0.4%	0.6%	0.7%	0.9%	1.3%	1.5%	1.7%	1.9%	2.0%	2.1%	2.1%	2.2%	2.2%	2.2%	2.1%	2.0%	1.7%	1.3%	0.9%	
5.000	0.4%	0.5%	0.7%	0.8%	1.2%	1.4%	1.5%	1.7%	1.8%	1.8%	1.9%	1.9%	1.9%	1.9%	1.9%	1.8%	1.5%	1.2%	0.8%	
6.000	0.4%	0.5%	0.6%	0.8%	1.1%	1.3%	1.4%	1.5%	1.6%	1.7%	1.7%	1.8%	1.8%	1.8%	1.7%	1.6%	1.4%	1.1%	0.8%	

*Red fields can be changed, i.e. adapted to the respective question*

**Example:**  
 In a sample of 300 companies from the universe of all companies in the manufacturing and finance and insurance sector in the selected countries, a proportion of 50% of companies said that they adopted AI. Then the true value of the companies with the probability chosen above for this proportion is ± 8%.  
 In fields with '---' the confidence interval is more than half the proportion and is therefore not shown.  
 The table is based on the formula for the confidence interval for samples without reserve with design factor:  $s(p) = t \sqrt{p(1-p)/(n-1)} \sqrt{1-n/N} \sqrt{2}$

For the calculation of the employer survey weights, the variables country, industry3 (sector of activity) and size3 (size category according to the respondent) were used.

<sup>7</sup> The purpose of this table is to give a quick overview of the error tolerance based on the formula using a standardised design factor that can be applied to any survey without strict random sampling approach.

## 6.2 Weighting of the worker survey

### 6.2.1 Available weighting factors

In view of the unequal response by criteria such as gender, age and company size, the weighting should be applied to most if not all analyses done with the worker survey. The weights included with the data set redress the unequal non-response in terms of the gender, age and education of the participating workers as compared to the universe and also of the size of the employer in terms of the number of employees working in the company.

There are four weighting factors provided in the data set:

- Weightwor1 weights the data according to the structure of the universe of all employees in sectors NACE C and K in a given country. It takes into account the factors age, gender, education and size of the employing company, redressing any unequal distributions in the net sample with regard to these criteria. The factor is scaled to the national net sample size. It should be used for showing overall results for the worker survey.
- Weighwor2 does the same as weightwor1, with the only difference that only employees working in companies with 20 or more employees are taken into account whereas those working in companies with fewer than 20 employees are excluded. This factor is meant for analyses directly comparing results from the worker survey with results from the (employee proportionally weighted) employer survey where companies with fewer than 20 employees are also excluded by definition.
- Weightwor1prop: As weightwor1, but additionally correcting for the disproportionalities between the countries. Country disproportionalities are redressed per sector.
- Weightwor2prop: As weightwor1, but additionally correcting for the disproportionalities between the countries. Country disproportionalities are redressed per sector.

For the distribution of the weights of the worker survey, the following variables were used:

- Employeeagecat2: age of employees; the 6 age groups in this variable were summarized to three age groups for the weighting (up to 34 years, 35 to 49 years, 50 or more years). These three categories are also the categories used for setting the targets during fieldwork.
- Employeeesex: Gender of the employees
- Education: Differentiation of employees with and without a university degree (ISCED 6 or higher)
- Businesssizebands: Size class of the company where the workers are employed, in 6 size-bands (1-19, 20-49, 50-249, 250-499 and 500+ employees).

### 6.2.2 Universe structures and weighted structures

The table below shows the universe structures according to the most recent available official statistics and the structures of the weighted sample. A comparison of the net sample structures as weighted with weightwor1 and weightworprop1 shows few and generally only small deviations, usually due to relatively small numbers of interviews in a subgroup. Slightly higher deviations can be seen, in the structures by size-band. In Germany, in NACE K only few interviews were realized in size-band 1 to 19 employees. Therefore, this size-band was summarized with size-band 20 to 49 workers for the weighting, leading to higher deviations from the given universe structure.

