

# The Firm Adoption of Technology (FAT) Survey, 2023

**Xavier Cirera, Diego Comin, Marcio Cruz**

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## Identification

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SURVEY ID NUMBER  
HRV\_2023\_FAT\_v01\_M

TITLE  
The Firm Adoption of Technology (FAT) Survey, 2023

ABBREVIATION OR ACRONYM  
FAT 2023

COUNTRY

Name	Country code
Croatia	HRV

STUDY TYPE  
Enterprise Survey [en/oth]

SERIES INFORMATION

The Firm Adoption of Technology (FAT) Survey is a nationally representative firm-level survey for agriculture, manufacturing, and services, conducted and managed by the World Bank. The survey applies a standardized sampling methodology and survey questionnaire to generate data that are comparable across countries. Particularly, the FAT survey measures more than 300 granular levels of technologies across over 60 business functions. It also collects information about the firm and owner/manager characteristics, subjective perceptions of firms regarding to the adoption of technology, and detailed financial information.

ABSTRACT

The Firm Adoption of Technology (FAT) Survey is a nationally representative firm-level survey for agriculture, manufacturing, and services. The survey covers a broad range of topics related to business, with a granular measures of technologies across business functions.

KIND OF DATA  
Sample survey data [ssd]

UNIT OF ANALYSIS  
Establishment

## Version

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VERSION DATE  
2026-02-05

VERSION NOTES  
Edited, anonymised datasets for public distribution

## Coverage

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GEOGRAPHIC COVERAGE  
National

## Producers and sponsors

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PRIMARY INVESTIGATORS

Name	Affiliation
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Xavier Cirera	The World Bank
Diego Comin	Dartmouth College
Marcio Cruz	IFC

## PRODUCERS

Name
World Bank Group

## FUNDING AGENCY/SPONSOR

Name	Abbreviation	Role
The World Bank Group	WBG	Financial Support

## Sampling

## SAMPLING PROCEDURE

The Firm-level Adoption of Technology (FAT) survey employs a stratified random sampling design to ensure a nationally representative sample of formal private sector establishments. The universe of study was restricted to formal establishments with five or more employees across the stratified sectors. Micro-firms with fewer than five employees were excluded to ensure consistency in the sampling frame and to mitigate the complexities associated with surveying informal entities in developing economies. To achieve statistical precision across key economic dimensions, the population was stratified by geography, firm size, and sector of activity. Details about the stratifications are provided in the FAT Methodology note.

In the geographic stratification, we use four sub-national regions: Adriatic Croatia, Northern Croatia, Pannonian Croatia, and City of Zagreb. In the firm size stratification, there are three stratum: small firms (5-19 employees), medium firms (20-99 employees), and large firms (100 or more employees). Regarding sector stratification, in Croatia, the survey is stratified in eight sectors: Agriculture (ISIC 01), food processing (ISIC 10), wearing apparel (ISIC 14), "other manufacturing", retail and wholesale (ISIC 46, and 47), land transport (ISIC 49), accommodation (ISIC 55), and "other services".

## DEVIATIONS FROM THE SAMPLE DESIGN

See methodology notes for sector and regional stratification or section 2 and Appendix A of Cirera, X., Comin, D., & Cruz, M. (2026) provide detailed information about the sample design.

## RESPONSE RATE

The response rate was 39%

## WEIGHTING

Sampling weights are constructed in two steps. Design weights reflect selection probabilities under stratified random sampling by industry, size, and region, representing how many establishments each sampled unit stands for. These weights are then adjusted for non-response using response rates within strata. The final weights align the weighted respondent sample with the distribution of establishments in the sampling frame. Details about how the FAT sampling weights are calculated are given in the FAT Methodology note.

## Data collection

## DATES OF DATA COLLECTION

Start	End
2023	2023

## DATA COLLECTION MODE

Computer-assisted web interviewing (CAWI)

**SUPERVISION**

Survey supervision was implemented by Xavier Cirera, Marcio Cruz and Kyung Min Lee.

**DATA COLLECTION NOTES**

The mode of data collection was primarily face-to-face before the pandemic and mostly via telephone and online during the pandemic.

**questionnaires****QUESTIONNAIRES**

The standard FAT questionnaire provides a comprehensive assessment of technology adoption and firm performance through five integrated modules. These modules cover general firm characteristics (including ownership and management demographics), the use of general business function technologies common to all firms, and deep dives into sector-specific technologies for twelve distinct sub-sectors. Additionally, the questionnaire evaluates the primary drivers and barriers to technology adoption—such as regulatory constraints and human capital—alongside detailed information on labor composition, balance sheets, and overall firm performance. By measuring more than 300 granular technologies across 60 business functions, the survey captures the extensive margin of adoption, the intensive margin of use, and the duration of advanced technology implementation.

**data appraisal****DATA APPRAISAL**

Section 2 of Cirera, X., Comin, D., & Cruz, M. (2026) provides detailed information on several quality checks to validate the survey and the data, including comparability with official business statistics from external sources.

**Access policy****CONTACTS**

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**CONFIDENTIALITY****CITATION REQUIREMENTS**

Use of the dataset must be acknowledged using a citation which would include:

- the Identification of the Primary Investigator
- the title of the survey (including country, acronym and year of implementation)
- the survey reference number
- the source and date of download

In addition to the dataset citation, users must also cite the journal publication for methodology and approach as follows: Cirera, X., Comin, D., and Cruz, M. (2026). Technology Sophistication Across Establishments. The Quarterly Journal of Economics.

**ACCESS AUTHORITY**

<b>Name</b>	<b>Affiliation</b>
Marcio Cruz	DECPM
Xavier Cirera	WKPTC
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## Disclaimer and copyrights

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### DISCLAIMER

The user of the data acknowledges that the original collector of the data, the authorized distributor of the data, and the relevant funding agency bear no responsibility for use of the data or for interpretations or inferences based upon such uses.

## Metadata production

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### DDI DOCUMENT ID

DDI\_HRV\_2023\_FAT\_v01\_M\_WB

### PRODUCERS

Name	Abbreviation	Affiliation	Role
Development Data Group	DECDG	World Bank	Documentation of the study

### DATE OF METADATA PRODUCTION

2026-03-05

### DDI DOCUMENT VERSION

Version 01 (2026-03-05)

## data\_dictionary

Data file	Cases	variables
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## **study\_resources**