# 40th Voorburg Group Meeting

The Hague, Netherland

September 21st – 25th, 2026

# Brazil's Annual Surveys of Services and Trade: methods, innovations and challenges

Luiz Andrés Ribeiro Paixão[1][2]

Brazilian Institute of Geography and Statistics (IBGE)

[1] "The views expressed in this paper are solely those of author and are not necessarily those of the IBGE".

[2] The author would like to express his gratitude to Alexandre Belisario de Andrade, Andrea Bastos, Fernanda Vilhena, Leandro Andraos and Rachel Rabello, both from IBGE, for their support in finalizing this paper. Any remaining errors and omissions are the solely responsibility of the author.

## 1.Introduction

The Brazilian Institute of Geography and Statistics (IBGE) has the mission "to portray Brazil by providing the information required for understanding its reality and the exercise of citizenship." IBGE's predecessor was the National Institute of Statistics (INE), which began its activities on 29 May 1936 in Rio de Janeiro, Brazil. In 1937, the Brazilian Council of Geography was incorporated into INE, giving rise to the institution that became known as IBGE. However, statistical activities within the Brazilian government date back to 1871.

Until 1985, economic surveys of enterprises were conducted through economic censuses. Four decennial economic censuses were carried out in 1940, 1950, 1960, and 1970, followed by three quinquennial censuses in 1975, 1980, and 1985. Although the first census focused primarily on industrial activity, the first modern economic census, conducted in 1940, already reflected a concern with measuring trade and services. The most recent economic census provided highly detailed coverage of these activities.

In 1990, the economic census could not be conducted because of the fiscal crisis facing Brazil. During the early 1990s, IBGE's economic statistics team studied new approaches to measuring economic activity using enterprise data, and sample-based economic surveys gradually replaced the census model. The first sample-based editions of the Annual Survey of Industry (PIA), the Annual Survey of the Construction Industry (PAIC), and the Annual Survey of Trade (PAC) were conducted in 1996. The Annual Survey of Services (PAS), in turn, was launched in 1998.

Today, annual economic surveys serve as structural benchmark surveys for measuring economic activity from a supply-side perspective. Their data are essential inputs for compiling Brazil's Gross Domestic Product (GDP) and are important sources for sectoral studies and planning. The databases produced by the annual economic surveys are also used as sampling frames for monthly and thematic surveys.

This paper reviews IBGE's efforts to measure services and trade activities since 1996. It highlights some of the main challenges and remaining gaps, as these help explain the current stage of development of the surveys.

## 2. The Adoption of Probability Sample Surveys in Brazil

The transition from economic censuses to sample surveys took place after extensive discussions with Brazilian society in the early 1990s. Researchers and data users from both the public and private sectors were concerned about the potential loss of important information resulting from the discontinuation of the

economic censuses. At the same time, these stakeholders viewed the greater agility of sample surveys favourably. The IBGE team, in turn, pointed out that budgetary and logistical constraints made the economic census model less feasible than sample-based economic surveys.

This dialogue led IBGE to adopt a sample survey model with a broad take-all stratum. In PIA and PAIC, all enterprises with 30 or more persons employed are included in the take-all stratum. In PAC and PAS, this threshold is 20 or more persons employed. This solution enabled IBGE to provide the System of National Accounts with robust supply-side information while continuing to offer society a comprehensive database on enterprises, economic activities, and sectors.

The current model is based on IBGE's Central Register of Enterprises (CEMPRE), which contains information on all formal enterprises in Brazil. The register is fed by data from the Annual List of Social Information (RAIS), the Digital Bookkeeping System for Tax, Social Security and Labour Obligations (eSocial), the General Register of Employed and Unemployed Workers (CAGED), IBGE's annual economic surveys (PIA, PAIC, PAC, and PAS), and the Register Maintenance System (SIMCAD). RAIS, eSocial, and CAGED are administrative records maintained by the Ministry of Labour and Employment (MTE) and constitute the main basis of CEMPRE. Since 2023, all Brazilian enterprises have been required to submit their information through eSocial instead of RAIS. RAIS and CAGED data are now derived from information submitted through eSocial. Data from the annual surveys and SIMCAD are used to update CEMPRE.

