

FDZ-DATENREPORT

Documentation of labour market data

07/2021 EN IAB-ZEW-Labor Market 4.0-Establishment Survey

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IAB-ZEW-Labor Market 4.0-Establishment Survey



Die FDZ-Datenreporte beschreiben die Daten des FDZ im Detail. Diese Reihe hat somit eine doppelte Funktion: zum einen stellen Nutzerinnen und Nutzer fest, ob die angebotenen Daten für das Forschungsvorhaben geeignet sind, zum anderen dienen sie zur Vorbereitung der Auswertungen.

FDZ-Datenreporte (FDZ data reports) describe FDZ data in detail. As a result, this series of reports has a dual function: on the one hand, those using the reports can ascertain whether the data offered is suitable for their research task; on the other, the data can be used to prepare evaluations.

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Abstract

This dataset describes the results of a survey of 2,032 German production- and service establishments regarding the importance of digital technologies.

Zusammenfassung

Dieser Datenreport beschreibt die Befragung von 2.032 deutschen Produktions- und Dienstleistungsbetrieben zur Bedeutung digitaler Technologien im Betrieb.

Outline

Name	BIZA
Long name	IAB-ZEW-Labor Market 4.0-Establishment Survey
Dataset version	BIZA-v01
Topics	Data about establishments with regard to the importance of digital technologies with a focus on the degree of digitalization and automation of work equipment, personnel development as well as education and training.
Research unit	Establishment
Number of cases	2,032 Interviews
Period	March 2016 to May 2016
Time reference	current (2016), partially retrospective (2011) and prospective (2021)
Regional structure	East and West Germany
Data collection method	quantitative computer-based interviews of 2032 German establishments in the production and service sector
Institutions involved	Institute for Employment Research (IAB), Leibniz Centre for European Economic Research (ZEW), uzbonn - Gesellschaft für empirische Sozialforschung und Evaluation
Frequency of data collection	every five years
File format	Stata, 1065 KB
File architecture	Survey waves
Data access types	Remote data access, On-site use
Anonymization degree	weakly anonymous
Standards for the citation of data and data documentation	Data: "This study uses the weakly anonymized IAB-ZEW-Labor Market 4.0-Establishment Survey (BIZA). Data access was provided via on-site use at the Research Data Centre (FDZ) of the German Federal Employment Agency (BA) at the Institute for Employment Research (IAB) and/or remote data execution." DOI: 10.5164/IAB.BIZA_W01.de.en.v1 Data documentation: Hanebrink, Alina; Lehmer, Florian; Müller, Christoph (2021): IAB-ZEW-Labor Market 4.0-Establishment Survey. FDZ-Datenreport, 07/2021 (en), Nuremberg. DOI: 10.5164/IAB.FDZD.2107.en.v1

The dataset described in this document is available for use by professional researchers. Further information can be found on the website http://fdz.iab.de

1. Introduction

With the establishment survey BIZA, the IAB in cooperation with the ZEW (and uzbonn as survey institute), provides data for scientific analysis regarding the use of digitalization- and automation technologies in German firms, via the Research Data Centre (FDZ) of the federal employment agency (BA). Data is based on representative phone surveys of 2,032 establishments in the production and service sector between March and May of 2016. The data report at hand describes the variables of the weakly anonymized version.

Information was retrieved currently (2016) and partially retrospectively (2011) and prospectively (2021). Target subjects within the establishment were primarily technical management.

Topics of the survey include:

- (1) Importance of digital technologies in the establishment
- (2) Degree of digitalization and automation of work equipment
- (3) Personnel development/labour demand
- (4) Training and Education
- (5) Background information of establishments

Work equipment can be divided into production equipment, which is mostly used by producers, and office and communication equipment, which is used by both producers and service providers. Here, the degree of digitalisation of the work equipment varies from "manually controlled" or "not IT-supported" to "self-controlled" or "IT-integrated".

Establishments were questioned regarding personnel development and labour demand about the development of working hours of employees over the past five years in different fields of functions. They further were asked to assess changes in skill requirements. Based on these questions, establishments described their reactions to changing skill requirements with regard to training and education.

