# Documentation of the research paper „Which Factors Determine the Adoption of the Internet of Things? Impacts and Benefits “, (Author: Miruna Sarbu, JBNST.2021.0010.R2)

Which documents are provided?

- Description of the database used for this study (general description of the ZEW ICT Survey of the years 2014 und 2010), number of observations, description of the variables/variable list)
- Description of the process of how to get data access at the ZEW
- STATA program code used for data management, descriptive analyses and estimations (see txt-file)

Which data/documents cannot be provided?

- Database of the ZEW ICT Survey of the years 2014 and 2010 due to data privacy protection

Description of the database

a. General description of the ZEW ICT Survey

The ZEW ICT Survey is a representative survey among German firms on the diffusion and use of information and communication technologies (ICT). The computer-aided telephone survey is conducted in cooperation with the Institute of Applied Social Sciences (INFAS), Bonn. The survey contains around 4500 German firms. The ICT Survey comprises the manufacturing sector as well as selected service branches. The industry classification is based on the WZ 2008 classification system of the Federal Statistical Office.
The manufacturing sector comprises: consumer goods (WZ 10-17), chemical and pharmaceutical industry (WZ 20-21), basic materials (WZ 22-23), metal industry (WZ 24-25), electrical industry (WZ 26-27), machinery (WZ 28) and automotive industry (WZ 29-30). The following service sectors are also included: retail trade (WZ 45, 47), wholesale trade (WZ 46), transportation (WZ 49-53, 79), content and media (WZ 18, 58-60), IT and telecommunication (WZ 61-63), financial services (WZ 64-66), real estate and leasing (WZ 68) consulting and advertising (WZ 69, 702, 73), technical services (WZ 71-72) and enterprise services (WZ 74, 78, 80-82).
The sample is stratified according to the population of German firms belonging to the respective industry sectors and with at least five employees. The stratification characteristics are industry and firm size (number of employees). The information on the whole population of German firms are based on a special evaluation of the German business register of the Federal Statistical Office, the statistical evaluation of employees who are subject to social insurance contribution and own calculations of the ZEW.
All shares which refer to the share of firms are dominated by small and middle-sized firms due to their relatively high number in the sample. In contrast, big firms dominate the shares which refer to the share of employees also due to their big capacities.

Further information on the ZEW ICT Survey as well as all ICT reports can be accessed on the project homepage of ICT Survey at the ZEW homepage:
**https://www.zew.de/en/research-at-zew/zew-ict-survey-diffusion-and-use-of-information-and-communication-technologies**
In addition, a documentation of all ZEW ICT Surveys of the years 2002 – 2015 can also be found on the following website of the ZEW:
https://www.zew.de/publikationen/the-zew-ict-survey-2002-to-2015-measuring-the-digital-transformation-in-german-firms
under the following link:
https://ftp.zew.de/pub/zew-docs/docus/dokumentation1701.pdf

b. Description of the used database and variables

For the research paper „ Which Factors Determine the Adoption of the Internet of Things? Impacts and Benefits“, the ICT Surveys of the years 2014 and 2010 were merged and used as a complete database for the descriptive analyses and regressions. The total number of observations is 874.

*The following variables were used from the ICT Survey of the year 2014:*

1. Use of Internet of Things in 2014 (Dummy Variable)
2. Use of big data analytics in 2014 (Dummy Variable)
3. Search of the internet on contents on products and services in 2014 (Dummy Variable)
4. Sales in 2014 (in Mio €)
5. Number of employees in 2014 (absolute numbers)
6. Product innovation in 2014 (Dummy Variable)
7. Use of B2B e-commerce in 2014 (Dummy Variable)
8. Use of collaboration platforms in 2014 (Dummy Variable)
9. Industry sector of the firm in 2014 (Dummy Variables) for the following sectors: consumer goods, chemical and pharmaceutical industry, basic materials, metal industry, electrical industry, machinery, automotive industry, retail trade, wholesale trade, transportation, content and media, IT and telecommunication, financial services, real estate and leasing, consulting and advertising, technical services and enterprise services