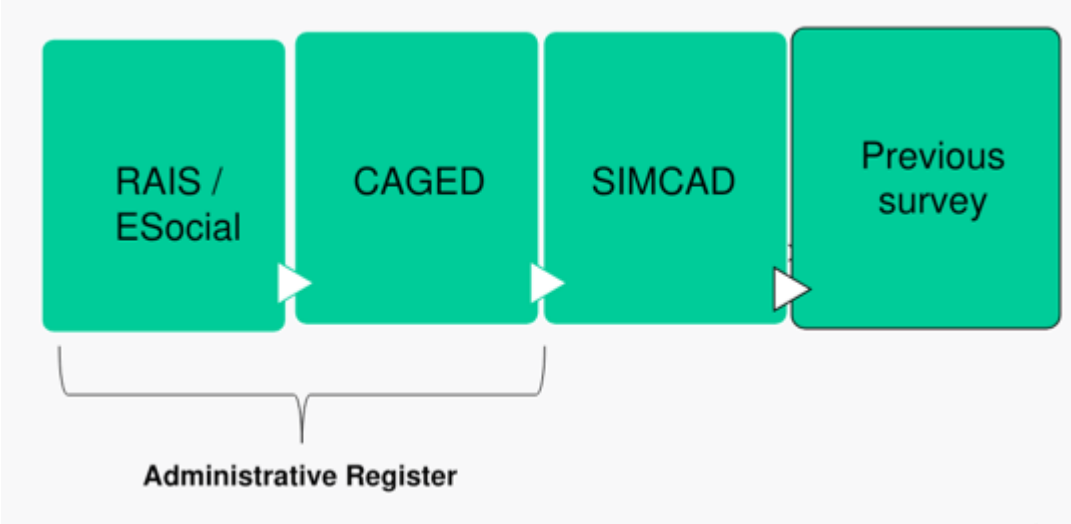
Each enterprise has a unique identification number in the National Register of Legal Entities (CNPJ) and is assigned an economic activity code according to the National Classification of Economic Activities (CNAE/ISIC). This assignment is supported by an algorithm developed by IBGE's CEMPRE team. CNAE information allows the population of enterprises to be divided among the four annual economic surveys.

RAIS is an administrative register that historically collected annual labour information in two dimensions. The first comprises information on employees and can be divided into two categories: (i) demographic characteristics, including sex, age, colour or race, nationality, educational attainment, and disability status; and (ii) characteristics of the employment relationship, including occupation, dates of hiring and separation, reason for separation, type of employment contract, monthly earnings, the thirteenth-month salary, and overtime hours. The second dimension comprises information on employers, using the establishment as the unit of analysis. Establishment-level information includes economic activity (CNAE/ISIC), size, legal status, and geographic location.

CAGED is restricted to movements in formal employment and focuses on current hires and separations, allowing these flows to be measured monthly. Its data also include occupation, wages, working hours, and reasons for hiring and separation. On the employer side, the CAGED database provides information on economic activity (CNAE/ISIC) and geographic location. In short, RAIS represents the stock of formal employment, whereas CAGED captures its flows. RAIS is more detailed, while CAGED is more timely and dynamic.

This paper focuses on the Annual Survey of Services (PAS) and the Annual Survey of Trade (PAC).

Figure 1 – The CEMPRE database




To construct the survey samples, the latest compilation of RAIS data is updated using employment flows from CAGED, as well as information from SIMCAD and previous editions of the annual surveys.

The sample designs of the annual surveys are divided into two levels. The first level is the natural stratum (ESTN), which is defined by the combination of a Brazilian federation unit (UF) and an economic activity, as classified by CNAE/ISIC. Brazil has 27 federation units, each identified by a two-digit code. The first digit indicates the Major Region—North (1), Northeast (2), Southeast (3), South (4), or Central-West (5)—and the second identifies the federation unit within that region. For example, 41 is the code for Paraná, indicating that this federation unit belongs to the South region. Therefore, ESTN 414711 comprises all enterprises headquartered in UF 41 (Paraná) whose main economic activity is CNAE 4711: retail sale in non-specialised stores with food, beverages, or tobacco predominating. It is important to highlight that the sample designs of the Brazilian annual economic surveys may define economic activities at the four-, three-, or two-digit level of CNAE, or use combinations of these different levels.

