

BUSINESSMEN WHO GRADUATED AT CEFET-MT AND THE PROFILE OF THEIR COMPANIES

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ABSTRACT

This paper addresses a study that aimed to verify the professional activities of CEFET-MT graduates as businessmen. In the investigation, we implemented automated software to find graduates from 2002 to 2008, during the institution's existence in the academic system, and to locate company owners and partners in the Federal Revenue database. Subsequently, a data crossing and filtering application was executed, and the

results indicate that: 8.6% of CEFET-MT graduates became businessmen; most of them come from lato sensu postgraduate courses; their companies predominantly operate in the fields of engineering, computer science, and technical support; generally, these companies are related to the professional courses they completed; and their location prevails in Cuiabá, the capital of Mato Grosso.

KEYWORDS: Graduate Tracking, vocational training, performance in the working life.

EMPRESÁRIOS EGRESSOS DO CEFET-MT E O PERFIL DE SUAS EMPRESAS

RESUMO

Este artigo aborda uma pesquisa que buscou verificar a atividade profissional dos egressos do Cefet-MT como empresários. Na investigação, foi implementado um software automatizado que mapeou os egressos de 2002 a 2008, período de existência da instituição, no sistema acadêmico e que localizou os proprietários e sócios de empresas na base de dados da Receita Federal. Posteriormente, foi executado um aplicativo de cruzamento e filtragem dos dados coletados, cujos

resultados indicam que: 8,6 % dos egressos do Cefet-MT tornaram-se empresários; que a maioria deles é oriunda de cursos de pós-graduação lato sensu; que suas empresas atuam, predominantemente, na área de engenharia, informática e suporte técnico; que, de maneira geral, elas relacionam-se aos cursos profissionais que eles concluíram; e que a localização delas prevalece na capital de Mato Grosso, Cuiabá.

PALAVRAS-CHAVE: Acompanhamento de egresso, formação profissional, atuação no mundo do trabalho.

1 INTRODUCTION

The social function of educational institution establishments is constitutional and provided for in the Law of Guidelines and Bases of National Education (LDBN/1996). The evaluation of the performance of school institutions, about fulfilling their purposes with society, is carried out in several ways, one of which refers to the verification of the professional activity of their graduates in the world of work.

Among the strategies for monitoring graduates, the use of electronic forms available in an interactive institutional space commonly called the "Graduate Portal" is common, where graduates have access to services and benefits that allow them to stay connected to the educational establishment (Simon & Pacheco, 2017). Computer-Assisted Telephone Interviewing (CATI) is also another means adopted to obtain information about their experiences after completing their studies (Patrão & Feres, 2009), (Serviço Nacional de Aprendizagem Comercial, 2016). Other means of consulting graduates are the on-site application of questionnaires in their work environment and the sending of invitations, via email and social networks, for them to fill out electronic questionnaires made available via access links (Campos, 2020).

Despite such procedures for monitoring former students being common, they are not always efficient in collecting data, as they often do not have access and adherence to all of them and are still time-consuming. Faced with this limitation, monitoring graduates to verify their professional activities after their studies, for example, requires a faster consultation strategy with the greatest possible capacity to cover all of them.

Considering this demand, a broad investigation was carried out within the scope of the Research Group in Professional Education (GPEP), in the research line: Organization and memories of pedagogical spaces in Professional and Technological Education (EPT), of the Federal Institute of Education, Science and Technology of Mato Grosso (IFMT), which aimed to investigate the professional performance of graduates from one of the predecessor institutions of IFMT, in this case the Federal Center for Technological Education of Mato Grosso (Cefet-MT).

This article aims to present a section of this broader research, which aimed to verify the professional performance of Cefet-MT alumni as businessmen. This more specific study was developed in the project entitled "Software for mapping graduate students with entrepreneurial professional performance," funded by the Mato Grosso Research Support Foundation (Fapemat), via Public Notice No. 005/2021 - Women and Girls in Computing, Engineering, and Exact and Earth Sciences.

The Cefet-MT had its historical origin in the School of Apprentice Artisans of Mato Grosso (EAAMT) created in 1909, in Cuiabá/MT, and transformed into the Industrial School of Cuiabá (EIC), in 1942, which was configured as the Federal Technical School of Mato Grosso (ETFMT), in 1965. As Kunze and Ferreira (2022) emphasize, in the 1990s the Ministry of Education (MEC) created the National Technological Education System encouraging the transformation of technical and agricultural schools into Cefets, and it was in this process that ETFMT became Cefet-MT, through a Presidential Decree of August 16, 2002, acquiring the status of college or university. Thus, it



offered in-person and distance learning (EaD) courses, graduate school (Specialization), higher technological education, technical high school, and initial continued training (Fic) until 2008, when it became the current Campus Cuiabá "Cel. Octayde Jorge da Silva" of IFMT, created by Law No. 11,892, of December 29.

The research in question, therefore, delimited the investigation of graduates from the period of Cefet-MT's existence, from 2002 to 2008, and chose as a source of study the database of students in the institutional academic system. To verify their professional performance as businessmen, the source of study used was the National Registry of Legal Entities (CNPJ), available on the official website of the Federal Revenue Service (Ministry of Finance, 2025). In this process, software was implemented to automate data collection in the two research sources and, subsequently, the Microsoft Power Bi application was used to cross-reference and filter the information collected.