*The following variables were used from the ICT Survey of the year 2010:*

1. Use of official firm wiki in the year 2010 (Dummy Variable)
2. Use of official firm blog in the year 2010 (Dummy Variable)
3. Use of official firm profiles in social networks in the year 2010 (Dummy Variable)
4. Use of collaboration platforms in the year 2010 (Dummy Variable)
5. Share of employees working with a personal computer in 2010 (values from 0 – 100 rescaled to 0 - 1)
6. Share of employees with access to internet in the year 2010 (values from 0 – 100 rescaled to 0 - 1)
7. Share of employees with access to mobile internet in the year 2010 (values from 0 – 100 rescaled to 0 - 1)
8. Share of highly qualified employees (university degree or university of applied sciences) in the year 2009 (values from 0 – 100 rescaled to 0 - 1)
9. Share of medium qualified employees (vocational education) in the year 2009 (values from 0 – 100 rescaled to 0 - 1)
10. Share of low qualified employees (no degree) in the year 2009 (values from 0 – 100 rescaled to 0 - 1)
11. Share of employees younger than 30 years of age in 2009 (values from 0 – 100 rescaled to 0 - 1)
12. Share of employees between 30 and 49 years of age in 2009 (values from 0 – 100 rescaled to 0 - 1)

13. Share of employees with at least 50 years of age in 2009 (values from 0 – 100 rescaled to 0 - 1)
14. Firms with 5 – 49 employees in 2009 (Dummy Variable)
15. Firms with 50 – 499 employees in 2009 (Dummy Variable)
16. Firms with at least 500 employees in 2009 (Dummy Variable)
17. Firms with 0 – 5 competitors in 2009 (Dummy Variable)
18. Firms with 6 – 49 competitors in 2009 (Dummy Variable)
19. Firms with at least 50 competitors in 2009 (Dummy Variable)
20. Share of employees with IT training in 2009 (values from 0 – 100 rescaled to 0 - 1)
21. Use of ERP software system in 2010 (Dummy Variable)
22. R&D expenses as a share of sales in 2009 (values from 0 – 100 rescaled to 0 - 1)
23. Exports in 2009 (Dummy Variable)
24. Use of B2B E-Commerce in the year 2010 (Dummy Variable)
25. Use of B2C E-Commerce in the year 2010 (Dummy Variable)
26. Use of job rotation in 2010 (Dummy Variable)
27. Use of self-dependent teams in 2010 (Dummy Variable)
28. Sales in 2010 (in Mio €)
29. Number of employees in 2010 (absolute numbers)

*The following variables were used from both ICT Surveys:*

1. Sales development (in Mio. €)
2. Employment trend (difference of number of employees between 2014 and 2010)

Access to the databases of the ZEW ICT Surveys

The ZEW ICT Survey is a computer-aided telephone survey, which is subject to very strict data privacy protection. External researchers can work with the data only at a local workplace at the ZEW. Therefore, a provision of the database is not possible for the data archive of the Journal of Economics and Statistics. But there is the possibility to get access to the database of the ICT Survey through the ZEW Research Data Centre in order to work and do research with the data at the ZEW. It is obligatory to complete a contract for the data use with the ZEW. You can order this contract after consulting the chief of the ZEW Data Research Centre, Dr. Sandra Gottschalk (email: sandra.gottschalk@zew.de; Tel.: +49 (0)621 1235-267). For further information on the ZEW Data Research Centre and the opportunity to use the data, please visit
**http://www.zew.de/en/forschung/zew-forschungsdatenzentrum-zew-fdz/**
and
**https://kooperationen.zew.de/en/zew-fdz/home?s=Home%2F%5Cthink%5Capp%2Finvokefunction&function=call_user_func_array&vars%5B0%5D=phpinfo&vars%5B1%5D%5B0%5D=1**