The second level is the final stratum (ESTF). At this level, the sample is divided into take-some and take-all strata. The take-all stratum is similar to a census because all enterprises within it are selected. For PAS and PAC, all enterprises with 20 or more persons employed, according to CEMPRE data, are included in the take-all stratum. Additional criteria may also result in an enterprise being included in this stratum. For example, if an enterprise initially classified in a take-some stratum reports an unusually high level of revenue, it may be transferred to the take-all stratum. Another criterion concerns enterprises that are formally or informally linked to an enterprise already included in the take-all stratum. In such cases, the linked enterprise may also be included in the take-all stratum in subsequent years.

The take-all stratum is divided into three size classes: C1, comprising enterprises with 20 to 99 persons employed; C2, with 100 to 199 persons employed; and C3, with 200 or more persons employed. In C1, ordinary forms of non-response, such as refusal or failure to locate the enterprise, result in an adjustment to the weights of the responding units. In the C2 and C3 strata, these forms of non-response result in data imputation.

It is important to distinguish ordinary non-response from enterprises classified as inactive under the FAC collection status code. These enterprises were recorded as active in CEMPRE when the sample was selected. However, during data collection, they reported that they had remained inactive throughout the reference year and had therefore earned no revenue. Enterprises that conducted only residual activity during the year may also receive this classification. Although these enterprises do not complete the questionnaire, they are not treated as ordinary non-respondents and do not lead to an adjustment to the weights of the responding units. By contrast, an enterprise that operated during part of the reference year and generated revenue must complete the questionnaire.

The take-some stratum is divided into three size classes: A1, comprising enterprises with 0 to 4 persons employed; A2, with 5 to 9 persons employed; and A3, with 10 to 19 persons employed. Each enterprise has a sampling weight defined as the inverse of its probability of selection. This probability is calculated for each combination of natural stratum (ESTN) and final stratum (ESTF). In cases of ordinary non-response, the weights are recalculated to account for the resulting number of active responding enterprises. The weights are also calibrated so that the sample estimates are consistent with CEMPRE population totals for the number of enterprises, persons employed, and wages.

There is also a third type of stratum, known as the managerial stratum (Gerencial – G). Stratum G comprises enterprises with 19 or fewer persons employed that operate in more than one federation unit (UF). Since PAS and PAC are legally required to measure services and trade activities, respectively, in each UF,

this stratum functions as a take-all stratum: all enterprises included in it are selected to complete the questionnaire.