Next, the details of these methodological procedures executed, and the results obtained will be presented, which outline Cefet-MT graduates working professionally as businessmen and the main characteristics of their companies.

2 METODOLOGY

The study developed was characterized as documentary research, as it approached institutional archives with documentation in digital format (Gil, 2017), aided by procedures from the area of computing, with emphasis on software engineering (Wazlawick, 2020).

Although the study dealt with data from human beings, it was not necessary to submit it to a Research Ethics Committee of the National Commission on Ethics in Research on Human Beings in Brazil (CEP/CONEP), as it concealed the identification of the subjects researched and started from demands of the professional practice of the researchers, aiming to deepen their knowledge about institutional information (National Health Council, 2022).

The first research source consulted was the academic system used by ETFMT, Cefet-MT, and IFMT called "QAcadêmico," developed by the company Qualidata as school data management software. This system has a feature that allows you to export your information into tabular text format files with comma-separated characters (CSV).

Obtaining student academic data occurred by activating the aforementioned functionality, which promoted the generation of 1 file containing 112,448 records, each of which was presented with the following information columns: cod_instituicao; desc_instituicao; sigla_curso; curso; ano_let_ingresso; periodo_let_ingresso; matricula; cod_matriz_curricular; desc_matriz_curricular; cod_habilitacao; desc_habilitacao; tipo_concomitancia; forma_ingresso; situacao_matricula; nome_aluno; nome_social; dt_nascimento; sexo; nome_pai; nome_mae; endereco; numero; complemento; bairro; cep; cidade; distrito; tel_residencial; tel_comercial; fax; celular; email; url; grau_instrucao; estado_civil; n_filhos; tipo_sanguineo; profissao; nacionalidade; naturalidade; etnia; reservista; csm; titulo_eleitor; zona_eleitor; estado_titulo_eleitor; cpf; identidade; n_termo_certidao_civil; necessidades_especiais; escola_fundamental;

ano_conclusao_fundamental; escola_medio; ano_conclusao_medio; escola_graduacao; ano_conclusao_graduacao; escola_pos_graduacao and ano_conclusao_pos_graduacao.

The analysis of the content of the generated file indicated inconsistencies in the information. The dt_nascimento column, for example, pointed to registration of incorrect data such as: 10/01/4197, 10/16/4976, 09/29/7982, ten equal to 01/01/1900 and 349 in blank. In addition, the columns nome_social, tel_comercial, fax, email, url, n_filhos, tipo_sanguineo, profissao, etnia, reservista, csm, titulo_eleitor, zona_eleitor, estado_titulo_eleitor, n_termo_certidao, necessidades_especiais, escola_fundamental, ano_conclusao_fundamental, escola_medio, ano_conclusao_medio, escola_graduacao, ano_conclusao_graduacao, escola_pos_graduacao were all blank. Other inconsistencies were also found in tipo_sanguineo, matricula, and sigla_curso. Therefore, such columns of information were disregarded, as this is the correct procedure to be adopted in studies of this nature, when inconsistent data are identified (Marques & Lima, 2002).

As the created file contained the registration of information from students of ETFMT, Cefet-MT, and IFMT, it was necessary to select only those referring to Cefet-MT students, so two filters were applied to the data set. The first was used in the "ano_let_ingresso" column and selected all records containing the years 2002 to 2008. The second filter was used in the "situacao_matricula" column and selected only the records containing the information "Concluído" and "Formado", indicating that the student completed the course workload and graduated. Thus, only those enrolled from 2002 to 2008 who presented the status of graduating and graduating during this same period were considered graduates. The result of the two filters presented a total of 3,104 Cefet-MT graduates.

The second research source consulted was a set of open data, organized into 40 CSV files, compressed in ZIP format and with a size of 5.84 GB, containing all CNPJs registered in Brazil. Available on the official website of the Federal Revenue Service of the Ministry of Finance, these files were accessed by downloading, the procedure of which is excessively time-consuming. Therefore, it was necessary to implement software in Python language to automate and accelerate this activity and the unzipping of files.

In the implementation of the software, the operating system executed independent Threads, which can be understood as execution lines, with distinct and simultaneous tasks, which allowed the parallelism of activities performed and provided approximately 75% reduction in the time of transfer and unpacking of files.

The verification of the 40 files accessed detected that 10 of them contained information on owners and partners of companies (individuals or legal entities) identified, respectively, by the number of the Individual Taxpayer Registry (CPF) or CNPJ. As the CPF is sensitive data, the Ministry of Finance discloses it in a uncharacterized format, hiding its first three and its last two digits with asterisks. Therefore, the recognition of Cefet-MT graduates, who are or were owners or partners of companies, occurred by identifying the six central digits of their CPFs that were contained in the

two research sources confronted. All steps of the methodological process executed are presented in Figure 1.