This datareport is structured as follows: Chapter 1 includes, in addition to an introduction, information about data access and a short data description. A further depiction of the survey design is located in chapter 2. Chapter 3 contains information on data preparation. Chapter 4 includes a detailed presentation of variables, including labels, name of the variable, question, characteristics and if necessary special features.

Data usage

To use the dataset it is necessary to submit an application to the FDZ. The FDZ decides about approval. After successful approval a user agreement will be made with the scientific institution of the researcher. Details regarding the application can be found on the FDZ-Website.

2. Survey Design

Stratified by region (2 categories), establishment size (4 categories) and economic sector (five categories), a random sample was drawn from all establishments that were registered at the German Federal Employment Agency on 30th June 2014 (n=2,938,437). In order not to reduce the willingness to respond in other IAB surveys, establishments were excluded that had been drawn in the IAB Job Vacancy Survey (n=83,312) or had participated in the IAB Establishment Panel (n=15,022) in the year 2015.

The addresses were transmitted to the survey institute uzbonn, where they were prepared and processed for the survey. Phone numbers had to be researched for 11,750 addresses. This enrichment was successful in 10,445 cases, making up almost 90%. Another delivery of 616 addresses was necessary in the beginning of May due to not reachable establishments as well as refusals.

After the survey was announced by postal letters, the establishment were called in the survey period April/May 2016 in order to conduct a 30-minute computer-assisted telephone interview (CATI interview). Person of interest was primarily the technical management, as well as (deputy) corporate or establishment management, assistant to the general management, owner, department head of controlling, department head of production or officer with statutory authority. The survey was conducted by 54 interviewers from uzbonn.

Of 12,366 randomly selected addresses from the IAB, 9,525 phone addresses were identified. 6,457 of these contacts were called for an interview, 2,032 interviews were conducted successfully. This results in a response rate of 31.5%. For those firms that were contacted but with whom the interview could not be successfully completed, the reasons for non-participation were asked. The most frequent reasons given were "generally no participation in surveys" (n=663), "generally no participation in telephone surveys" (n=755), "no time" (n=959) and "no interest in the topic of the study" (n=1,005). Some companies (n=176) with the reason for refusal "not interested in the topic of the study" were also asked before the end of the interview whether their non-participation was due to the fact that automation and digitalisation technologies do not play a role in the company. This was answered in the negative by 81%. A potential non-reponse bias with regard to the use of these technologies should therefore be low.

As mentioned above, the survey was drawn stratified according to the stratification characteristics region (East/West Germany), establishment size (0-9, 10-49, 50-200, 200 and more employees) and economic sector. In the five economic sectors, a distinction was made between non-knowledge-intensive producers (e.g. furniture manufacturers, construction establishment), knowledge-intensive producers (e.g. vehicle manufacturers, machine builders), non-knowledge-intensive service providers (e.g. wholesalers, catering businesses), knowledge-intensive service providers (e.g. scientific and engineering service providers, insurance establishments and banks), and ICT businesses (e.g. businesses that either manufacture data processing equipment, consumer electronics or telecommunications technology or offer services in information technology, telecommunications or data processing). For this purpose, the economic sectors (3-digit) of the German Classification of Economic Activities 2008 (WZ 2008) were aggregated as follows: Non-knowledge-intensive manufacturing with codes 11-99, 101-182, 221-259 and 310- 439; Knowledge-intensive manufacturing with codes 191-212, 265-267 and 271-309; Non-knowledge-intensive services with codes 451-464, 466-563, 681-683, 771-856, 871-889, 920-949 and 952-990; Knowledge-intensive services with codes 581, 591-602, 639-663, 691-750, 861-869 and 900-910; ICT sector with codes 261-264, 268, 465, 582, 611-631, 951.

This resulted in 40 stratification cells. The aim of the survey was to realise at least 50 interviews per cell. With one exception (in the East German ICT sector the cells "50-200 employees" and "200 and more employees" were aggregated) the goal was achieved. Since stratification had an impact on the drawing probability, we provide a firm stratification weight. This is calculated as the inverse probability of being in a

particular stratification cell of the survey sample.