**Table 20: Comparison of universe and weighted survey structures**

Q001 code 1 Austria	Structure		weightwor1		weightwor1prop		
	Universe (workers)*:	manufacturing 646.286	finance 111.286	manufacturing N = 421	finance N = 326	manufacturing N = 67	finance N = 28
	<b>sizebands</b>						
code 1	Up to 19 workers	11,0%	9,9%	11,0%	9,9%	11,0%	9,9%
code 2	20 to 49 workers	10,3%	6,5%	10,3%	6,6%	10,3%	6,6%
code 3, 4	50 to 249 workers	25,2%	18,5%	25,2%	18,5%	25,2%	18,5%
code 5, 6	250 workers or more	53,5%	65,1%	53,5%	65,0%	53,5%	65,0%
	total	100%	100%	100%	100%	100%	100%
	<b>age</b>						
code 2,3	16 - 34 yrs	36,7%	26,9%	36,7%	27,5%	36,7%	27,5%
code 4	35 - 49 yrs	36,5%	35,6%	36,5%	36,1%	36,5%	36,1%
code 5,6	50+ yrs	26,8%	37,5%	26,8%	36,4%	26,8%	36,4%
	total	100%	100%	100%	100%	100%	100%
	<b>gender</b>						
code 1	men	73,7%	49,4%	73,7%	49,4%	73,7%	49,4%
code 2	women	26,3%	50,6%	26,3%	50,6%	26,3%	50,6%
	total	100%	100%	100%	100%	100%	100%
	<b>education</b>						
code 1	ISCED 6+	11,5%	25,7%	11,5%	25,9%	11,5%	25,9%
code 2,9	lower or n.a.	88,5%	74,3%	88,5%	74,1%	88,5%	74,1%
	total	100%	100%	100%	100%	100%	100%

\*Source: Statistik Austria: Leistungs- und Strukturstatistik 2019 (sizebands) / EU-LFS 2019 (age, gender, education)

Q001 code 2 Canada	Structure		weightwor1		weightwor1prop		
	Universe (workers)*:	manufacturing 1.481.973	finance 721.457	manufacturing N = 425	finance N = 412	manufacturing N = 153	finance N = 181
	<b>sizebands</b>						
code 1	Up to 19 workers	12,5%	9,9%	12,5%	9,9%	12,5%	9,9%
code 2	20 to 49 workers	11,9%	4,8%	11,9%	4,8%	11,9%	4,8%
code 3, 4	50 to 249 workers	29,0%	12,2%	29,0%	12,2%	29,0%	12,2%
code 5, 6	250 workers or more	46,7%	73,1%	46,7%	73,1%	46,7%	73,1%
	total	100%	100%	100%	100%	100%	100%
	<b>age</b>						
code 2,3	16 - 34 yrs	27%	33%	27,3%	32,7%	27,3%	32,7%
code 4	35 - 49 yrs	34%	37%	33,8%	37,2%	33,8%	37,2%
code 5,6	50+ yrs	39%	30%	38,8%	30,1%	38,8%	30,1%
	total	100%	100%	100%	100%	100%	100%
	<b>gender</b>						
code 1	men	72%	45%	72,0%	44,9%	72,0%	44,9%
code 2	women	28%	55%	28,0%	55,1%	28,0%	55,1%
	total	100%	100%	100%	100%	100%	100%
	<b>education</b>						
code 1	ISCED 6+	22%	53%	22,3%	53,0%	22,3%	53,0%
code 2,9	lower or n.a.	78%	47%	77,7%	47,0%	77,7%	47,0%
	total	100%	100%	100%	100%	100%	100%

Source: OECD Statistics 2016 (sizebands) / Statistics Canada (LFS 2019) for age, gender and education

Q001 code 7 France	Structure		weightwor1		weightwor1prop		
	Universe (workers)*:	manufacturing 2.619.300	finance 781.818	manufacturing N = 412	finance N = 393	manufacturing N = 270	finance N = 196
	<b>sizebands</b>						
code 1	Up to 19 workers	17,1%	17,6%	17,1%	17,6%	17,1%	17,6%
code 2	20 to 49 workers	12,0%	4,4%	12,0%	4,4%	12,0%	4,4%
code 3, 4	50 to 249 workers	23,6%	8,5%	23,6%	8,5%	23,6%	8,5%
code 5	250 to 500 workers	11,4%	4,6%	11,4%	4,6%	11,4%	4,6%
code 6	500 workers or more	35,9%	64,8%	35,9%	64,8%	35,9%	64,8%
	total	100%	100%	100%	100%	100%	100%
	<b>age</b>						
code 2,3	16 - 34 yrs	31%	30%	30,5%	30,0%	30,5%	30,0%
code 4	35 - 49 yrs	39%	42%	39,4%	42,1%	39,4%	42,1%
code 5,6	50+ yrs	30%	28%	30,0%	27,9%	30,0%	27,9%
	total	100%	100%	100%	100%	100%	100%
	<b>gender</b>						
code 1	men	70%	44%	70,0%	43,9%	70,0%	43,9%
code 2	women	30%	56%	30,0%	56,1%	30,0%	56,1%
	total	100%	100%	100%	100%	100%	100%
	<b>education</b>						
code 1	ISCED 6+	18%	53%	17,6%	52,6%	17,6%	52,6%
code 2,9	lower or n.a.	82%	47%	82,4%	47,4%	82,4%	47,4%
	total	100%	100%	100%	100%	100%	100%