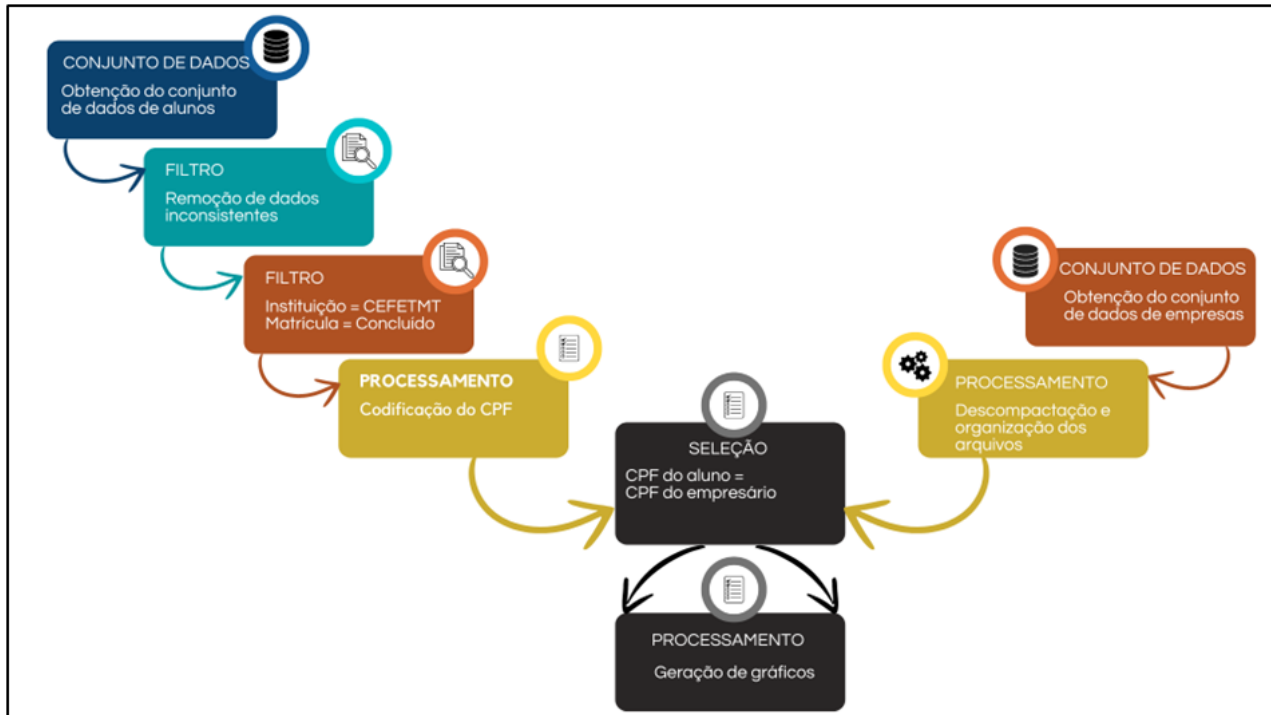


Figure 1: Schematic Diagram of the Research Methodology.

Source: Prepared by the authors.

The two data sets - graduates and companies - were then combined and analyzed using statistical techniques enabled by the Microsoft Power Bi application, the results of which will be presented below.

3 THE GRADUATES OF THE CEFET-MT

The analysis of the data collected from the first research source – the QAcadêmico System – indicated several inconsistencies in the records of information necessary to outline the socioeconomic profile of the graduates under study. As previously clarified, these inconsistencies had to be disregarded. Consequently, this section focuses on the most consistent data, allowing a restricted characterization by gender, nationality, and completed course.

During the period from 2002 to 2008, Cefet-MT provided complete educational training, from high school to graduation, to a total of 3,104 students, with 1,606 being female and 1,498 being male.

Regarding their nationality, 249 do not have any recorded origin, 2,738 are Brazilian, and 3 are foreign nationals, including 1 Argentinian, 1 Egyptian, and 1 Burundian. However, the latter's place of birth is registered as the Brazilian city of Cacoal, in the state of Rondônia, indicating an inconsistency, likely an error in the information registration. Additionally, 114 graduates have a

record only of their place of birth in a Brazilian city, denoting that they are Brazilian, like the individual identified as Burundian. Therefore, the total number of Brazilians is 2,853.

Some authors state that, in collaborative learning contexts, students benefit from having partners from different countries, as it increases the completion of their tasks and the development of their school activities without errors (Bowman et al., 2020). In this sense, the promotion of the presence of foreigners at Cefet-MT was not extensive, given the minimal number of them among the graduates with an identified origin in the school record.

Concerning the completed courses, the research verified that the alumni obtained training among 41 courses, offered at the headquarters of Cefet-MT, in Cuiabá, and in their respective Decentralized Teaching Units (Uneds), located in another neighborhood of the city, such as Bela Vista, and in the municipalities of Campo Novo dos Parecis and Pontes e Lacerda.

The Table 1 clarifies what these courses were, from high education to graduate courses. The names are presented as they were written in the QAcadêmico System, as well as the number of students who completed them during the period of institutional existence.