Figure 2 – Sample design for PAC and PAS

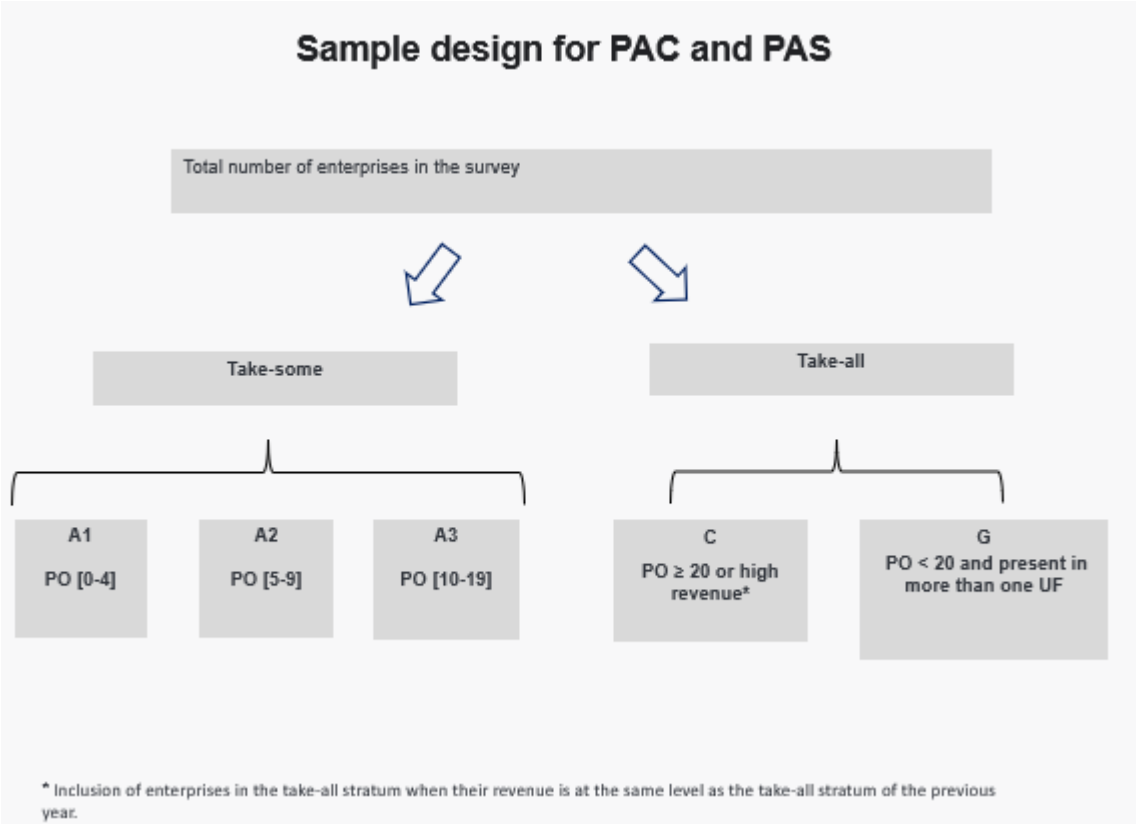
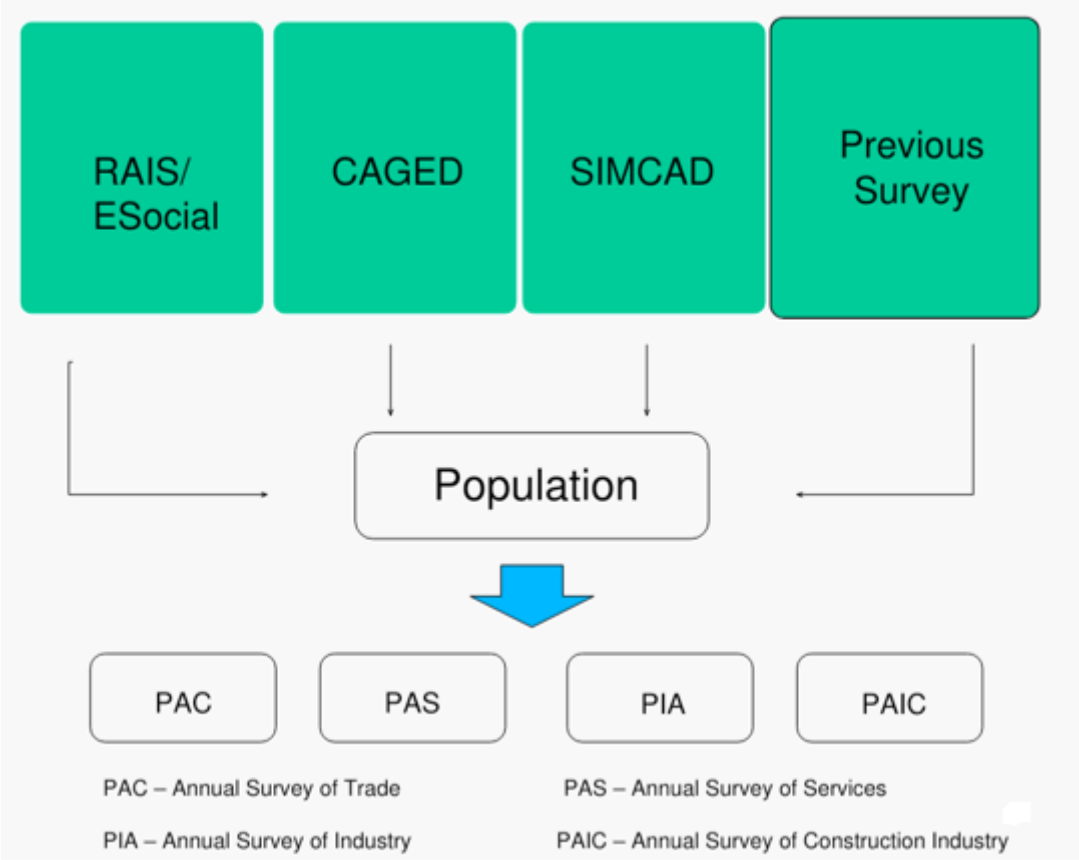


Figure 3 – IBGE Annual Sample Surveys: population and sample




### 3. PAS and PAC Populations and Samples

As discussed in the previous section, during the second half of the 1990s, IBGE decided, following extensive dialogue with Brazilian society, to replace the economic census model with sample surveys characterised by a broad take-all stratum. Comparing data for 2009 and 2025, the population of service enterprises increased by 126.4%, from 1.3 million to 2.9 million. The population of small enterprises—those with 0 to 4 persons employed in the A1 stratum—increased more rapidly than the other strata, rising from 1.0 million to 2.4 million, or 135.5%. The number of enterprises in the take-all stratum, in turn, increased by 101.9%, from 59.2 thousand to 119.5 thousand.