Source: Insee: DSND-DADS 2019 (sizebands) / EU-LFS 2019 (age, gender, education)

Q001 code 3 Germany		manufacturing	finance
<b>Universe (workers)*:</b>		<b>7,336,298</b>	<b>933,673</b>
<b>sizebands</b>			
code 1	Up to 19 workers	9,9%	10,6%
code 2	20 to 49 workers	9,1%	3,2%
code 3, 4	50 to 249 workers	24,3%	14,2%
code 5, 6	250 workers or more	56,7%	72,0%
total		100%	100%
<b>Q005 age</b>			
code 2.3	16 - 34 yrs	30%	24%
code 4	35 - 49 yrs	33%	36%
code 5.6	50+ yrs	38%	40%
total		100%	100%
<b>Q077 gender</b>			
code 1	men	73%	49%
code 2	women	27%	51%
total		100%	100%
<b>Q081 education</b>			
code 1	ISCED 6+	27%	35%
code 2.9	lower or n.a.	73%	65%
total		100%	100%

Source: DESTATIS: Statistisches Unternehmensregister, 2019 (sizebands) / EU-LFS (age, gender, education)

manufacturing	finance
N = 428	N = 418
9,9%	2,9%
9,1%	10,9%
24,3%	14,2%
56,7%	72,0%
100%	100%
29,7%	24,4%
32,7%	36,0%
37,6%	39,6%
100%	100%
72,7%	48,9%
27,3%	51,1%
100%	100%
27,2%	34,9%
72,8%	65,1%
100%	100%

manufacturing	finance
N = 757	N = 234
9,9%	2,9%
9,1%	10,9%
24,3%	14,2%
56,7%	72,0%
100%	100%
29,7%	24,4%
32,7%	36,0%
37,6%	39,6%
100%	100%
72,7%	48,9%
27,3%	51,1%
100%	100%
27,2%	34,9%
72,8%	65,1%
100%	100%

Q001 code 4 Ireland		manufacturing	finance
<b>Universe (workers)*:</b>		<b>231,538</b>	<b>104,360</b>
<b>sizebands</b>			
code 1	Up to 19 workers	13,1%	12,6%
code 2	20 to 49 workers	9,8%	6,3%
code 3, 4	50 to 249 workers	26,9%	14,3%
code 5, 6	250 workers or more	50,3%	66,8%
total		100%	100%
<b>Q005 age</b>			
code 2.3	16 - 34 yrs	31%	31%
code 4	35 - 49 yrs	46%	49%
code 5.6	50+ yrs	23%	20%
total		100%	100%
<b>Q077 gender</b>			
code 1	men	70%	51%
code 2	women	30%	49%
total		100%	100%
<b>Q081 education</b>			
code 1	ISCED 6+	37%	69%
code 2.9	lower or n.a.	63%	31%
total		100%	100%

Source: CSO Ireland: Business Demography 2019 (sizebands) / EU-LFS 2019 (age, gender, education)

manufacturing	finance
N = 234	N = 208
13,1%	12,6%
9,8%	6,3%
26,9%	14,3%
50,3%	66,8%
100%	100%
30,6%	30,8%
46,0%	49,0%
23,4%	20,2%
100%	100%
70,0%	50,6%
30,0%	49,4%
100%	100%
37,4%	69,1%
62,6%	30,9%
100%	100%

manufacturing	finance
N = 24	N = 26
13,1%	12,6%
9,8%	6,3%
26,9%	14,3%
50,3%	66,8%
100%	100%
30,6%	30,8%
46,0%	49,0%
23,4%	20,2%
100%	100%
70,0%	50,6%
30,0%	49,4%
100%	100%
37,4%	69,1%
62,6%	30,9%
100%	100%

