Innovation in Data Collection, Estimation and Dissemination for ICT Indicators

11TH WORKSHOP ON SURVEY METHODOLOGY

Quantitative Methods Team:
Marcelo Pitta, Isabela Coelho,
Mayra Pizzot, Camila Lima,
José Márcio Martins, Winston Oyadomary

Consultants:
Pedro Silva & Denise Silva

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- Context, past experiences
- The impact of COVID pandemic
- Experiences of CETIC.br
- ICT indicators dissemination and analysis

A BIT OF CONTEXT

15 YEARS PRODUCING ICT DATA FOR POLICYMAKING AND RESEARCH

1995

Multistakeholder model for Internet governance in Brazil

2005

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registro.br

2011

UNESCO 36th General Conference approves Cetic.br as a Category 2 Center

2012

UNESCO

Organização das Nações Unidas para a Educação, a Ciência e a Cultura

cetic.br

Centro Regional de Estudos para o Desenvolvimento da Sociedade da Informação sob os auspícios da UNESCO

2021

Fonte: CGI.br/NIC.br (2021)

A BIT OF CONTEXT

15 YEARS PRODUCING ICT DATA FOR POLICYMAKING AND RESEARCH

- Increasing demand for timely and disaggregated indicators
- Demand for new indicators

But

- Reduction of the resources available for the traditional statistics production process
- Increasing survey non-response, irrespective of collection mode

A BIT OF CONTEXT

15 YEARS PRODUCING ICT DATA FOR POLICYMAKING AND RESEARCH

- Study and production of small area estimates by state for the ICT Households Survey (SJIAOS 36 – June 2020)
- Study on combining non-probability with probability sampling as a lower cost alternative to the traditional methods (JSM 2020)[1]
- Use of administrative records and big data sources (web scrapping and analysis methodologies) to collect and produce ICT estimates (Statistics Canada's Int. Meth. Symposium 2018)[2]

[1] https://ww2.amstat.org/meetings/jsm/2020/onlineprogram/AbstractDetails.cfm?abstractid=313597
https://www.amstat.org/asa/files/pdfs/ASAStoreOrderForm.pdf?hkey=a420f2db-cdfd-4bd4-b4f1-5fa4c9364a1f
[2] https://www.statcan.gc.ca/eng/conferences/symposium2018/program

A BIT OF CONTEXT

15 YEARS PRODUCING ICT DATA FOR POLICYMAKING AND RESEARCH

- These studies provide insight about challenges and advantages related to application of innovative methods for ICT data production
- Some experiments concluded that new approaches tried were not capable of meeting the desired goals

Some of the results, even when they meet good quality standards, are complex to explain to the ordinary user

THE INPACT OF THE COVID PANDEMIC

THE INPACT OF THE COVID PANDEMIC

COVID-19 DEFINES A NEW SCENARIO FOR DATA PRODUCTION

Traditional face-to-face interviewing impossible for most surveys during 2020 and early 2021

Telephone interviewing with enterprises, schools and health facilities (other target populations of Cetic.br surveys) became more difficult → non-response rates increased

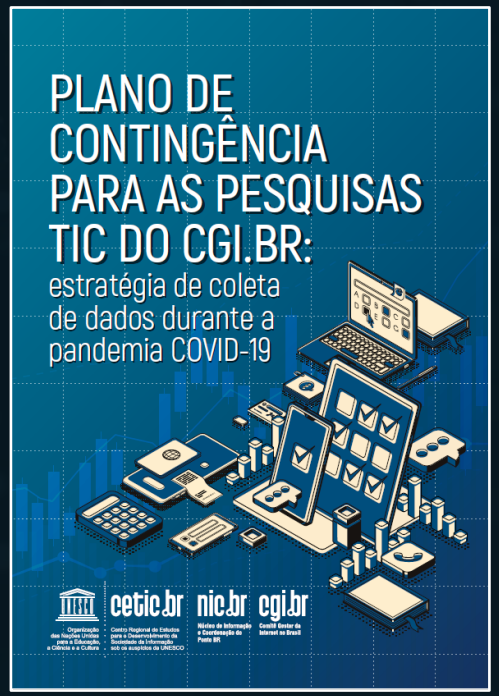
Themes of study of Cetic.br – access, use and appropriation of Internet technologies is correlated to the new way of life and to the possibility of becoming “respondents” to Cetic.br surveys (of any kind)

EXPERIENCES OF CETIC.BR

COVID-19 AND FACE-TO-FACE SURVEYS

Cetic.br developed a contingency plan to collect and publish ICT statistics based in alternative methods of data collection:

- Web panel survey with Internet users
- Telephone data collection for the traditional ICT Households survey



- » New methodological approaches
- » Data collection via CATI and WEB

COLLECTING DATA FROM A WEB PANEL

NONPROBABILITY SAMPLING

ICT Panel COVID-19 (Web panel survey)