It is worth recalling that Cefet-MT experienced, in its short period of six years, the consequences of two professional education reforms promoted by the federal government. The first, established by Decree No. 2,208, of April 17, 1997, issued by the President of the Republic Fernando Henrique Cardoso, determined the separation between basic education and professional training in secondary education. Consequently, it had to offer the preparatory secondary education course and, separately, the modular technical courses in the concurrent or subsequent format (Brasil, 1997a). The second reform, instituted by Decree No. 5,154, of September 23, 2004, issued by the President of the Republic Luiz Inácio Lula da Silva, revoked the separatist decree and eliminated the duality previously imposed (Brasil, 2004). Thus, Cefet-MT started offering secondary education integrated with technical courses, in addition to subsequent technical courses, higher technology and undergraduate courses, and lato sensu postgraduate courses (specializations).

Table1: Number of CefetOMT Graduates from 2002 to 2008 by course name.

Nome do Curso	Número
Ensino Médio - Seriado	778
Técnico em Secretariado - Subsequente	346
Especialização em Educação de Jovens e Adultos	194
Técnico em Secretariado - Integrado	175
Técnico em Construções Prediais - Modular por Competencia (ep)	134
Técnico em Topografia e Geoprocessamento - Modular por	129
Guia de Turismo Regional - Seriado - Integrado	128
Técnico em Eletrotécnica - Subsequente	102

Tecnologia em Controle de Obras	99
Informática Integrado - Seriado - Integrado	97
EAD - Curso Superior de Licenciatura em Química	80
Tecnologia em Sistemas para Internet	70
Guia de Turismo Regional - Modular por Competencia (em)	68
Técnico em Telecomunicações - Subsequente	67
Técnico em Hotelaria - Modular por Competencia (ep)	65
Técnico em Informática - Modular por Competencia (ep)	59
Técnico em Eletrônica - Subsequente	53
Técnico em Edificações - Subsequente	51
Técnico em Geomensura - Semestral	43
Técnico em Eletrotécnica - Proeja	30
Técnico em Edificações - Proeja	29
Técnico em Refrigeração e Ar Condicionado - Proeja	26
Ead - Curso Superior de Tecnologia em Sistemas para Internet	25
Especialização em Educação Prof. e Tecnológica Inclusiva - Modular	25
Especialização em Gestão Pública Judiciária - Modular por	25
Especialização em Desenvolvimento Java - Modular por Competencia	21
Especialização em Gestão Ambiental	20
Especialização em Eng. de Seg. do Trabalho - Modular por	19
Gestão Ambiental - Modular por Competencia (ep)	18
Técnico em Refrigeração e Ar Condicionado	17
Tecnologia em Redes de Computadores	17
Ensino Médio - Modular por Competencia (em)	15
Especialização em Georeferenciamento	15
Técnico em Segurança no Trabalho - Modular por Competencia (ep)	14
Especialização em Redes de Computadores - Modular por	12

Especialização em Redes e Computação Distribuída	11
Especialização em Geoinformatização no Planejamento de Cidades - Tecnologia em Automação Industrial	7
Técnico em Turismo - Modular por Competencia (ep)	7
Especialização em Segurança da Informação em Sistemas Linux -	6
Técnico em Design de Móveis - Modular por Competencia (ep)	5
	2
The total number of graduates	3104

Prepared by the authors using data obtained from the QAcadêmico System in November 2023..
Note: The Cefet-MT graduates were considered to be enrolled students from 2002 to 2008 who had graduate status during that same period.

The data presented in Table 1 reveals educational trends and patterns in graduate education, highlighting the different areas and levels of knowledge covered by the courses they completed. The course with the highest number of graduates was "Ensino Médio - Seriado" (High School - Series), with 778 graduates, representing approximately 25.05% of the total. This indicates a tendency to offer this preparatory course in the institution's educational program, likely due to the dualistic reform implemented by Decree No. 2.208/1997 and possibly high local demand.

Additionally, a significant number of 1,114 graduates from various technical courses in different professional areas, offered separately from the preparatory high school in the subsequent format (619), such as "Técnico em Secretariado - subsequente" (Technical Secretary - subsequent) (346), and in the modular format (495), such as "Técnico em Construções Prediais - Modular por Competencia (ep)" (Technical in Building Constructions - Modular by Competence) (134), also demonstrates the strong separatist effect of the aforementioned decree.

The number of graduates from technical courses integrated with high school (400) and courses from the National Program for Integrating Professional Education with Basic Education in the Youth and Adult Education Modality (Proeja técnico) (85) - along the lines of "Técnico em Secretariado - Integrado" (Technical Secretary - Integrated) (175) and "Técnico em Eletrotécnica - Proeja" (Technical in Electrotechnics - Proeja) (30) - indicates the effect of the educational reform established by Decree No. 5.154/2004, which broke with duality and reinforced the institutional trend of comprehensive professional training at the technical level.

Regarding graduates from higher education courses, there is a concentration in technology courses (218), with an emphasis on computer science, such as "Tecnologia em Sistemas para Internet" (Technology in Internet Systems) (70), because only one undergraduate course was offered during the period - "EAD - Curso Superior de Licenciatura em Química" (EAD - Higher Education Degree in Chemistry) (80) - and no bachelor's degrees.