Q001 code 5 UK		manufacturing	finance
<b>Universe (employees)*:</b>		<b>2,429,789</b>	<b>1,013,306</b>
<b>sizebands</b>			
code 1	Up to 19 workers	17,7%	10,9%
code 2	20 to 49 workers	11,6%	3,8%
code 3, 4	50 to 249 workers	25,5%	10,3%
code 5	250 to 500 workers	9,9%	5,9%
code 6	500 workers or more	35,4%	69,1%
total		100%	100%
<b>Q005 age</b>			
code 2.3	16 - 34 yrs	33%	38%
code 4	35 - 49 yrs	33%	41%
code 5.6	50+ yrs	35%	21%
total		100%	100%
<b>Q077 gender</b>			
code 1	men	74%	57%
code 2	women	26%	43%
total		100%	100%
<b>Q081 education</b>			
code 1	ISCED 6+	20%	44%
code 2.9	lower or n.a.	80%	56%
total		100%	100%

Source: Office of National Statistics ONS: IDBR 2021 (sizebands) / EU-LFS 2019 (age, gender, education)

manufacturing	finance
N = 426	N = 402
17,7%	10,9%
11,6%	3,8%
25,5%	10,3%
9,9%	5,9%
35,4%	69,1%
100%	100%
32,6%	37,8%
32,7%	40,7%
34,7%	21,5%
100%	100%
74,2%	57,3%
25,8%	42,7%
100%	100%
20,2%	43,8%
79,8%	56,2%
100%	100%

manufacturing	finance
N = 251	N = 254
17,7%	10,9%
11,6%	3,8%
25,5%	10,3%
9,9%	5,9%
35,4%	69,1%
100%	100%
32,6%	37,8%
32,7%	40,7%
34,7%	21,5%
100%	100%
74,2%	57,3%
25,8%	42,7%
100%	100%
20,2%	43,8%
79,8%	56,2%
100%	100%

Q001 code 6 US		manufacturing	finance
<b>Universe (workers)*:</b>		<b>12,109,803</b>	<b>6,553,166</b>
<b>sizebands</b>			
code 1	Up to 19 workers	8,1%	10,5%
code 2	20 to 49 workers	8,2%	3,8%
code 3, 4	50 to 249 workers	18,0%	9,7%
code 5	250 to 500 workers	7,7%	4,8%
code 6	500 workers or more	57,9%	71,2%
total		100%	100%
<b>Q005 age</b>			
code 2.3	16 - 34 yrs	30%	31%
code 4	35 - 49 yrs	33%	35%
code 5.6	50+ yrs	37%	33%
total		100%	100%
<b>Q077 gender</b>			
code 1	men	71%	45%
code 2	women	29%	55%
total		100%	100%
<b>Q081 education</b>			
code 1	ISCED 6+	30%	60%
code 2.9	lower or n.a.	70%	40%
total		100%	100%

Source: US SUSB 2019 (sizebands) / US Current Population Survey (CPS) 2019 for age, gender and education

manufacturing	finance
N = 426	N = 403
8,1%	10,5%
8,2%	3,8%
18,0%	9,7%
7,7%	4,8%
57,9%	71,2%
100%	100%
30,1%	31,4%
32,8%	35,4%
37,1%	33,2%
100%	100%
70,5%	45,2%
29,5%	54,8%
100%	100%
30,2%	59,6%
69,8%	40,4%
100%	100%

manufacturing	finance
N = 1,250	N = 1,643
8,1%	10,5%
8,2%	3,8%
18,0%	9,7%
7,7%	4,8%
57,9%	71,2%
100%	100%
30,1%	31,4%
32,8%	35,4%
37,1%	33,2%
100%	100%
70,5%	45,2%
29,5%	54,8%
100%	100%
30,2%	59,6%
69,8%	40,4%
100%	100%

## 6.2.3 Error tolerance

For the net samples of the worker survey, the confidence intervals are slightly smaller than in the employer survey as the number of interviews is larger, particularly in the Finance and Insurance sector.