3. Data preparation

3.1. Differences between questionnaire and data set

For data protection reasons, the information on question 26 (What was your turnover approximately last year?) was coarsened. For this purpose, a cumulative distribution was formed from the establishments' information and then divided into 20 categories in ascending order using the percentiles. As a special case, an additional category 0 was formed, which contains zero turnovers. As a result, category 1 (turnover above 0) contains fewer observations than categories 2 to 20. The mean value and the turnover at the lower limit of the respective category are shown as additional information. The variable F26 was then deleted. The same procedure was followed with the information on profit (question 34).

3.2. Use of German and English labels

The BIZA data are provided with both German and English labels. The following Stata commands allow to change the label language:

* Set label language to English label language en

* Set label language to German label language de

4. Variables of actual wave(s)

4.1. BIZA

4.1.1. IAB-ZEW-Labor Market 4.0-Establishment Survey

4.1.1.1. Screening

- · · · J			
Question number	Name of variable	Label of variable	Measure level
S01	S01_1	Screening: Connected with correct company	nominal
S01	S01_2	Screening: Name change due to change of name/legal form	nominal
S01	S01_3	Screening: Company has moved	nominal
S01	S01_4	Screening: No, wrong company	nominal
S02	S02	Number of employees subject to social security contributions	nominal
S02	S02_validierung	Company belongs to another company size class	nominal
S03	S03	Year of company foundation	metric
S04	S04	Company operation	nominal

4.1.1.2. Assessments of the importance of digital technologies in the establishment

Question number	Name of variable	Label of variable	Measure level
01	F01	Technologies relevant in your company	ordinal
02	F02	Provider of such technologies?	nominal
03	F03	Aim of technology offer	nominal
04	F04	Estimated sales growth achieved with technologies	metric
05	F05	Percentage of operating and business equipment already belonging to these techno	metric

Question number	Name of variable	Label of variable	Measure level
06	F06_a	Technology use: Reduces labor costs / wage costs	ordinal
06	F06_b	Technology use: Increases labor productivity	ordinal
06	F06_c	Technology use: Reduces energy costs	ordinal
06	F06_d	Technology use: Reduces transportation and warehousing costs	ordinal
06	F06_e	Technology use: Enables to offer new products and services	ordinal
06	F06_f	Technology use: Enables to better meet individual customer requirements	ordinal
06	F06_g	Technology use: Reduces physical workload for employees	ordinal
06	F06_h	Technology use: Increases mental workload for employees	ordinal
06	F06_i	Technology use: Increases the dependence on external services	ordinal
06	F06_j	Technology use: Is connected to high investment costs	ordinal
06	F06_k	Technology use: Is hampered by a shortage of suitable skilled workers	ordinal
06	F06_I	Technology use: Increases the training needs of employees	ordinal
06	F06_m	Technology use: Changes education and training content in the company	ordinal

Question number	Name of variable	Label of variable	Measure level
06	F06_n	Technology use: Increases economic risks	ordinal
06	F06_o	Technology use: Necessitates a reorganization of work processes	ordinal
06	F06_p	Technology use: Increases expenditures for data protection and cybersecurity	ordinal

4.1.1.3. Capital investment/stock

Question number	Name of variable	Label of variable	Measure level
07	F07	Use of production equipment	nominal
08	F08_1	Manually controlled equipment	metric
08	F08_2	Indirectly controlled equipment	metric
08	F08_3	Self-controlling equipment	metric
09	F09_1	Retrospective: Manually controlled equipment	metric
09	F09_1_Codes_1	Retrospective equipment: not in company at that time	nominal
09	F09_1_Codes_2	Retrospective equipment: unchanged	nominal
09	F09_1_Codes_3	Retrospective equipment: not specified	nominal
09	F09_1_Codes_4	Retrospective equipment: unknown	nominal
09	F09_2	Retrospective: Indirectly controlled equipment	metric
09	F09_2_Codes	Retrospective equipment: Codes	nominal
09	F09_3	Retrospective: Self- controlling equipment	metric

Question number	Name of variable	Label of variable	Measure level
09	F09b_1	Correction: Retrospective: Manually controlled equipment	nominal
09	F09b_1_Codes	Retrospective manually controlled equipment: Codes	nominal
10	F10_1	Prospective: Manually controlled equipment	metric
10	F10_1_Codes	Prospective equipment: Codes	nominal
10	F10_2	Prospective: Indirectly controlled equipment	metric
10	F10_3	Prospective: Self-controlling equipment	metric