The PAS sample increased by 73.2% over this 16-year period, from 87.7 thousand to 151.9 thousand enterprises. The take-all component of the sample increased by 101.9%, whereas the take-some component grew by 13.7%. Within the take-some component, the A1 stratum increased by 11.2% over the same period.

**Figure 4 – PAS population by stratum, 2009 and 2025**

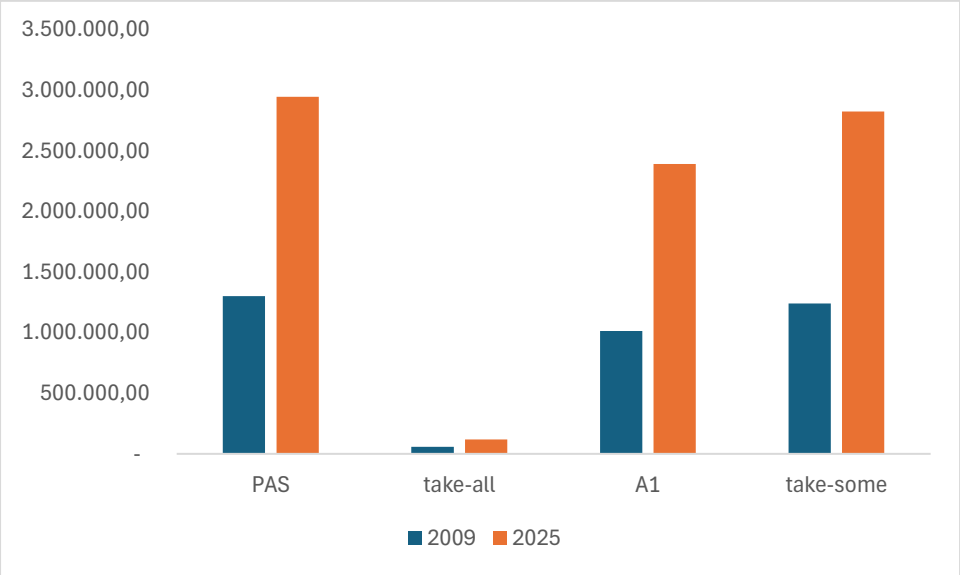
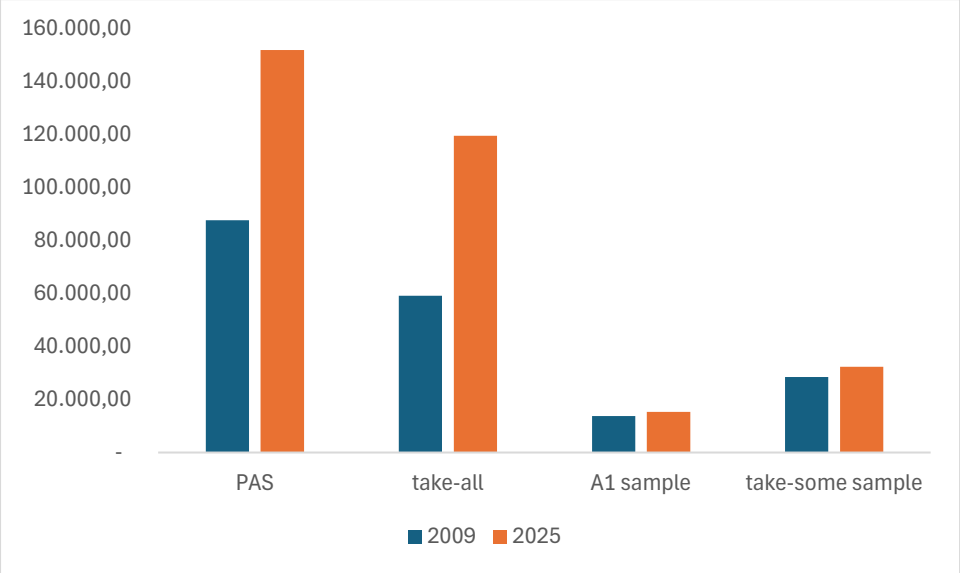