Target population

Internet users aged 16+ in Brazil

Target domains

Sex (2), education (3), region (5), age group (5) and socioeconomic status - SES (4) – not cross-classified

Frame

Web panel of individuals obtained from market research companies, complemented by telephone lists (to reach population with lower SES/education)

Sample design

Quota sampling based on region, sex, age group, SES, and education

COLLECTING DATA FROM A WEB PANEL

WEIGHTING

Calculating pseudo-weights based on a reference probability sample survey: ICT Households 2019

Target population

Permanent private households and their residents aged 10+ in Brazil

Total sample size

~ 30,000 interviews

(households and individuals – one per household)

Frame

IBGE 2010 census enumeration areas database

Sample design

Stratified multi-stage sampling of households and residents

METHODS

APPROACH USED

Update the size of the target population (Internet users aged 16+) using data collected by the ICT Households 2019 survey combined with data from IBGE's main quarterly labor force household survey

Evaluate and identify the population represented by respondents of the web panel survey, among those in the target population, through a predictive model for Internet use

METHODS

APPROACH USED

Estimate pseudo-inclusion probabilities for the non-probability sample units via logistic regression model and use their reciprocals as weights, considering thresholds defined by propensity scores of Internet use (model for Internet use)

Evaluate the results according to calibration factors and experts' knowledge

Estimate variances using bootstrap

RESULTS
EVALUATING PROS & CONS

ADVANTAGES

- Data collected avoiding face-to-face interviews
- The whole survey, from planning to publishing survey results, took less than two months to complete
- Cost of data collection much lower than that of traditional face-to-face surveys

RESULTS
EVALUATING PROS & CONS

DISADVANTAGES

- Web panel recruitment is not meant to be representative of the target population (Internet users)
- Coverage issues remain, despite using a probability survey as reference for weighting
- Approach is model-dependent: good models may not always be available
- Explanation of methodology and its dissemination is complex

ICT HOUSEHOLDS 2020

COLLECTING HOUSEHOLD DATA THROUGH CATI

ICT HOUSEHOLDS 2020

Target population

Permanent private households and their residents aged 10+ in Brazil

Frame

All the respondents of ICT Households surveys from 2017, 2018 and 2019 that provided a valid telephone number (53.673 contacts)

Sample design

Stratified, multistage cluster sampling (the same as used in the past surveys)

ICT HOUSEHOLDS 2020

COLLECTING HOUSEHOLD DATA THROUGH CATI

~7% response rate, with indication of bias towards individuals with higher SES and more connected households and individuals

Attempts to correct for the differential non-response by weighting methods unsuccessful

Solution: collect additional sample via face-to-face interviewing based on a small subsample of the frame used

ICT HOUSEHOLDS 2020

COLLECTING HOUSEHOLD DATA THROUGH F2F

Sample of enumeration areas with no respondents in the CATI phase of the data collection

Procced the regular F2F collection method for the selected enumeration areas

Data collection: made in three weeks, w/ appropriate sanitary protocols

Response rate: 72%

ICT HOUSEHOLDS 2020

WEIGHTING

Weighted data obtained from the two collection modes separately for representing their respective parts of the original frame