4.1.1.4. Office and communication equipment

Question number	Name of variable	Label of variable	Measure level
11	F11_1	Not IT-supported equipment	metric
11	F11_2	IT-supported equipment	metric
11	F11_3	IT-integrated equipment	metric
12	F12_1	Retrospective: Not IT- supported equipment	metric
12	F12_1_Codes	Retrospective Not IT- supported equipment: Codes	nominal
12	F12_2	Retrospective: IT- supported equipment	metric
12	F12_2_Codes	Retrospective IT equipment: Codes	nominal
12	F12_3	Retrospective: IT-integrated equipment	metric
13	F13_1	Prospective: Not IT- supported equipment	metric
13	F13_1_Codes	Prospective Not IT- supported equipment: Codes	nominal
13	F13_2	Prospective: IT- supported equipment	metric
13	F13_2_Codes	Prospective IT equipment: Codes	nominal

Question number	Name of variable	Label of variable	Measure level
13	F13_3	Prospective: IT-integrated equipment	metric
13	F13_3_Codes	Prospective IT equipment: Codes	nominal

4.1.1.5. Personnel development/labor demand

Question number	Name of variable	Label of variable	Measure level
14_1	f14_1_a	Change retrospective: education/teaching	ordinal
14_1	f14_1_b	Change retrospective: consulting and informing	ordinal
14_1	f14_1_c	Change retrospective: Measureing, testing or control quality	ordinal
14_1	f14_1_d	Change retrospective: Monitoring or controling machines, plants or technical pro	ordinal
14_1	f14_1_e	Change retrospective: Repair, maintenance or overhaul	ordinal
14_1	f14_1_f	Change retrospective: Purchasing, procuring or selling	ordinal
14_1	f14_1_g	Change retrospective: Negotiating	ordinal
14_1	f14_1_h	Change retrospective: advertising, marketing, public relations	ordinal
14_1	f14_1_i	Change retrospective: collecting information, researching, documenting	ordinal
14_1	f14_1_j	Change retrospective: organizing, planning and preparing work processes	ordinal
14_1	f14_1_k	Change retrospective: developing, researching or constructing	ordinal
14_1	f14_1_I	Change retrospective: manual tasks to manufacture or produce goods.	ordinal

Question number	Name of variable	Label of variable	Measure level
14_1	F14_1_m	Change retrospective: hosting, serving or accommodating.	ordinal
14_1	F14_1_n	Change retrospective: Nursing, caring or healing	ordinal
14_1	F14_1_o	Change retrospective: Hiring personnel, instructing, controlling, evaluating em	ordinal
14_1	F14_1_p	Change retrospective: Transporting, storing or shipping	ordinal
14_1	F14_1_q	Change retrospective: Securing, protecting or guarding	ordinal
14_1	F14_1_r	Change retrospective: Securing, protecting or guarding	ordinal
14_1	F14_1_s	Change retrospective: cleaning, removing waste or recycling	ordinal
14_1	F14_1_t	Change retrospective: Clerical work, correspondence or form work	ordinal
14_1	F14_1_u	Change retrospective: Calculating, charging or booking	ordinal
14_1	F14_1_v	Change retrospective: Applying or interpreting laws or regulations	ordinal
14_2	f14_2_a	Change prospective: education/teaching	ordinal
14_2	f14_2_b	Change prospective: consulting and informing	ordinal
14_2	f14_2_c	Change prospective: Measureing, testing or control quality	ordinal
14_2	f14_2_d	Change prospective: Monitoring or controling machines, plants or technical proce	ordinal