More significant than the higher education level was the number of graduates at the lato sensu postgraduate level (354), offered through specialization courses in diverse areas of

knowledge, with emphasis on education, such as "Especialização em Educação de Jovens e Adultos" (Specialization in Youth and Adult Education) (194) and "Especialização em Educação Prof. e Tecnológica Inclusiva - Modular por Competencia (ep)" (Specialization in Prof. and Inclusive Technological Education - Modular by Competence) (25).

The following will verify how many of these former Cefet-MT students have become businessmen.

4 THE BUSINESSMEN THAT GRADUATED AT CEFET-MT

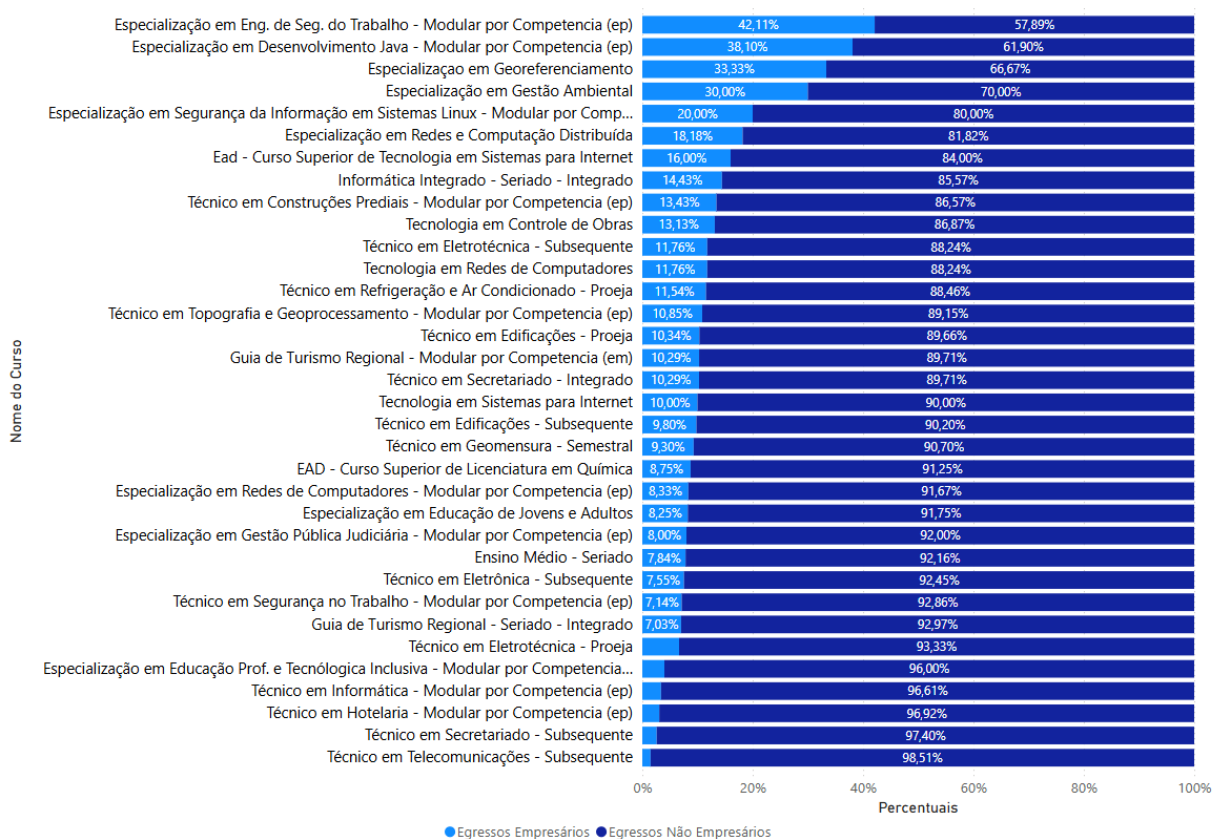
The institutional model of "Cefet" was redefined by Decree No. 2,406, on November 27, 1997, within the scope of that separatist reform of Vocational and Technological Education (EPT), as a professional education establishment specialized in qualifying and training workers for the economic sectors, with emphasis on the development of their entrepreneurial capacities (Brasil, 1997b). In this sense, the graduates of the various courses at Cefet-MT experienced training that fostered skills for the development of their own technological and innovative businesses, services, products, and processes, interconnected with the means of production.

The analysis of data collected from the second source of the research—the 10 files from the Federal Revenue Service—combined with those obtained from the first source—the QAcademic System—indicated that, among its 3,104 graduates, 267 (8.6%) entered the world of work developing businessperson professional activity, either as a sole proprietor, majority owner, or company partner.

Of this total of former students turned businessmen, 89 (33.3%) are female and 178 (66.7%) are male. These data further demonstrate that, despite Cefet-MT having trained more women (1,606), few of them (3%) became business owners, while this employment condition was higher (11.9%) among men (1,498).

Regarding their nationality, 240 (89.8%) are Brazilian, 1 (0.45%) is Argentinian, 1 (0.45%) is Egyptian, and 25 (9.3%) are part of that number of graduates (114) whose school records only state their place of birth as a Brazilian city. Thus, the total of 265 (99.15%) are considered Brazilian.