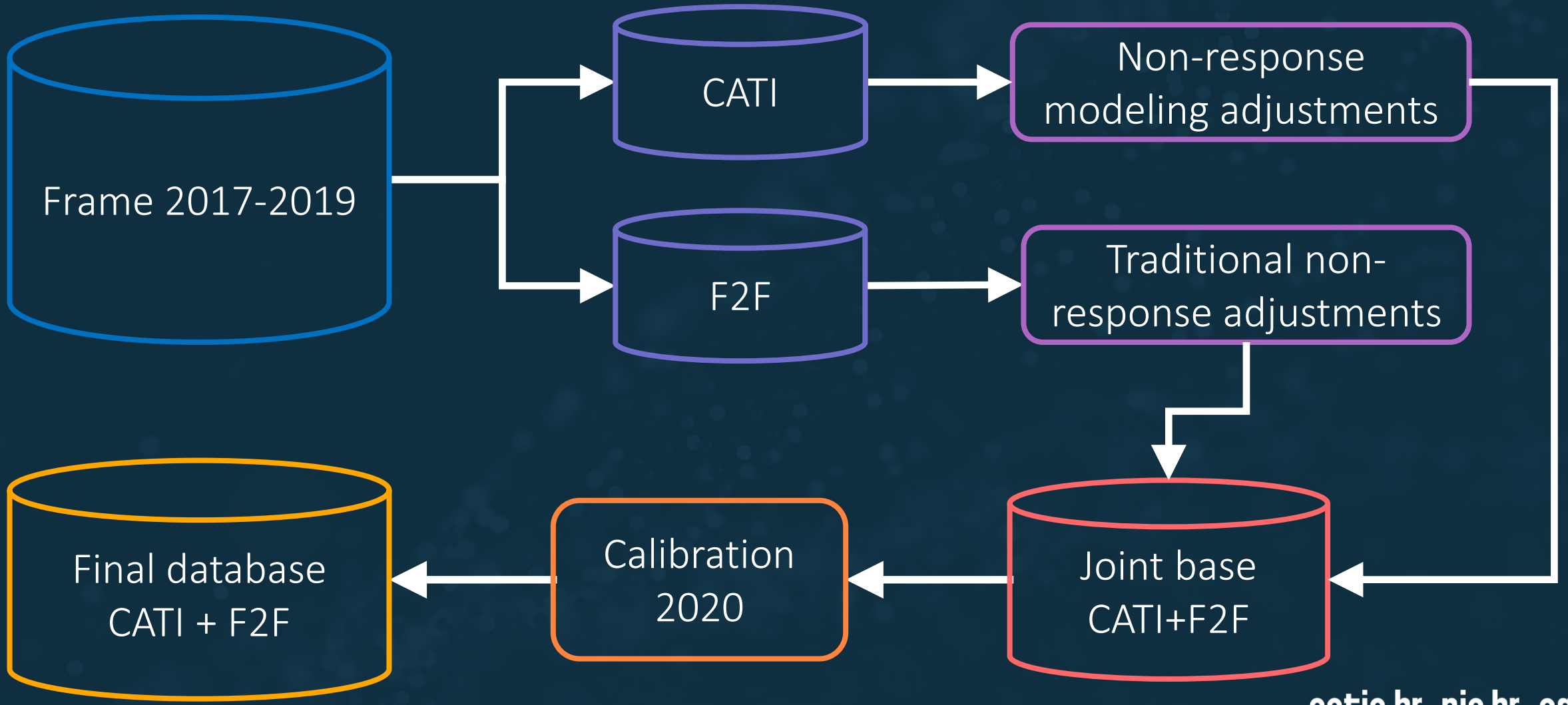
- CATI: weighting using modeling approaches and propensity scores methods
- F2F: weighting using traditional inverse-selection-probability techniques

Joined data obtained from both collection modes and calibrating for estimated population totals (IBGE – National household survey)

Variances estimated using bootstrap method

ICT HOUSEHOLDS 2020

WEIGHTING



RESULTS
EVALUATING PROS & CONS

ADVANTAGES

- Data collected minimizing face-to-face interviews
- Cost of data collection cheaper than a traditional face-to-face survey

CAVEATS

- Requires up-to-date database of telephone contacts (compliant with data privacy regulations)
- It was not possible to evaluate mode effects

RESULTS
EVALUATING PROS & CONS

DISADVANTAGES

- CATI requires shorter questionnaire (less information collected)
- Resulting sample smaller than the traditional sample
- Harder to explain the ‘dual-mode’ methodology and to disseminate microdata

ICT INDICATORS DISSEMINATION AND ANALYSIS

NEW PLANS

- More detailed methodology explanation when releasing the results
- A new space in the Cetic.br portal – ***Experimental statistics***
- More capacity building events for users of our data
- Dissemination of microdata in open statistical software – R CRAN – which enables using more advanced techniques with ease (R *survey* package data objects)

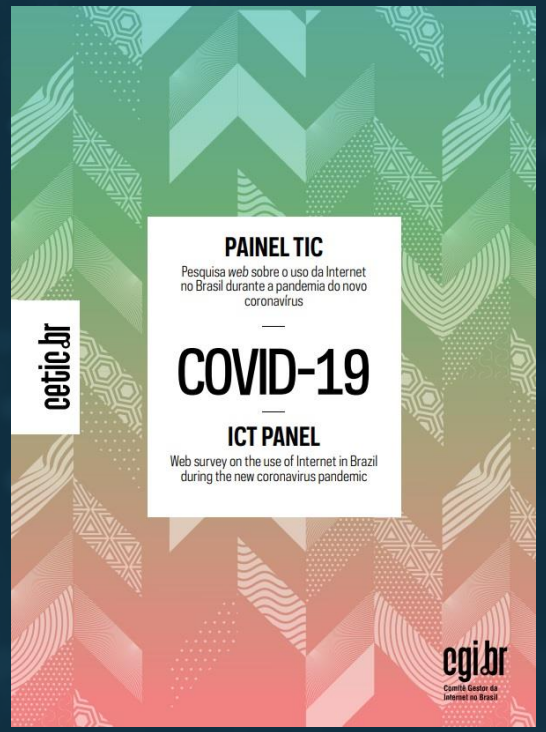
Thank you all!

www.cetic.br

marcelopitta@nic.br

Access the survey in English/Portuguese:

https://cetic.br/en/publicacao/painel-tic-covid-19/



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