Question number	Name of variable	Label of variable	Measure level
14_2	f14_2_e	Change prospective: Repair, maintenance or overhaul	ordinal
14_2	f14_2_f	Change prospective: Purchasing, procuring or selling	ordinal
14_2	f14_2_g	Change prospective: Negotiating	ordinal
14_2	f14_2_h	Change prospective: advertising, marketing, public relations	ordinal
14_2	f14_2_i	Change prospective: collecting information, researching, documenting	ordinal
14_2	f14_2_j	Change prospective: organizing, planning and preparing work processes	ordinal
14_2	f14_2_k	Change prospective: developing, researching or constructing	ordinal
14_2	f14_2_I	Change prospective: manual tasks to manufacture or produce goods.	ordinal
14_2	F14_2_m	Change prospective: hosting, serving or accommodating.	ordinal
14_2	F14_2_n	Change prospective: Nursing, caring or healing	ordinal
14_2	F14_2_o	Change prospective: Hiring personnel, instructing, controlling, evaluating empl	ordinal
14_2	F14_2_p	Change prospective: Transporting, storing or shipping	ordinal
14_2	F14_2_q	Change prospective: Securing, protecting or guarding	ordinal
14_2	F14_2_r	Change prospective: Securing, protecting or guarding	ordinal

Question number	Name of variable	Label of variable	Measure level
14_2	F14_2_s	Change prospective: cleaning, removing waste or recycling	ordinal
14_2	F14_2_t	Change prospective: Clerical work, correspondence or form work	ordinal
14_2	F14_2_u	Change prospective: Calculating, charging or booking	ordinal
14_2	F14_2_v	Change prospective: Applying or interpreting laws or regulations	ordinal
15_1	F15_1_a	Importance retrospective: Working under high or long-lasting physical stress	ordinal
15_1	F15_1_b	Importance retrospective: Manual dexterity and dexterity	ordinal
15_1	F15_1_c	Importance retrospective: working independently	ordinal
15_1	F15_1_d	Importance retrospective: creativity	ordinal
15_1	F15_1_e	Importance retrospective: Dealing with customers (customer relationship manageme	ordinal
15_1	F15_1_f	Importance retrospective: Multitasking	ordinal
15_1	F15_1_g	Importance retrospective: Learn new skills and competencies	ordinal
15_1	F15_1_h	Importance retrospective: Working under high or long-lasting psychic stress	ordinal
15_1	F15_1_i	Importance retrospective: Environmental protection knowledge	ordinal

Question number	Name of variable	Label of variable	Measure level
15_1	F15_1_j	Importance retrospective: Knowledge in the application of IT	ordinal
15_1	F15_1_k	Importance retrospective: IT development	ordinal
15_1	F15_1_I	Importance retrospective: cross- disciplinary approach to work	ordinal
15_1	F15_1_m	Importance retrospective: Leadership skills	ordinal
15_1	F15_1_n	Importance retrospective: Process know-how	ordinal
15_2	F15_2_a	Importance prospective: Working under high or long- lasting physical stress	ordinal
15_2	F15_2_b	Importance prospective: Manual dexterity and dexterity	ordinal
15_2	F15_2_c	Importance prospective: working independently	ordinal
15_2	F15_2_d	Importance prospective: creativity	ordinal
15_2	F15_2_e	Importance prospective: Dealing with customers (customer relationship management	ordinal
15_2	F15_2_f	Importance prospective: Multitasking	ordinal
15_2	F15_2_g	Importance prospective: Learn new skills and competencies	ordinal
15_2	F15_2_h	Importance prospective: Working under high or long-lasting psychic stress	ordinal

Question number	Name of variable	Label of variable	Measure level
15_2	F15_2_i	Importance prospective: Environmental protection knowledge	ordinal
15_2	F15_2_j	Importance prospective: Knowledge in the application of IT	ordinal
15_2	F15_2_k	Importance prospective: IT development	ordinal
15_2	F15_2_I	Importance prospective: or cross-disciplinary approach to work	ordinal
15_2	F15_2_m	Importance prospective: Leadership skills	ordinal
15_2	F15_2_n	Importance prospective: Process know-how	ordinal
16	F16	Prospective: Development number of employees	ordinal
16_1	F16_sinken	Prospective: decrease of employees	metric
16_2	F16_steigen	Prospective: increase of employees	metric
17	F17_a	Prospective: employees with simple tasks	ordinal
17	F17_b	Prospective: employees with qualified tasks	ordinal
17	F17_c	Prospective: employees with specialist tasks	ordinal
17	F17_d	Prospective: employees with highly qualified tasks	ordinal