About the courses at Cefet-MT, of the 41 attended during the period, 34 (82.9%) were completed by the graduate businessmen. Graph 1 presents a comprehensive view of the proportion of these in the different educational paths.



Graph 1: Cefet-MT Courses with percentages of graduate businessmen and non-businessmen (2002-2008).

Source: Prepared by the authors with data obtained from the QAcadêmico system and the National Registry of Legal Entities (CNPJ), consulted in November 2023.

The percentages of graduates who chose to work in the business world as businessmen vary widely among the courses, with values ranging from 1%, as in the "Telecommunications Technician - Subsequent" course, to 42.11% in the case of the "Specialization in Occupational Safety Engineering - Modular by Competency (ep)" course.

It is noted that the specialization courses structured with modular curricula by competencies stand out in the percentages of graduates who become businessmen, followed by those that are non-modular and a higher EAD technology course. This result suggests that such courses may have given greater emphasis to the technical-practical character of the training through specific skills demanded by the productive scenario. Furthermore, the age factor may also have been decisive in this result, since the age group of self-business owners is concentrated, for the most part, above 30 years old, as indicated in the information from the CNPJs analyzed. Thus, it is perceived that there was a tendency for the professional courses at a higher education level, completed by older adults, to present higher percentages of former student businessmen compared to those at a previous education level.

In general terms, the propaedeutic high school courses, technical courses integrated with high school, the Proeja technical courses, and subsequent and modular technical education courses by competency presented the lowest percentages of graduates who implemented their own companies, despite having trained the largest number of students, as pointed out in Table 1.



Regarding the focus of the courses, it is verified that those focused on professional training in the areas of engineering, management, and information technology tended to generate a higher percentage of former student businessmen compared to those focused on other areas of qualification. Certainly, this intriguing disparity reflects the demands of the professional areas that most capture autonomous services, or startups, as well as the influence of their respective curricular designers in the development of skills that foster professional activities considered entrepreneurial.

The next section will address the main characteristics of the business establishments founded by the graduates of Cefet-MT

5 THE MAIN CHARACTERISTICS OF COMPANIES OF CEFET-MT GRADUATES

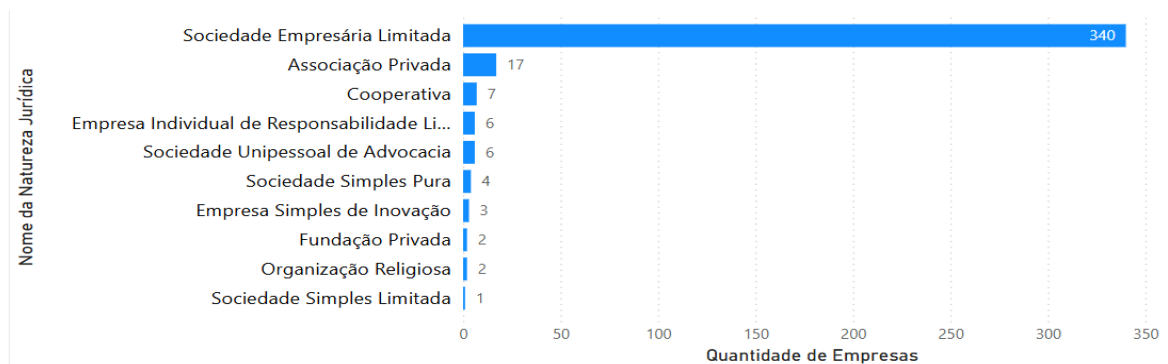
A company is an economic and legal organization, which can be composed of one or more people, with the objective of carrying out productive, commercial, or service-providing activities, aiming at profit. In Brazil, the Civil Code defines it as an activity professionally exercised for the production or circulation of goods or services.

The number of companies created by Cefet-MT graduates totaled 388, as verified by the combination of the CPF (Individual Taxpayer Registry) and CNPJ (National Registry of Legal Entities) data collected, respectively, in the first—QAcadêmico System—and in the second source of the research—10 files from the Federal Revenue Service. The difference of 121 more companies than the number of graduate business owners (267) occurs because some of them have corporate ties with more than one enterprise, as the Federal Revenue Service registers, separately, both the data of the headquarters, by its basic CNPJ, and those of the branches, by the CNPJ branch.

The legal typology of a company is represented by its legal nature, and this has its own legislation that must be followed by its owners. Graph 2, therefore, presents this typological characteristic of those (388) in whose corporate structure Cefet-MT graduates are part.

As verified, the "Limited Liability Company" typology stands out as the predominant legal structure with 87.6% (340), indicating an evident preference of former students for this business structure. Possibly, this choice reflects the advantages of this type of enterprise, such as the limited liability of partners and administrative flexibility, compatible with small businesses. It is further inferred that the predominance of this typology may be related to some adaptation of the graduates' choices to local regulations, the regional economic environment, or the economic implications that favor the sustainability and growth of this model.