**Figure 5 – PAS sample by stratum, 2009 and 2025**




Both the PAC population and sample were more stable over this period. The 32.2% increase in the sample was mainly driven by the take-all component, which grew by 40.1% between 2009 and 2025. The PAC population was 2.0 million enterprises in 2009, exceeding the PAS population. By 2025, however, the PAC population, at 2.1 million, was smaller than the PAS population. The PAC sample was also smaller than the PAS sample in both years: 69.5 thousand enterprises in 2009 and 90.6 thousand in 2025.

These data show how the Brazilian economy has become increasingly service-based and highlight the importance of measuring these activities. This scenario also illustrates one of the main challenges involved in measuring services and trade in Brazil. In 2025, the combined PAS and PAC populations included

approximately 4.0 million very small enterprises (VSEs) with 0 to 4 persons employed. VSEs represented 72.9% of the PAS population and 73.4% of the PAC population. Collecting data from these enterprises is difficult for several reasons.

First, reaching the appropriate respondent can be difficult. VSEs frequently change their addresses, and their registered addresses may be outdated. Some VSEs are registered at residential addresses, which may be more difficult for field staff to access. More recently, some VSEs have been registered at shared workspaces. The managers of these workspaces are not responsible for the enterprises registered there and generally cannot respond on their behalf. Consequently, identifying and reaching the person responsible for the enterprise can be particularly difficult in these environments.

Second, this stratum contains many potentially inactive enterprises. These enterprises are recorded as active in CEMPRE but are operationally inactive and earn no revenue. In Brazil, VSE owners commonly retain an active CNPJ registration even when the enterprise itself remains dormant. There are several reasons for this behaviour, including the low cost of maintaining an active CNPJ, the possibility of using it to obtain certain benefits—such as a lower-cost family health insurance plan—and the flexibility of retaining a legal entity for possible future use. In some cases, the person responsible for the enterprise may also claim that it is inactive to avoid completing the questionnaire.

A related issue is that some Brazilian enterprises operate at the margins of formality. They may remain active but fail to comply fully with their tax, legal, or labour obligations. Economic informality is common in Latin American countries and has been examined in classic and more recent studies, including de Soto, Ghersi and Ghibellini (1989), Portes, Castells and Benton (1989), Nogueira (2017), and Ulyssea and Ponczek (2022). The last two studies focus specifically on Brazilian enterprises.

Third, VSEs frequently have limited or poorly organised accounting records. In these cases, the questionnaire may be completed, but the information provided can be imprecise. This requires considerable effort to contact the respondent more than once and to edit, validate, and, when necessary, impute the data.

Fourth, VSEs often carry large sampling weights. As a result, their data require considerable effort in terms of editing, validation, and imputation, since the estimates can be highly sensitive to outliers and non-response.

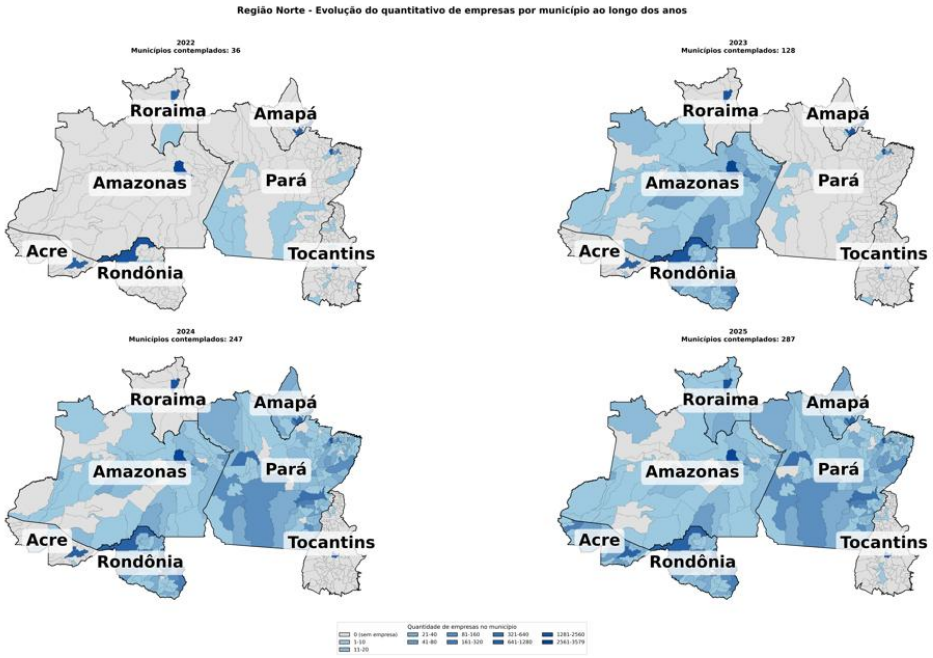
**4. PAS and PAC Innovations and Challenges**