**Table 21: Error tolerance with design factor, worker survey<sup>8</sup>**

Error tolerance table with design factor																	KANTAR PUBLIC=		
with a confidence level of																	95,0 % ← Please select this value (max. 99,9)		
N =																	37.074.053 ← Please enter the size of the universe		
Sample size	Proportion values in the sample																		
N =	1%	2%	3%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	70%	80%	90%	95%
50	---	---	---	---	---	---	---	---	---	---	19,9%	20,2%	20,3%	20,2%	19,9%	18,6%	16,2%	12,2%	8,8%
100	---	---	---	---	---	---	---	12,2%	12,9%	13,5%	13,8%	14,0%	14,1%	14,0%	13,8%	12,9%	11,3%	8,5%	6,1%
200	---	---	---	---	---	7,1%	7,9%	8,6%	9,1%	9,4%	9,7%	9,8%	9,9%	9,8%	9,7%	9,1%	7,9%	5,9%	4,3%
300	---	---	---	---	4,8%	5,7%	6,4%	7,0%	7,4%	7,7%	7,9%	8,0%	8,0%	8,0%	7,9%	7,4%	6,4%	4,8%	3,5%
400	---	---	---	---	4,2%	5,0%	5,6%	6,0%	6,4%	6,6%	6,8%	6,9%	7,0%	6,9%	6,8%	6,4%	5,6%	4,2%	3,0%
500	---	---	---	---	3,7%	4,4%	5,0%	5,4%	5,7%	5,9%	6,1%	6,2%	6,2%	6,2%	6,1%	5,7%	5,0%	3,7%	2,7%
600	---	---	---	2,5%	3,4%	4,1%	4,5%	4,9%	5,2%	5,4%	5,6%	5,6%	5,7%	5,6%	5,6%	5,2%	4,5%	3,4%	2,5%
700	---	---	---	2,3%	3,2%	3,7%	4,2%	4,5%	4,8%	5,0%	5,1%	5,2%	5,3%	5,2%	5,1%	4,8%	4,2%	3,2%	2,3%
800	---	---	---	2,1%	2,9%	3,5%	3,9%	4,3%	4,5%	4,7%	4,8%	4,9%	4,9%	4,9%	4,8%	4,5%	3,9%	2,9%	2,1%
900	---	---	---	2,0%	2,8%	3,3%	3,7%	4,0%	4,2%	4,4%	4,5%	4,6%	4,6%	4,6%	4,5%	4,2%	3,7%	2,8%	2,0%
1.000	---	---	1,5%	1,9%	2,6%	3,1%	3,5%	3,8%	4,0%	4,2%	4,3%	4,4%	4,4%	4,4%	4,3%	4,0%	3,5%	2,6%	1,9%
1.100	---	---	1,4%	1,8%	2,5%	3,0%	3,3%	3,6%	3,8%	4,0%	4,1%	4,2%	4,2%	4,2%	4,1%	3,8%	3,3%	2,5%	1,8%
1.200	---	---	1,4%	1,7%	2,4%	2,9%	3,2%	3,5%	3,7%	3,8%	3,9%	4,0%	4,0%	4,0%	3,9%	3,7%	3,2%	2,4%	1,7%
1.300	---	---	1,3%	1,7%	2,3%	2,7%	3,1%	3,3%	3,5%	3,7%	3,8%	3,8%	3,8%	3,8%	3,8%	3,5%	3,1%	2,3%	1,7%
1.400	---	---	1,3%	1,6%	2,2%	2,6%	3,0%	3,2%	3,4%	3,5%	3,6%	3,7%	3,7%	3,7%	3,6%	3,4%	3,0%	2,2%	1,6%
1.500	---	---	1,2%	1,6%	2,1%	2,6%	2,9%	3,1%	3,3%	3,4%	3,5%	3,6%	3,6%	3,6%	3,5%	3,3%	2,9%	2,1%	1,6%
1.600	---	1,0%	1,2%	1,5%	2,1%	2,5%	2,8%	3,0%	3,2%	3,3%	3,4%	3,5%	3,5%	3,5%	3,4%	3,2%	2,8%	2,1%	1,5%
1.700	---	0,9%	1,1%	1,5%	2,0%	2,4%	2,7%	2,9%	3,1%	3,2%	3,3%	3,3%	3,4%	3,3%	3,3%	3,1%	2,7%	2,0%	1,5%
1.800	---	0,9%	1,1%	1,4%	2,0%	2,3%	2,6%	2,8%	3,0%	3,1%	3,2%	3,3%	3,3%	3,3%	3,2%	3,0%	2,6%	2,0%	1,4%
1.900	---	0,9%	1,1%	1,4%	1,9%	2,3%	2,5%	2,8%	2,9%	3,0%	3,1%	3,2%	3,2%	3,2%	3,1%	2,9%	2,5%	1,9%	1,4%
2.000	---	0,9%	1,1%	1,4%	1,9%	2,2%	2,5%	2,7%	2,8%	3,0%	3,0%	3,1%	3,1%	3,1%	3,0%	2,8%	2,5%	1,9%	1,4%
3.000	---	0,7%	0,9%	1,1%	1,5%	1,8%	2,0%	2,2%	2,3%	2,4%	2,5%	2,5%	2,5%	2,5%	2,3%	2,0%	1,5%	1,1%	0,8%
4.000	0,4%	0,6%	0,7%	1,0%	1,3%	1,6%	1,8%	1,9%	2,0%	2,1%	2,1%	2,2%	2,2%	2,2%	2,1%	2,0%	1,8%	1,3%	1,0%
5.000	0,4%	0,5%	0,7%	0,9%	1,2%	1,4%	1,6%	1,7%	1,8%	1,9%	1,9%	2,0%	2,0%	2,0%	1,9%	1,8%	1,6%	1,2%	0,9%
6.000	0,4%	0,5%	0,6%	0,8%	1,1%	1,3%	1,4%	1,5%	1,6%	1,7%	1,8%	1,8%	1,8%	1,8%	1,8%	1,6%	1,4%	1,1%	0,8%