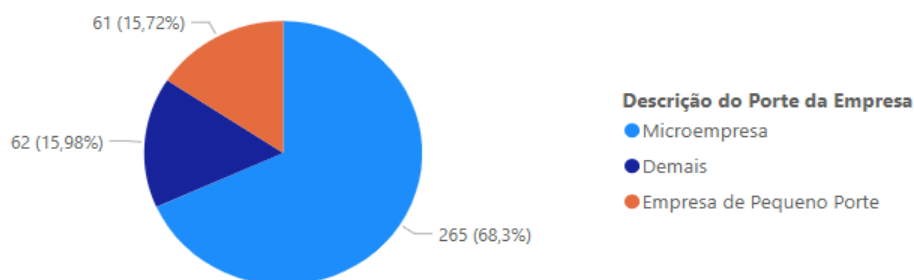
The other categories, such as the "Private Association," with 17 (4.3%) units, the "Cooperative," with 7 (1.8%), and the "Limited Liability Individual Enterprise," with 6 (1.5%), have significantly smaller quantities. This discrepancy suggests that such legal formats are more restricted to specific niches or economic sectors with well-defined characteristics.



Graph 2: Legal Nature of companies of Cefet-MT graduates.

Source: Prepared by the authors with data obtained from the QAcadêmico system and the National Registry of Legal Entities (CNPJ), consulted in November 2023.

As for the less frequent typologies, such as "Pure Simple Society," with 4 (1%) ventures, and "Private Foundation," with 2 (0.5%), they reflect a more specialized business model that is not as widely chosen by Cefet-MT graduates. Finally, it is observed that most of their entrepreneurial initiatives are aligned with the characteristics of micro or small businesses, as reinforced by Graph 3.



Graph 3: The size of companies of Cefet-MT graduates.

Source: Prepared by the authors with data obtained from the QAcadêmico system and the National Registry of Legal Entities (CNPJ) consulted in November 2023.

Regarding the size of the companies, Graph 3 reveals an absolute preponderance of micro-enterprises, which total 265 units (68.3%). This significant concentration shows that most of the businessmen trained by the institution chose to start businesses that require less initial capital and greater operational flexibility.

Following the analysis of this characteristic, it is verified that there is a similar proportion between the "Other" sizes, with 62 companies (15.98%), and the "Small Businesses," with 61 (15.72%). However, the "Other" sizes category has a lower representativeness in the total of the ventures (388) of the graduates when compared to those of small businesses and micro-enterprises together (326). Possibly, it encompasses medium and large-sized establishments or other more specific classifications.

The predominance of micro-enterprises indicates that the entrepreneurial profile of some of the Cefet-MT graduates was probably influenced by the nature of the courses they completed, consistent with the economic specificities of the local context.

The activities developed by companies in Brazil are specified according to the National Classification of Economic Activities (CNAE), and their registration with the Federal Revenue Service is done in two data sets that organize them into primary and secondary. Considering the excessive diversity of CNAEs in the records of the 388 business establishments of the Cefet-MT graduates, it was prioritized to verify the primary ones as they are sufficient to characterize their lines of business. Therefore, in the set of data collected in the second source of the research—the 10 files from the Federal Revenue Service—the existence of 127 distinct CNAEs was detected, indicating the main economic activity practiced by them.

The analysis of these reveals that there is a strong concentration of companies, representing 18.3% of the total, operating in the specialized service sectors in the areas of civil engineering, information technology, health, and food commercialization, whose quantity comprises: 20 of them in the "Engineering Services" branch; 17 in "Construction of buildings"; 14 in "Technical Support, Maintenance and Other Services in Information Technology"; 10 in "Outpatient medical activity restricted to consultations"; and 10 in "Retail trade of food products in general or specialized in unspecified food products."

There is also a balanced concentration of enterprises, representing 21.4% of the total, that operate with services in the branches of law, management, computing, health, architecture, and logistics, comprising: 9 in "Legal Services"; 8 in "Activities of intermediation and agency of services and businesses in general, except real estate"; 7 in "Municipal Road Transport of Cargo, excluding dangerous products and removals"; 7 in "Development of custom computer programs"; 6 in "Architecture Services"; 6 in "Retail trade of furniture"; 5 in "Dental activity"; 5 in "Unspecified associative activities previously"; 5 in "Activities of associations for the defense of social rights"; 5 in "Retail trade of clothing and accessories"; 5 in "Electrical installation and maintenance"; 5 in "Sales promotion"; 5 in "Combined office and administrative support services"; and 5 in "Training in professional and management development."

On the other hand, there is a low concentration of establishments, in the quantity of 1 to 4, which develop economic activities in diversified areas, such as specialized retail trade (jewelry, books, cosmetics, jewelry, etc.); support for education and health; maintenance of industrial equipment and vehicles, manufacture of specific products (furniture, cement, fabrics, etc.), which are equivalent to 234 (60.3%) of the total (388).

In general terms, the companies of the Cefet-MT graduates operate in broad economic branches, and their concentration in activities in the areas of engineering, computing, information technology, and management reflects their training in courses in these areas, which presented a higher percentage of graduates who became businessmen.

Regarding the location of their enterprises, Figure 2 indicates in which Brazilian states their headquarters are installed.