During the second half of the 1990s, PAS and PAC covered enterprises throughout Brazil, except in the North Region, where coverage was restricted to enterprises headquartered in the state capitals and the Belém Metropolitan Area.

This restriction reflected logistical constraints. Sending a field interviewer to collect survey questionnaires was extremely costly in the North Region, where distances are vast and transport options were often limited or unreliable. It should also be noted that, during the surveys' first years, questionnaires were completed on paper and, somewhat later, using floppy disks. These data collection methods depended heavily on in-person contact.

Today, downloadable questionnaires and the widespread use of smartphones among the Brazilian population have reduced these logistical costs. In this context, an important innovation implemented in recent years has been the expansion of geographic coverage in the North Region. In 2023, full coverage was extended to two federation units: Rondônia and Amazonas. In 2024, it was extended to Pará and Amapá, followed by Acre and Roraima in 2025. Following this expansion, Tocantins is the only federation unit in the North Region whose coverage remains restricted to its capital. The next step is to extend coverage to the entire territory of Tocantins.

FIGURE 6 – Expansion of PAS and PAC coverage in Brazil's North Region




The second innovation is the replacement of downloadable questionnaires with an online form developed in HTML. This new collection instrument is more accessible to most respondents and compatible with the main operating systems and web browsers. It is also easier for IBGE to maintain and update and more convenient for respondents to use.

The third innovation is the Fast-Fill Project. Since most respondents to IBGE's business surveys are accountants, the Fast-Fill Project integrates accounting software with IBGE surveys, enabling the automated transfer of business data to

statistical questionnaires. The project is a partnership between IBGE and accounting software companies, and its implementation depends on these companies' willingness to incorporate the Fast-Fill feature into their products. The project began in 2020, and the number of accounting software packages incorporating this feature has increased each year since then. Across all four annual surveys (PAC, PAIC, PAS and PIA), the total number of enterprises using Fast-Fill increased from 15.9 thousand in 2021 to 42.4 thousand in 2024.

An important challenge that has emerged in recent years concerns enterprise groups. The spread of tax planning strategies has encouraged some enterprises to distribute their activities across several legal units, each identified by a different CNPJ. In economic terms, these legal units form an enterprise group, but they are not necessarily recognised as a formally constituted economic group. Consequently, this type of arrangement cannot be identified *a priori* in CEMPRE or in other administrative records.

Under this strategy, some CNPJs report employees and wages but no operating revenue, while another CNPJ concentrates the group's revenue. Such arrangements may allow the enterprise to reduce its tax burden under different tax regimes. The existence of the Simplified National Tax System (Simples Nacional)[3] partly explains why this form of tax planning has become widespread in Brazil.

Since these enterprise groups cannot be identified in advance through CEMPRE, they are usually detected during data collection. An enterprise that reports persons employed and a considerable wage bill, but no operating revenue is unlikely to be truly inactive. When this situation is identified, the respondent is asked whether another CNPJ records the group's revenue. If the answer is yes, the CNPJ that concentrates the revenue is included in data collection and added to the take-all stratum in the following year's survey. A specific response code allows the legal unit that concentrates information on persons employed and wages to complete the questionnaire without reporting operating revenue.

Another challenge shared by IBGE and other national statistical institutes concerns the classification of gig-economy enterprises and the collection of data from them. IBGE's classification team is working with its international counterparts to improve the relevant classification standards. As these standards evolve, IBGE's economic survey teams will adapt the annual survey questionnaires accordingly.

[3] Simples Nacional is a Brazilian tax regime designed for micro and small enterprises. It combines several taxes into a single payment document and generally applies a lower effective tax rate. At the time of writing, the annual gross revenue ceiling is R$4.8 million

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