4.1.1.6. Training and further education in the establishment

Question number	Name of variable	Label of variable	Measure level
18	F18	Training contracts (yearly)	metric

Question number	Name of variable	Label of variable	Measure level
19	F19	Change retrospective: Training contracts	ordinal
20	F20_a	In-company training: Changing occuptions	ordinal
20	F20_b	In-company training: Changing content	ordinal
20	F20_c	In-company training: Inadequacy	ordinal
20	F20_d	In-company training: Soft skills	ordinal
20	F20_e	In-company training: ICT-skills	ordinal
21	F21	Further training participants (last 12 months)	metric
22	F22	Change retrospective: Further training participation	ordinal
23	F23_a	Further training: Increasing expenditure	ordinal
23	F23_b	Further training: ICT-skills	ordinal
23	F23_c	Further training: General skills	ordinal
23	F23_d	Further training: Educational upgrading	ordinal
23	F23_e	Further training: E-learning	ordinal

4.1.1.7. Background information of the establishment

Question number	Name of variable	Label of variable	Measure level
24_0	Vor24	Skip block & alternative target?	nominal
24_1	F24	Development of revenues	ordinal
24_2	F24_sinken	Decrease of revenues	metric
24_3	F24_steigen	Increase of revenues	metric
25	F25	Prospective: Development of revenues	ordinal

Question number	Name of variable	Label of variable	Measure level
25_1	F25_sinken	Prospective: Decrease of revenues	metric
25_2	F25_steigen	Prospective: Increase of revenues	metric
27	F27	Share of export in revenues	metric
28	F28	Share of external services in revenues	metric
28_1	F28_nachfrage	Sum external services	metric
29	F29	Retrospective: Development of external services	ordinal
29_1	F29_sinken	Retrospective: Decrease of external services	metric
29_2	F29_steigen	Retrospective: Increase of external services	metric
30	F30	Prospective: Development of external services	ordinal
30_1	F30_sinken	Prospective: Decrease of external services	metric
30_2	F30_steigen	Prospective: Increase of external services	metric
31	F31	Retrospective: Development profit	ordinal
31_1	F31_sinken	Retrospective: Decrease of profit	metric
31_2	F31_steigen	Retrospective: Increase of profit	metric
32	F32	Prospective: Development profit	ordinal
32_1	F32_sinken	Prospective: Decrease of profit	metric
32_2	F32_steigen	Prospective: Increase of profit	metric
33	F33	Profit	nominal
35	F35	Profit in comparison to others	ordinal

4.1.1.8. Response process within the establishment

Question number	Name of variable	Label of variable	Measure level
36	F36	Age of respondent	metric
37	F37	Highest level of education	ordinal
38	F38_1	Position: CEO	nominal
38	F38_2	Position: Operations Manager	nominal
38	F38_3	Position: IT Manager	nominal
38	F38_4	Position: Controller	nominal
38	F38_5	Position: IT- Administrator	nominal
38	F38_6	Position: Sales Manager	nominal
38	F38_7	Position: Other position	nominal
39	Bericht	Report	nominal

4.1.1.9. Generated Variables

Question number	Name of variable	Label of variable	Measure level
40	id	id	metric
41	Quotierungszelle	East/west, company size class, type of company	nominal
42	Quotierungszelle_a15 20	Agg east/west, company size class, type of company	nominal
43	gewicht1	Design weight by cell (region, farm size class & sector aggregate).	metric
44	groekat	Employees subject to social security contributions in the company (categories)	ordinal
44	groesse	Employees subject to social security contributions in the company	metric
44	mitarb	Number of employees	metric
45	Erhebung	Survey	nominal
45	Status	Interview status	nominal
45	Status_Nachfassaktio	Status follow up	nominal

Question number	Name of variable	Label of variable	Measure level
45	Status_Verweigerung sstudie	Status refusal survey	nominal
46	prodie	Company type	nominal
47	Gewinn_mean	mean profit category	metric
47	Gewinn_min	profit at lower limit of the category	metric
47	Gewinnkategorie	profit category	metric
48	Umsatz_mean	mean revenue category	metric
48	Umsatz_min	revenue at lower limit of the category	metric
48	Umsatzkategorie	revenue category	metric

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