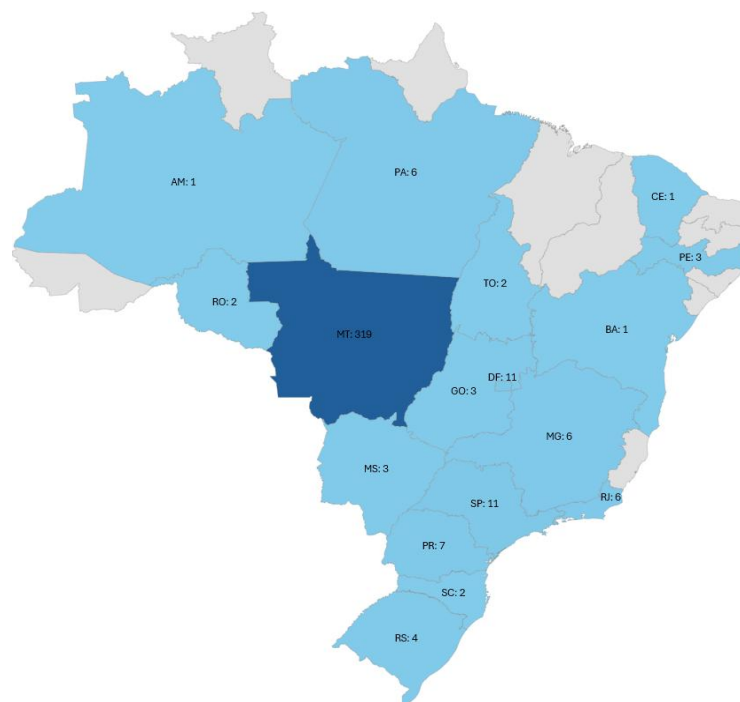


Figure 2: The number of companies of Cefet-MT graduates in Brazilian states, in November/2023.

Source: Prepared by the authors.

The data recorded in the Federal Revenue Service about the address of the companies of the former students of Cefet-MT, indicate that they are located between 17 states, including the Federal District, and 70 cities, including 13 state capitals and the capital of the country.

The state of Mato Grosso is the one that concentrates the largest number of them (319), with emphasis on its capital Cuiabá, which hosts 225, for the city of Várzea Grande with 31, Cáceres with 10 and Sinop with 8. The other 45 are distributed among 25 municipalities in the interior. The Federal District and the state of São Paulo, including their capitals, host a slightly higher amount (11) than the others. Other states such as Paraná with 7, Pará, Minas Gerais and Rio de Janeiro with 6 companies each, also have a relative prominence, but in considerably smaller magnitudes.

In general, the values reported in Figure 2 indicate that there is significant disparity in the location of establishments among Brazilian cities because they are concentrated in a single location, while in others they are substantially negligible and widely dispersed.

Finally, they demonstrate that the predominance of the companies of Cefet-MT graduates in Cuiabá/MT is a consequence of the institutional purpose of training professionals to act in meeting local demands and contribute to the economic development of the region. Furthermore, they point out that their dispersion, although smaller, in other locations in the country reflects the ability of graduates to explore opportunities beyond their professional training location.

6 FINAL CONSIDERATIONS

This research culminated in the identification of Cefet-MT alumni from the 2002 to 2008 cohort who are, or have been, part of the corporate structure of companies registered in Brazil.

The methodological procedures employed proved to be efficient in identifying former students who transitioned into businessmen.

The consultation and comparison of partial Cadastro de Pessoas Físicas (CPF) data — Brazilian individual taxpayer registry identification — present in the two accessed sources, namely the QAcadêmico System and the Cadastro Nacional da Pessoa Jurídica (CNPJ) — the Brazilian national registry of legal entities —, facilitated by automated data tracking and filtering software, represented an innovative approach and highlights the contribution of technological tools to educational research.

The findings indicate that the proportion of graduates who became businessmen was negligible, accounting for only 8.6% of the total (3,104). Furthermore, most of these businessmen were male, underscoring the existing gender inequality in business and emphasizing the importance of promoting greater encouragement and support for female participation in the business world across all levels.

The majority of alumni originated from *lato sensu* postgraduate programs (specializations), notably in the fields of engineering and computing. This suggests that advanced professional training and greater maturity may be influential factors in the entrepreneurial career path selection.

The enterprises founded by these alumni are characterized by diverse legal structures, with a predominance of "Limited Liability Company" (Sociedade Empresária Limitada) structures (87.6%); varying sizes, with a prevalence of micro-enterprises (68.3%); and different branches of the Classificação Nacional de Atividades Econômicas (CNAE)—the Brazilian national classification of economic activities—, primarily concentrated in service sectors related to engineering and architecture, information technology, healthcare, management, and law, demonstrating alignment with their academic backgrounds. These enterprises are geographically dispersed throughout the country, although Cuiabá/MT hosts the largest concentration of them (58%).

Consequently, the prevalence of small ventures with lower initial capital requirements suggests a preference among alumni for more viable alternatives and for legal structures that offer enhanced security and administrative flexibility. The diversity in the branches of their businesses, with a predominance of those corresponding to the areas of their completed courses, suggests that their educational and professional training contributed to the versatility of their entrepreneurial activities. Finally, the geographical dispersion of their companies, although concentrated in Cuiabá/MT, highlights their capacity for professional mobility and the exploration of opportunities in different regions of the country.

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