*Red fields can be changed, i.e. adapted to the respective question*

**Example:**  
 In a sample of 800 workers from the universe of all workers in the manufacturing and finance and insurance sector in the selected countries, a proportion of 50% of companies said that they adopted AI. Then the true value of the companies with the probability chosen above for this proportion is ± 4,9%.  
 In fields with '---' the confidence interval is more than half the proportion and is therefore not shown.  
 The table is based on the formula for the confidence interval for samples without reserve with design factor:  $s(p) = t \sqrt{p(1-p)/(n-1)} \sqrt{1-n/N} \sqrt{2}$

<sup>8</sup> The purpose of this table is to give a quick overview of the error tolerance based on the formula using a standardised design factor that can be applied to any survey without strict random sampling approach.

## ANNEX

### Motivation letter

[OECD logo]

Paris, 14 January 2022

#### **Representative company survey of the OECD on advanced technologies**

Dear Sir or Madam,

You have been contacted by an interviewer requesting your participation in our survey about the use and impact of advanced technologies.

The survey is conducted on behalf of the OECD, the *Organisation for Economic Co-operation and Development*. The OECD is an international research and policy organisation that works to shape policies that foster prosperity, equality, opportunity and well-being for all.

The aim of this survey is to explore whether advanced technologies are used in your company and if so, how they impact workplaces, work processes and employees. If your company does not use any advanced technologies, we also would be very interested to know your view and expectations on these new developments in your sector.

The results of the survey will be used to better understand the opportunities and risks associated with these new developments and to shape government policies in this area. We will publish a report based on this survey, which you will be able to access on our website ([www.oecd.org/future-of-work/reports-and-data](http://www.oecd.org/future-of-work/reports-and-data)) later this year.

#### **Who will be interviewed?**

More than 2,000 company representatives in the manufacturing and in the financial and insurance sectors in 7 countries worldwide will be interviewed in this survey. Your company has been selected at random. We would like to interview the company representative who has the best overview of any new advanced technologies applied in the company. In smaller companies this is usually the owner or the managing director. In larger companies, this can also be the head of technology or the head of production.

FFIND is conducting the interviews in France/Canada. At the international level, the survey is coordinated by the research institute Kantar Public, which also has the overall scientific responsibility for the project.

The interview should take only 10 minutes of your time. Your participation is, of course, voluntary. To ensure that the results are representative and reliable, it is important to secure the highest possible participation from the selected companies. Therefore, we would be extremely grateful for your valuable input. Your answers will be evaluated with strict anonymity to ensure that no connection to your person or organisation is possible.

# KANTAR PUBLIC

An interviewer will contact you again to ask you to take part in the survey. We would very much appreciate your participation.

Yours sincerely,  
[signature]

Stefano Scarpetta  
Director, Directorate for Employment, Labour and Social Affairs  
[contact details]